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Interventions to prevent obesity in children aged 5 to 11 years old

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Abstract

Background

Prevention of obesity in children is an international public health priority given the prevalence of the condition (and its significant impact on health, development and well-being). Interventions which aim to prevent obesity involve behavioural change strategies that promote healthy eating and/or physical activity which work by reducing energy intake and/or increasing energy expenditure, respectively.

Objectives

The primary objectives are to evaluate the effects of interventions that aim to modify dietary intake or physical activity, sedentary behaviour, sleep, play and/or structured exercise, or a combination of both, on changes in zBMI score, BMI and serious adverse events among children. The secondary objectives are to collect information to explore if, how, and why the effectiveness of interventions on zBMI/BMI varied on factors related to health inequity and to collect information about the costs of interventions to enable use of the review as a source of information to inform economic analyses.

Search methods

We used standard, extensive Cochrane search methods. The latest search date was February 2023.

Selection criteria

Randomised controlled trials of dietary and/or activity interventions that aimed to prevent overweight or obesity in children and young people aged 5 to 11 years, reported outcomes at a minimum of 12 weeks post-baseline and targeted children in the general population.

Data collection and analysis

We used standard Cochrane methods. Our outcomes were BMI, age- and sex-standardised BMI (zBMI), BMI percentile and serious adverse events. We used GRADE to assess the certainty of the evidence for each outcome.

Main results

We included 172 studies (189,707 participants), of which 149 (160,267 participants) were included in meta-analyses. Studies were based mainly in high-income countries such as the USA and in Europe, 13% were in upper middle-income and 2% in lower middle-income countries. Most of the studies compared an intervention involving strategies to improve both dietary intake and activity levels with a control group. Interventions were mostly delivered at school, with some being delivered at home, in the community or within a primary care setting. Most interventions were implemented for less than 9 months with the shortest intervention conducted over one visit and the longest over 4 years.

Dietary interventions versus control

Dietary interventions compared with control may have little to no effect on BMI at short-term (12 weeks to < 9 months from baseline; MD 0, 95% CI -0.10 to 0.10; 5 studies, 2107 participants; very low-certainty evidence), medium-term (9 months to < 15 months from baseline; MD -0.01, 95% CI -0.15 to 0.12; 9 studies, 6815 participants; low-certainty evidence) follow-up or BMI and zBMI at long term follow-up (15 months from baseline or more ;BMI: MD -0.17, 95% CI -0.48 to 0.13; 2 studies, 945 participants; zBMI: MD -0.05, 95% CI -0.10 to 0.01; 7 studies, 5285 participants low-certainty evidence).

Dietary interventions compared with control, probably do not reduce zBMI at short- or medium-term follow-up (short-term: MD -0.06, 95% CI -0.13 to 0.01; 8 studies, 33695 participants; or medium-term: MD -0.04, 95% CI -0.10 to 0.02; 9 studies, 7048 participants; moderate certainty evidence).

Activity interventions versus control

Activity interventions compared with control, do not reduce BMI and zBMI at short-term or long-term follow-up (BMI short-term: MD -0.02, 95% CI -0.17 to 0.13; 14 studies; 4069 participants; zBMI short-term: MD 0.02, 95% CI -0.07 to 0.02; 6 studies; 3580 participants; low-certainty evidence; BMI long-term: MD -0.07, 95% CI -0.24 to 0.10; 8 studies; 8302 participants; zBMI long-term: MD -0.02, 95% CI -0.09 to 0.04; 6 studies; 6940 participants; low-certainty evidence). Activity interventions likely result in a slight reduction of BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI -0.18 to -0.05; 16 studies; 21286 participants; zBMI: MD -0.05, 95% CI -0.09 to -0.02; 13 studies; 20600 participants; moderate-certainty evidence).

Dietary and activity interventions versus control

Dietary and activity interventions compared with control may result in a slight reduction in BMI and zBMI at short-term follow-up (BMI: MD -0.11, 95% CI -0.21 to -0.01; 27 studies; 16066 participants; zBMI: MD -0.03, 95% CI -0.06 to 0.00; 26 studies; 12784 participants; low-certainty evidence) and likely result in a reduction of BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI -0.21 to 0.00; 21 studies; 17547 participants; zBMI: MD -0.05, 95% CI -0.07 to -0.02; 24 studies; 20998 participants; moderate-certainty evidence).

Dietary and activity interventions compared with control do not reduce BMI and zBMI at long term follow-up (BMI: MD 0.03, 95% CI -0.11 to 0.16; 16 studies; 22098 participants; zBMI: MD -0.02, 95% CI -0.06 to 0.01; 22 studies, 23594 participants low-certainty evidence).

Of 36 studies reporting data on serious adverse events, only six observed such events; three reported injuries and other medical illnesses requiring a visit to a medical care provider; one reported a small number of cases of headache, allergy, behavioural problems and abdominal discomfort; one study reported a few cases of dizziness during baseline venipuncture; one study reported one case of mortality, although it was not reported if related to the intervention or participation in the trial.

Heterogeneity was apparent in the results from all outcomes at the three follow-up times, which could not be explained by main setting of the interventions (school; home; school and home; other), country income status (high income vs non-high income), participants socioeconomic status (low vs mixed) and duration of the intervention. Most studies excluded children with a mental or physical disability.

Authors' conclusions

The body of evidence in this review demonstrates that a range of school-based physical activity interventions, alone or in combination with dietary interventions, can have a modest beneficial effect on obesity in childhood at short- and medium-term, but not at long term, follow-up. Diet interventions alone may result in little to no difference. Limited evidence of low quality was identified on the effect of dietary and/or activity interventions on adverse effects and health inequalities; exploratory analyses of these data suggest no meaningful impact. A dearth of evidence was identified for home and community-based settings (e.g. delivered through local youth groups), for children living with disabilities, and indicators of health inequity.

Plain language summary

Do dietary and activity strategies help prevent obesity in children aged 5 to 11 years?

Key messages

- Strategies for changing activity levels, or both activity levels and diet, of children to help prevent them developing overweight or obesity might be effective in making small reductions in body mass index (BMI) in children aged 5 to 11 years.

- There is very little information about whether the strategies resulted in serious harms (e.g. eating disorders) but from what we found there appears to be little or no effect.

- This change in BMI, when provided to many children across a whole population, is useful for parents concerned about their children becoming overweight as they move into adulthood and for governments in trying to tackle the problems of obesity through the life course.

Why is preventing obesity in children important?

More children are developing overweight and obesity worldwide. Being overweight as a child can cause health problems, and people may be affected psychologically and in their social life. Children that are overweight are likely to be overweight as adults and continue to experience poor physical and mental health. Indeed, childhood obesity is associated with type 2 diabetes and heart disease in adulthood and middle-age mortality.

What did we want to find out?

We wanted to find out if strategies to help people modify their diet or activity (or both) are effective at preventing obesity in children aged 5 to 11 years. We also wanted to find out if dietary and/or activity interventions were associated with any serious adverse events.

What did we do?

We searched many scientific databases to find studies that looked at ways of preventing obesity in children. We included studies aimed at children aged 5 to 11 years. We only included studies if the methods they were using were aimed at changing children's diet, or their level of activity (i.e. increasing physical activity or reducing inactive time) or both. We looked only for the studies that randomly placed people into groups receiving different strategies (which may include changing nothing). We looked at how well the studies were done and analysed them in sets of similar ones.

What did we find?

We found 172 studies that involved 189,707 children. The studies were based mainly in high-income countries such as the USA and in Europe, although 13% were in upper middle-income and 2% in lower middle-income countries. The majority of the studies compared an intervention involving strategies to improve both dietary intake and activity levels with a control group. Most interventions were implemented for less than 9 months with the shortest intervention conducted over one visit and the longest over 4 years. The majority of the studies declared non-industry funding, twenty- four studies (2%) were funded in part of wholly by industry (e.g., food suppliers, pharmaceutical industry and private healthcare services). Most strategies were tried in schools, though some were based in the home or other places. We found very few studies based in community settings such as youth groups.

Our analyses included results from 149 studies of 160,267 children. We found that children who were helped with a strategy to change their activity levels alone or in combination with a strategy to change their diet, may have their BMI reduced, compared to children who were not given any strategy. This means that these children may

have been able to reduce their weight by a small amount. In contrast, children who were helped with a strategy to change their diet only, did not have their BMI reduced.

Only a few studies reported any possible harms of the strategies, and no serious harms were identified in these.

What are the limitations of the evidence?

Our confidence in the evidence is moderate to very-low. However, it is difficult to be confident that funding more studies, at least more school-based studies, would produce a much higher level of confidence in the results.

Four main factors reduced our confidence in the evidence.

1. Results were very inconsistent across the different studies.

2. A lot of the studies had limitations in how they were done.

3. Studies were very small or there were not enough studies in of a similar type to be certain about the results.

4. Results from some studies are not reported and this may have an impact on the results of our analyses.

This review does not provide sufficient information to be able to assess how well strategies work for children with disabilities, or whether those implemented in community settings are effective.

How up to date is this evidence?

This review updates our previous review. The evidence is up to date to February 2023.

Summary of findings

Summary of findings 1

Dietary interventions versus control

Patient or population: children aged 5-11 years
Setting: all settings (school, home, school + home, others)
Intervention: dietary interventions
Comparison: control (no active interventions)

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With dietary interventions (mean difference)			
BMI short term (12 weeks from baseline to <9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0 points (0.1 points lower to 0.1 points higher)	2107 (5 studies)	+--- Very low[a]	There may be little to no difference in BMI
BMI medium term (9 months to <15 months)	Average BMI = 16.23	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.01 points lower (0.15 points lower to 0.12 points higher)	6815 (9 studies)	++-- Low[b]	There may be little to no difference in BMI
BMI long term (> 15 months)	Average BMI = 16.48	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.17 points lower (0.48 points lower to 0.13 points higher)	945 (2 studies)	++-- Low[c]	There may be little to no difference in BMI
zBMI short term (12 weeks from baseline to <9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.06 points lower (0.13 points lower to 0.01 points higher)	3695 (8 studies)	+++- Moderate[d]	Probably results in little to no difference in zBMI
zBMI medium term (9 months to <15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at short-term follow-up in the intervention group was, on average, 0.04 points lower (0.1 points lower to 0.02 points higher)	7048 (9 studies)	+++- Moderate[d]	Probably results in little to no difference in zBMI
zBMI long term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.05 points lower (0.1 points lower to 0.01 points higher)	5285 (7 studies)	++-- Low[f]	There may be little to no difference in zBMI
Serious adverse events	One study reported serious adverse events that may have occurred as a result of the intervention, including headache (none in intervention, 1% of the participants in the control group), allergy (1% in both the intervention and control group), behavioural problems (1% in the intervention and 0.5% in the control group) and abdominal discomfort (2% in both the intervention and the control group). Adverse events were reported by 21 non-completer participants as a reason to stop drinking the beverages and by 7 children who completed the study		1913 (5 studies)**	++-- Low[g]	

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short term; ~ 6 months), 9 (medium term; ~ 12 months) and 9.5 (long term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls; the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.

**Criteria for judging certainty in the evidence are reported in Appendix 1.

***Number of randomized participants.

EXPLANATIONS

[a]Downgraded one level due to imprecision (evidence from 2107 participants); one level due to inconsistency (low heterogeneity (I^2 0%, P =0.66) but point estimates and confidence intervals vary considerably); one level due to publication bias (results from one study are not reported and no information regarding the direction of the effect is reported; results that are ineligible for inclusion in the meta-analysis from one study show no evidence of effect of the intervention;results that are ineligible for inclusion in the meta-analysis from one study suggest a beneficial effect of the intervention. Meta-analysis of results from shows no evidence of effect of the intervention; the proportion of missing data is very large (52%) and there is potential for missing results to impact on the synthesised effect estimate);

[b]Downgraded one level due to inconsistency (moderate heterogeneity (I^2 43%, P=0.08) and point estimates and confidence intervals vary considerably); one level due to publication bias (data from one study that are ineligible for inclusion in the meta-analysis suggests a beneficial effect of the intervention; meta-analysis of results shows no evidence of effect of the intervention; the proportion of missing data is relativelly large (37.5%) and there is potential for the missing results to impact on the synthesised effect estimate);

[c]Downgraded one level due to imprecision (evidence from 945 participants); one level due to inconsistency (low heterogeneity (I^2 8%, P=0.3) but point estimates and confidence intervals vary considerably);

[d]Downgraded one level due to inconsistency (large heterogeneity (I^2 93%, P<0.00001) and point estimates and confidence intervals vary considerably);

[e]Downgraded one level due to inconsistency (large heterogeneity (I^2 80%, P<0.00001) and point estimates and confidence intervals vary considerably);

[f]Downgraded one level due to risk of bias (evidence contributing 50.2% of the weight is from four results at high risk of bias); one level due to inconsistency (substantial heterogeneity (I^2 67%, P=0.006) and point estimates and confidence intervals vary considerably);

[g]Downgraded one level due to imprecision (evidence is from 1913 participants) and one level due publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Abbreviations: CDC: Centers for Disease Control and Prevention; CI: confidence interval.

Summary of findings 2

Activity interventions versus control

Patient or population: children aged 5-11 years
Setting: all settings (school, home, school + home, others)
Intervention: activity interventions
Comparison: control (no active interventions)

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With activity interventions (mean difference)			
BMI short term (12 weeks from baseline to <9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.02 points lower (0.17 points lower to 0.13 points higher)	4069 (14 studies)	++-- Low[a]	There may be little to no difference in BMI
BMI medium term (9 months to <15 months)	Average BMI = 16.23	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.11 points lower (0.18 points lower to 0.05 points lower)	21286 (16 studies)	+++- Moderate[b]	Probably decrease BMI
BMI long term (> 15 months)	Average BMI = 16.48	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.07 points lower (0.24 points lower to 0.1 points higher)	8302 (8 studies)	++-- Low[c]	There may be little to no difference in BMI
zBMI short term (12 weeks from baseline to <9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.02 points lower (0.07 points lower to 0.02 points higher)	3580 (6 studies)	++-- Low[d]	There may be little to no difference in BMI
zBMI medium term (9 months to <15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.05 points lower (0.09 points lower to 0.02 points lower)	20600 (13 studies)	+++- Moderate[e]	Probably decrease BMI
zBMI long term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at long-term follow-up in the intervention group was, on average, 0.02 points lower (0.09 points lower to 0.04 points higher)	6940 (6 studies)	++-- Low[f]	There may be little to no difference in BMI
Serious adverse events	One study reported that dizziness during baseline venipuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of the study. No other adverse events were reported by students during the health examinations. Two minor ankle sprains occurred during the sessions of the program (9 months incidence risk: 0.4 %). One study reported that the incident rate of adverse events (e.g. musculoskeletal injuries) was 0.03 in Year 1 (20 mild; 3 moderate; 1 severe); 0.02 in Year 2 (4 mild; 6 moderate; 2 severe); and 0.01 in Year 3 (5 mild; 2 severe).		21278 (11 studies)**	+++- Moderate[g]	

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short term; ~ 6 months), 9 (medium term; ~ 12 months) and 9.5 (long term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls; the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.

**Criteria for judging certainty in the evidence are reported in Appendix 1.

***Number of randomized participants.

EXPLANATIONS

[a]Downgraded one level due to risk of bias (evidence contributing 46.6% of the weight is from six results at high risk of bias); one level due to inconsistency (large heterogeneity (I^2 86%, P<0.00001) and point estimates and confidence intervals vary considerably);

[b]Downgraded one level due to risk of bias (evidence contributing 32.3% of the weight is from six results at high risk of bias);

[c]Downgraded one level due to risk of bias (evidence contributing 56% of the weight is from six results at high risk of bias); one level due to inconsistency (substantial heterogeneity (I^2 64%, P=0.007) and point estimates and confidence intervals vary considerably);

[d]Downgraded one level due to inconsistency (moderate heterogeneity (I^2 35%, P=0.17) and point estimates and confidence intervals vary considerably); one level due to publication bias (results that are ineligible for inclusion in the meta-analysis from one study show no evidence of effect of the intervention; results fromto studies eare not reported and no information regarding the direction of the effect is reported. Meta-analysis show no evidence of effect of the intervention; the proprtion of missing data is relativelly large (35%) and there is potential for missing results to impact on the synthesised effect estimate);

[e]Downgraded one level due to inconsistency (moderate heterogeneity (I^2 48%, P=0.03) but point estimates and confidence intervals do not vary considerably);

[f]Downgraded one level due to risk of bias (evidence contributing 36.3% of the weight is from two resuts at high risk of bias); one level due to inconsistency (moderate heterogeneity (I^2 55%, P=0.05) and point estimates and confidence intervals vary considerably);

[g]Downgraded one level due to publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Summary of findings 3

Dietary and activity interventions versus control

Patient or population: children aged 5-11 years
Setting: all settings (school, home, school + home, others)
Intervention: dietary and activity interventions
Comparison: control (no active interventions)

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With dietary and activity interventions (mean difference)			
BMI short term (12 weeks from baseline to <9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.11 points lower (0.21 points lower to 0.01 points lower)	16066 (27 studies)	++-- Low[a]	May decrease BMI
BMI medium term (9 months to <15 months)	Average BMI = 16.23	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.11 points lower (0.21 points lower to 0 points)	17547 (21 studies)	+++- Moderate[b]	Probably decrease BMI
BMI long term (> 15 months)	Average BMI = 16.48	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.03 points lower (0.11 points lower to 0.16 points higher)	22098 (16 studies)	++-- Low[c]	There may be little to no difference in BMI
zBMI short term (12 weeks from baseline to <9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.03 points lower (0.06 points lower to 0 points)	12784 (26 studies)	++-- Low[d]	May decrease zBMI
zBMI medium term (9 months to <15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at short-term follow-up in the intervention group was, on average, 0.05 points lower (0.07 points lower to 0.02 points lower)	20998 (24 studies)	+++- Moderate[e]	Probably decrease zBMI

zBMI long term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.02 points lower (0.06 points lower to 0.01 points higher)	23594 (22 studies)	++-- Low[f]	There may be little to no difference in zBMI
Serious adverse events	Four studies reported occurrence of serious adverse events. In one study few adverse events and injuries were reported amongst the participants. Injuries were reported by 2 girls (11%) in the comparison group, and one girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by one girl (5.5%) in the comparison group, and 2 girls (9.5%) in the parent-targeted group. The authors reported that none of the above adverse events were judged by the Coordinating Center to be related to study participation, but the Center deemed 2 of the injuries to be possibly related to participation in the intervention. They also reported that an elevated cholesterol value was reported for one participant and notification was made to the family. In one study all-cause mortality was reported for 0.9% of the participants in intervention group, but it is not reported whether this was related to the intervention received; no other serious adverse events were reported. In two studies low levels of extreme dieting behaviour were observed in both the intervention and control groups		27882 (19 studies)	+++- Moderate[g]	

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short term; ~ 6 months), 9 (medium term; ~ 12 months) and 9.5 (long term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls; the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.

**Criteria for judging certainty in the evidence are reported in Appendix 1.

***Number of randomized participants.

EXPLANATIONS

[a]Downgraded one level due to risk of bias (evidence contributing 35.6% of the weight is from 12 results at high risk of bias); one level due to inconsistency (large heterogeneity (I^2 72%, P <0.00001) and point estimates and confidence intervals vary considerably);

[b]Downgraded one level due to inconsistency (large heterogeneity (I^2 74%, P<0.00001) and point estimates and confidence intervals vary considerably);

[c]Downgraded one level due to risk of bias (evidence contributing 48.7% of the weight is from seven results at high risk of bias); one for inconsistency (large heterogeneity (I^2 72%, P<0.00001) and point estimates and confidence intervals vary considerably);

[d]Downgraded one level due to risk of bias (evidence contributing 40.3% of the wegith isf rom 13 results at hgh risk of bias); one for inconsistency (substantial heterogeneity(I^2 58%, P=0.0001) and point estimates and confidence intervals vary considerably);

[e]Downgraded one level due to inconsistency (large heterogeneity (I^2 77%, P<0.00001) and point estimates and confidence intervals vary considerably);

[f]Downgraded one level due to risk of bias (evidence contributing 49% of the weight is from 12 results at high risk of bias); inconsistency (large heterogeneity (I^2=88%, P<0.00001) and point estimates and confidence intervals vary considerably);

[g]Downgraded one level due to publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Background

Population levels of overweight and obesity are a growing, major challenge throughout the world (WHO 2022; World Obesity Atlas 2023). The causes of this are complex: a 2007 foresight report from the UK government mapped over 100 interconnected factors, all of which contribute to the population prevalence of obesity (Government Office for Science 2007). These factors include macroeconomic drivers, biological factors, food supply and production, media, healthcare, built environment, transport and recreation, technology, early life experiences and education. These factors can operate differently in different people, and partially explain inequalities in childhood obesity. A good example is the relative cost of healthy food such as fruits and vegetables, which may be prohibitive for families on a low income (Power 2021).

The global evidence suggests that the prevalence of overweight and obesity in children started to rise at the end of the 1980s (Ng 2014). By 2010, 43 million children under five years of age were categorised as having overweight or obesity, with approximately 35 million of these children living in low- and middle-income countries (de Onis 2010). Internationally, childhood obesity rates continue to rise in some countries (e.g. Mexico, India, China, Canada), although there is evidence of a slowing of this increase or a plateauing in some age groups in some countries (WHO 2016; WHO 2017). In 2015, the World Health Organization (WHO) Commission on Ending Childhood Obesity found that childhood obesity is reaching alarming proportions, including obesity in children of primary school age, in many countries. The WHO posited that this posed an urgent and serious challenge (WHO 2016; WHO 2017). The Sustainable Development Goals, set by the United Nations in 2015,

also identify prevention and control of non-communicable diseases, including obesity, as core priorities (United Nations 2018). Obesity in childhood can be difficult to reverse through interventions (Al-Khudairy 2017; Mead 2017).

Children with obesity have poorer psychological well-being and elevated levels of cardio-metabolic risk factors (Sommer 2018). Obesity comorbidities, including high blood pressure, high blood cholesterol and insulin insensitivity, are being observed at an increasingly early age (Freedman 1999). Childhood obesity may also cause musculoskeletal problems, obstructive sleep apnoea, asthma and a number of psychological issues (NHS 2014; Papoutsakis 2013; Paulis 2014; Rankin 2016). Childhood obesity is associated with type 2 diabetes and heart disease in adulthood and middle-age mortality (PHE 2022; Umer 2017). Obesity itself tracks through to adulthood (Simmonds 2016), strengthening the case for primary prevention. Adult obesity is associated with increased risks for heart disease, stroke, metabolic syndrome, type 2 diabetes and some cancers (Bhaskaran 2014; Yatsuya 2010).Estimates of the economic impacts of obesity (adult and child) as a percentage of gross domestic product (GDP) range from 0.13% in Thailand (Pitayatienanan 2014) to 9.3% in the USA (Waters 2018). However, the methods used to estimate these costs vary between studies, and most studies use a health system perspective rather than a societal perspective. Recently, Okunogbe 2021 estimated current and future national economic impacts of obesity across a sample of heterogeneous contexts globally. They estimated that obesity cost between 0.8% and 2.4% of GDP in 2019 in the eight countries in their study (Australia, Brazil, India, Mexico, Saudi Arabia, South Africa, Spain and Thailand). Their projections revealed an increasing trend in obesity costs as a percentage of GDP over time, estimated to reach 2.4% of GDP in Spain and up to 4.9% in Thailand by 2060. They concluded that economic impacts of obesity are substantial and reach a similar magnitude in low-income and middle-income countries as in high-income contexts. A separate projection for England reports that halving childhood obesity by 2030 could save the National Health Service GBP 37 billion and wider society GBP 202 billion (Hochlaf 2020).

Children aged 5 to 11 years attend primary schools in most countries. Primary school years are a key period for weight gain, and are seen as a key setting for obesity prevention (NICE 2014). Most children have long-term and in-depth contact with primary schools (Clarke 2017; WHO 2021a), so they present key opportunities to undertake and observe obesity prevention behaviours. The school environment, policies, curriculum, extracurricular activities and personnel have the potential to influence children's lifestyle behaviours positively, and play an important role in instilling these behaviours. However, the other environments (in real life and virtual environments) in which children live and play also provide opportunities for intervention.

The potential for negative unintended consequences of obesity prevention interventions has received much attention. Whilst the risk of inducing or worsening eating disorders/disordered eating as part of an obesity prevention intervention remains small, when this does occur the results can be severe (Allen-Scott 2014). The shared aetiology of obesity and eating disorders has implications for the design of interventions to prevent childhood obesity. Researchers in both the obesity and eating disorder fields have proposed using an integrated approach to prevention that addresses the spectrum of weight-related disorders within interventions. The identification of risk factors that are shared between these weight-related disorders is an essential step in developing effective prevention interventions (Haines 2006).

The WHO Commission on Ending Childhood Obesity states that progress in tackling childhood obesity has been slow and inconsistent, and obesity prevention and treatment requires a whole-of-government approach in which policies across all sectors systematically take health into account, avoid harmful health impacts, and thus improve population health and health equity (WHO 2016; WHO 2017). Indeed, it is now acknowledged that tackling obesity requires a systems approach and policy initiatives across government departments that are joined-up (Rutter 2017).

The broader system that influences obesity has been elegantly described (Government Office for Science 2007) and is multi-level and complex in nature. Understanding this broader system allows us to identify points that could be reasonable targets for intervention development. Some of these points are upstream (e.g. policy environment) and some downstream (e.g. individual-level education), and some points in the system are more modifiable than others. Downstream interventions rely on individuals actively making a choice to consume a healthier diet or have a more active lifestyle. These types of interventions often simply provide education and information on a healthy diet or healthy physical activity levels, and rely on the individual child and family being willing and able to make these changes. Upstream interventions change policy or the environment in which the child lives (home, school, the wider environment), which makes consuming a healthy diet and being physical activity the easy choice (sometimes the only choice). Examples include mandatory food standards and guidance on physical education for schools, policies around marketing of foods with a high level of fat, salt or sugar (HFSS foods) which are targeted at children (including in supermarkets), town planning policies on mobile food and beverage vans close to schools, and the number and locations of takeaways on walking journeys experienced by children.

There is evidence that downstream interventions are more likely to result in intervention-generated inequalities (Adams 2016; Hillier-Brown 2014; McGill 2015). Importantly, the most successful approach to tackling childhood obesity is to develop and implement both upstream and downstream interventions. Experts have noted, in relation to Chapter 2 of the Childhood Obesity Plan for England, that the main focus of interventions relies on self-regulation at an individual level (downstream interventions), and that an equal focus on upstream interventions is also required if a step change in tackling childhood obesity is to be realised (Griffin 2021; Knai 2018). There is also evidence that the successful implementation of a whole-school approach, such as that used in the Nutrition-Friendly Schools Initiative (WHO 2021b**)**, is a key factor in the effectiveness of interventions to promote healthy eating for children aged 5 to 11 years. However, careful consideration should be given to how school culture can

and needs to be shifted, working with schools to tailor the approach and circumnavigate staff capacity issues, and building relationships within and outside the school gates to enhance sustainability (Daly-Smith 2020; Tibbitts 2021).

Description of the condition

Overweight and obesity are terms used to describe an excess of adiposity (or fatness) above the ideal for good health. Current expert opinion supports the use of body mass index (BMI) cut-off points to determine weight status (as healthy weight, overweight or obese) for children, and several standardised BMI (zBMI) cut-offs have been developed that account for the child's age and gender (Adab 2018; Bell 2018). Population monitoring of overweight and obesity is best done through use of BMI, but this measure has limitations at an individual level and, in children, zBMI is deemed to be more useful. Despite this, there is no consistent application of this methodology by experts and a variety of percentile-based methods are also used, which can make it difficult to compare randomised controlled trials (RCTs) that have used different measures and weight outcomes.

Overweight and obesity in childhood are known to have significant impacts on both physical and psychosocial health (reviewed in Lobstein 2004). Indeed, many of the cardiovascular consequences that characterise adult-onset obesity are preceded by abnormalities that begin in childhood. Hyperlipidaemia, hypertension, abnormal glucose tolerance, and type 2 diabetes occur with increased frequency in children with obesity (Freedman 1999). In addition, obesity in childhood is known to be associated with cardiovascular disease risk factors in adults (Umer 2017), underpinning the importance of obesity prevention efforts.

Health inequalities

Obesity results from a sustained positive energy imbalance, and a variety of genetic, behavioural, cultural, environmental and economic factors have been implicated in its development (reviewed in Lobstein 2004). The interplay of these factors is complex and has been the focus of considerable research. However, the burden of obesity is not experienced uniformly across a population, with the highest levels of the condition experienced by those (including children) most disadvantaged (Ballon 2018). In high-income countries there is a significant association observed between obesity and lower socio-economic status e.g. in the UK, Office for National Statistics & NHS Digital (NHS Digital 2020). In the UK, body mass trends during childhood were associated with local area deprivation in a large UK cohort, even when controlling for family socioeconomic circumstances (Staatz 2021). In a study of children aged six to nine years living in 24 countries in the WHO European region, an inverse relationship between the prevalence of childhood overweight/obesity and parental education was found in high-income countries, whereas the opposite relationship was observed in most of the middle-income countries (Buoncristiano 2021). In low-income countries the relationship is variable, and there appears to be a shifting of the obesity burden across socioeconomic groups and different patterns by gender (Jiwani 2019; Monteiro 2004). On this basis, we explored any reported effects of interventions by World Bank category high-, upper middle-, lower middle-, and low-income countries (World Bank 2021).

Description of the intervention

This review examines interventions aimed at preventing obesity, either as the primary aim of the intervention or one of the key aims of the intervention. These intervention may be implemented in any setting, though it is to be expected that most will take place in schools.

How the intervention might work

Interventions that aim to prevent childhood obesity seek to maintain an energy balance that is ideal for the healthy growth and development of the child. All such interventions work either by limiting the amount of energy (calories) consumed or by increasing the amount of energy expended (which includes basal metabolic rate, physical activity and other movement including sleep, and energy required for child growth), or by both limiting the amount of energy consumed and increasing the amount of energy expended. If sustained energy expenditure (normal metabolic demands plus cost of growth) exceeds energy consumed, the child may become malnourished. A severe energy deficit over a prolonged period in childhood, particularly during rapid periods of growth such as adolescence, may have serious negative consequences for growth and development, and these effects are potentially irreversible. Getting the balance of short-term effectiveness versus a more moderate, safer and sustained energy deficit in the context of childhood obesity prevention interventions 'right' remains a key public health challenge (Emmett 2015).

The safest and most reliable way to ensure an ideal energy balance in growing children is for the child to eat a healthy diet (low in fat and sugar) and be physically active. Most countries have age-specific recommendations for daily food and drink intakes, and physical activity levels. Most interventions that include a diet component promote a low fat or low sugar intake, or both, for example by replacing sugary drinks with water and high fat snacks with fruit and vegetables. Examples relevant for children include replacing sugar-containing beverages with noncaloric, artificially sweetened beverages (de Ruyter 2012) or water (Sichieri 2008; Stettler 2015), changes in the content of school packed lunch (Barnes 2021) or replacement of packed lunch with school meals reach in fruit and vegetable (Damsgaard 2014). Furthermore, intervention promoting healthy nutrition included

family's involvement in Community Supported Agriculture (Seguin-Fawler 2021), building school gardens (Davis 2021), school-based game play (Viggiano 2018) or telehealth dietitian consultation for families (Chai 2019).

Interventions that include a physical activity component promote sport and active leisure time activities, active travel, a reduction in sedentary behaviour, or a combination of these. Examples relevant for children include weekly afterschool physical activity sessions for mothers and daughters (Barnes 2015), school map out of route or track in their school grounds to encourage children to run or walk for 15 min a day (Breheny 2020), replacement of standard classroom sitting desks with sit-stand desks (Clemes 2020) or implementation of individual physical exercises during routine learning activities such as mathematics, spelling, and reading tasks in the classroom (de Greeff 2016). Most countries include physical education as part of the curriculum in schools.

Why it is important to do this review

Governments internationally are being urged to take action to prevent childhood obesity and to address the underlying determinants of the condition. To provide decision makers with high-quality research evidence to inform their planning and resource allocation, this review aims to provide an update of the evidence from RCTs designed to prevent childhood obesity. Previous work has highlighted that the current evidence base focuses mainly on individual-level interventions that are assessed via an RCT. Where possible, the totality of the evidence base should also capture studies that evaluate the effectiveness of upstream interventions (Nobles 2021), mindful of the fact that these types of interventions are not commonly assessed via an RCT because of the design challenges at scale. There has been considerable growth in the number of studies in this field over the last five to 10 years. Importantly, many of the relatively recent studies we have identified have reported data on inequalities and new evidence that could affect the recommendations. The burden of children with obesity was exacerbated in most countries during the Covid- 19 pandemic. Indications in a number of countries show that the rising levels of childhood obesity (www.worldobesity.org/) also increased health inequalities. In some countries, particularly low-income countries, the double burden of malnutrition (obesity and undernutrition) has risen sharply during the pandemic (IFPRI 2020; Zemrani 2021). Those responsible for public health in all regions of the world, countries, and local communities are planning (and then implementing) their Covid-recovery strategies. As such, our public health policymakers' needs for cost-effective interventions to prevent childhood obesity that are scalable and feasible are more urgent than ever before. These interventions should then feed into a broader strategy that includes upstream interventions.

Objectives

Primary objectives

- to evaluate the effects of interventions that aim to modify dietary intake on changes in zBMI score, BMI and serious adverse events among children;
- to evaluate the effects of interventions that aim to modify physical activity, sedentary behaviour, sleep, play and/or structured exercise (i.e., movement behaviours) on changes in zBMI score, BMI and serious adverse events among children;
- to evaluate the combined effects of interventions that aim to modify both dietary intake and physical activity/movement behaviours on changes in zBMI score, BMI and serious adverse events among children;
- to compare the effects of interventions that aim to modify dietary intake with those that aim to modify physical activity/movement behaviours on changes in zBMI score, BMI and serious adverse events among children.

Secondary objectives

To collect information to explore if, how, and why the effectiveness of interventions on zBMI/BMI varies depending on factors related to health inequity, using the PROGRESS factors (O'Neill 2014).

- **P**lace of residence
- **R**ace/ethnicity/culture/language
- **O**ccupation
- **G**ender/sex
- **R**eligion
- **E**ducation
- **S**ocioeconomic status
- **S**ocial capital

To collect information about the costs of interventions to enable use of the review as a source of information to inform economic analyses.

Methods

Criteria for considering studies for this review

Types of studies

We included studies that:

- were individually-randomised, or cluster-randomised with at least three clusters per intervention arm (to allow some level of comparability between arms and to allow reasonable estimation of the intra-cluster correlation coefficient (ICC)). We included only the first period of any trials with a cross-over design (due to important concerns about carry-over effects);
- measured BMI at baseline and after the end of the intervention period (including collection of self-reported measurement); and
- included an active intervention period of any duration, provided that the studies reported follow-up outcome data at a minimum of 12 weeks from baseline (any intervention shorter than 12 weeks is less likely to result in a sustainable change in BMI).

We included studies written in any language. We excluded studies published before 1990, since global evidence suggests that the prevalence of overweight and obesity in children started to rise at the end of the 1980s (de Onis 2010; Ng 2014). Given the time lag between the conception, funding, and completion of RCTs, we considered a 1990 publication date as a pragmatic and reasonable starting point for the literature in the area. We excluded experimental, comparative studies that did not use formal randomisation (so-called "quasi-randomized studies").

Types of participants

We included children with a mean age of 5 years and above, but less than 12 years, at baseline. We applied this rule if an age-based subset of children from a trial including a wide range of ages was reported separately and fulfilled this criterion. We considered studies to include eligible children if they met any one of the following criteria:

- targeted children who are in the general population;
- included children who are part of a family group receiving the intervention, if outcome data can be extracted separately for the children;
- targeted children who are ‘at risk’ for overweight or obesity, for example because a parent is overweight or with obesity; or
- targeted children who are from specific place-based areas (e.g., of high deprivation) or specific settings (e.g., religious settings) where that population is known to have relatively low levels of physical activity, high levels of energy intake, high levels of obesity, or a combination of these factors.

In order to reflect a public health approach that recognises the range of weights of children and adolescents within the general population, RCTs that included participants with overweight or obesity were eligible, with the exception of RCTs that have an aim to treat obesity.

We excluded:

- RCTs that recruit only children and adolescents with overweight or obesity at baseline, because we consider these interventions to be focused on treatment rather than prevention; and
- RCTs of interventions designed for children and adolescents with a critical illness or severe comorbidities.

Types of interventions

Eligible interventions were those whose main aim was to change at least one factor from: diet, physical activity, sedentary behaviour, sleep, play or structured exercise to help prevent obesity in children.

Examples of interventions that were included in the review include the following.

- Interventions that provide opportunities for children to do more physical activity in school time (e.g., active lessons) so as to improve concentration in the classroom, and in the longer term, help prevent obesity.
- Interventions that alter the food environment within the school canteen (e.g., layout of food by kiosks) so as to make it easier to purchase healthier food items.
- Interventions that provide education to children and their families on how to have a healthier diet and to do more physical activity.
- Interventions that regulate how HFSS (high in fat, salt and sugar) foods are advertised to children within, and in close proximity to, educational settings.
- Digital interventions that are accessed by children on their smartphones that use interactive games to educate on nutritional value of certain food types.

We excluded studies of:

- interventions designed primarily to improve sporting performance (focused on strength and sport-specific fitness training);
- interventions designed to prevent obesity in people who are pregnant.

Setting

We included interventions in any setting, including the home, healthcare settings, schools and the wider community. We also included digital interventions. There is no single agreed definition of a digital intervention, and we operationalised it here as one that employs software, hardware and digital services (e.g., mobile health apps, wearable devices, telehealth and telemedicine, and personalised medicine) to help prevent childhood obesity.

Comparators

We included studies that compared an eligible intervention with a non-intervention control group who received no intervention or usual care, or with another eligible intervention (i.e. head-to-head comparisons).

Types of outcome measures

Primary outcomes

Our primary outcomes are:

- zBMI score, measured from weight and height of the children at least 12 weeks after randomisation and standardised to age-specific local or national tables for BMI;
- unstandardised BMI, measured from weight and height of the children at least 12 weeks after randomisation;
- BMI percentile, measured from weight and height of children at least 12 weeks after randomisation and standardised to age-specific local or national tables for BMI, and
- serious adverse events, defined as eating disorders, body dysmorphia disorder, body image disturbance or injuries sufficient to seek medical attention.

We consider zBMI to be more useful than BMI as a measure of body fatness in children. We also present results for BMI because zBMI is not reported in some studies, particularly older studies. We added BMI percentile as an outcome since writing the protocol, as we found studies reporting only this interpretation of BMI. In the event of presentation of multiple sets of data for zBMI or BMI, we followed the decision rules set out under Data extraction and management and Measures of treatment effect. We presented these main outcomes in the summary of findings tables.

We included zBMI, BMI and BMI percentile results taken from either measured or self-reported weight and height data. Serious adverse events were assessed as number of cases in each study.

Time points

We collected data from all reported post-intervention time points at least 12 weeks from baseline. We grouped data for analysis into three time periods: i) 12 weeks to < 9 months from baseline (short-term); ii) 9 months to < 15 months from baseline (medium-term; corresponding to approximately one school year); and iii) 15 months from baseline or more (long-term).

Secondary outcomes

There are no secondary outcomes.

Search methods for identification of studies

The search methods for this review (5 to 11 years) were built on, and are an update of, the literature searches and record screening activities, previously undertaken for the Cochrane review of children aged 0-18 years (Brown 2019). Because our eligibility criteria coincide with those of the Brown 2019 review, we updated but did not repeat their earlier searches. This review, and three other reviews covering children aged 0 to 2, 2 to 4, and 12 to 18 will replace and update the Brown 2019 review.

Electronic searches

For this review, studies were obtained from several different electronic searches, including updated searches from collaborators, an appended search of CENTRAL on the Cochrane Library and the inclusion of educational databases and grey literature.

Hodder update searches

Searches were conducted for an interim (non-Cochrane) update of the Brown 2019 review (Hodder 2022). The Hodder 2022 review sought records published from 2018 (the date of the last full search for Brown 2019) up to 23 March 2021, and also screened the records listed as ongoing and awaiting classification studies in Brown 2019. Details of the search strategies and methods of selection of studies can be found in Hodder 2022. They included

searches of Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO and trial registries.

New databases and grey literature searches

Database searches (September 2021)

We searched the following databases to update previous searches as mentioned above

(see section 2.1 in Appendix 2):

- Cochrane Central Register of Controlled Trials (CENTRAL; 2021, Issue 9) in the
- Cochrane Library (searched 26 September 2021);
- MEDLINE Ovid (23 March to 24 September 2021);
- Embase Ovid (23 March to 24 September 2021); and
- PsycINFO Ovid (23 March to 24 September 2021).

In addition, in September 2021 we searched the following education databases from 1990 onwards, to extend our reach compared with previous versions of the Brown 2019 and Hodder 2022 reviews (see section 2.4 in Appendix 2):

- Australian Education Index (AEI) ProQuest (1990 to 26 September 2021);
- British Education Index (BEI) EBSCOhost (1990 to 26 September 2021);
- ERIC (Education Resources Information Center) EBSCOhost (1990 to 26
- September 2021);
- Appended search of CENTRAL (1990 to 2021, Issue 9) in the Cochrane Library
- (searched 26 September 2021).

The appended search of CENTRAL (see sections 2.3 and 2.4 in Appendix 2 included search terms for interventions around the following topics of: marketing; beverages and sweetening agents; food labelling; school meals; after/out-of-school activities; parental interventions; public health; electronic apps and web-based interventions (backdated to 1990 onwards).

The decision to limit the appended search to CENTRAL only, was pragmatic, as Cochrane's Centralised Search Service (CSS) uses a highly efficient search strategy to capture reports of RCTs from MEDLINE and Embase (for inclusion in CENTRAL) (Noel-Storr 2020). Also, our full rolling search (run across all databases, all years to date) includes several generic 'prevention' search strings, to capture any type of intervention.

International trial registers

We searched the international trial registers (ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform, search portal (ICTRP)) via CENTRAL on the Cochrane Library.

Grey literature

We restricted the search of the grey literature to theses and dissertations and ran a pragmatic search for PhD theses (1990 onwards) on the following databases (see section 2.5 in Appendix 2):

- Proquest Dissertations & Theses Global (search.proquest.com/pqdtglobal/dissertations/) (1990 to 24 February 2022).
- Electronic Theses Online Service (EThOS) - British Library (ethos.bl.uk/Home.do) (1990 to 11 March 2022);
- DART - Europe e-theses Portal (dart-europe.eu/basic-search.php) (1990 to 31 March 2022).

Retractions and corrigenda

We ran a search for retractions and corrigenda (6 April 2022) (see section 2.6 in Appendix 2)

Search updates (February 2023)

From September 2021 to 7 February 2023, we ran automated weekly searches for new studies or additional reports of those already included, and screened the results. This search comprised a multifile search of Ovid MEDLINE, Embase and PsycINFO together with a search of CENTRAL on the Cochrane Library (see section 2.7 in Appendix 2. This search supersedes all previous searches of the four main bibliographic databases (MEDLINE, Embase, PsycINFO, CENTRAL) as it is far more sensitive, based on terms for condition and population only (plus a RCT filter) (no terms for intervention).

Searches of the education databases were manually updated on 7 October 2022. We regard the date of last search for this review as 7 February 2023 because, with the exception of the grey literature and education databases, this is the latest date that all other databases were searched.

Searching other resources

We scanned the references of the included studies reports to identify additional relevant records. We also screened the records that were classified as awaiting classification and ongoing by Hodder's team (obtained via personal communication with the authors).

Data collection and analysis

In successive sections, we only report the methods we used and the reader should refer to our protocol (Moore 2022) and Differences between protocol and review for pre-planned but unused methods.

Selection of studies

Two authors (FS, ET) screened titles and abstracts independently and in duplicate using Covidence systematic review software. They retrieved full-text articles of records that potentially meet the eligibility criteria and screened these independently and in duplicate. The two authors resolved any differences in opinion or uncertainty through a process of discussion and, when necessary, with involvement of a third author. We recorded the selection process in a PRISMA diagram (Page 2021).

Data extraction and management

We modified a data collection form for study characteristics and outcome data that was used in the Brown 2019 Cochrane Review of interventions to prevent obesity in children. Two review authors (FS, ET) piloted the form, then pair of authors (ET, FS, TM, SP, JS, CS, YG, FH, LW) extracted study characteristics and numerical data independently and in duplicate. We extracted the study characteristics listed in Appendix 3.

Where we were not able to extract desirable statistics directly (e.g. standard deviations of BMI), we computed or estimated these using the methods described in the Cochrane Handbook for Systematic Reviews of Interventions (Li 2019). We provide details of these imputation methods in section 4.2 of Appendix 4.

Furthermore, for studies that only report outcome data as prevalence of overweight/obesity (i.e. not BMI, zBMI or BMI percentile), we used the prevalence data to estimate mean zBMI. The estimation procedure assumes that zBMI in each study sample follows a normal distribution. We describe the methods in detail in section 4.1.3 of Appendix 4.

We examined serious adverse events only in the studies meeting the main eligibility criteria and we did not perform an additional search focusing on serious adverse events.

Assessment of risk of bias in included studies

We assessed the risk of bias (RoB) for all BMI, zBMI and BMI percentile results using the RoB 2 tool (Sterne 2019). RoB 2 is structured into five domains of bias: bias arising from the randomization process; bias due to deviations from intended interventions; bias due to missing outcome data; bias in measurement of the outcome; and bias in selection of the reported result. Judgement can be 'Low' or 'High' risk of bias, or can express 'Some concerns'. For cluster RCTs we used the version of the RoB 2 tool designed for studies using cluster randomisation (Eldridge 2021), which has an additional domain 'bias arising from the identification or recruitment of participants into clusters'. Judgements about risk of bias were determined using the algorithms in the tool, based on answers we gave to the relevant signalling questions. All assessments were managed using the RoB2 Excel tool available at https://sites.google.com/site/riskofbiastool/welcome/rob-2-0-tool.

We assessed risk of bias for the effect of assignment to the intervention for zBMI, BMI and BMI percentile, and only for specific results that contributed to meta-analyses. For studies with multiple intervention arms, we assessed risk of bias for each specific pairwise comparison contributing to meta-analyses.

For studies identified through new searches, two authors independently used the RoB 2 tool to carry out the assessments (ET, FS, JPTH, JS, TM). Results included in either the Brown 2019 Cochrane Review or the Hodder 2022 review had been assessed for risk of bias by two authors independently using the original Cochrane risk of bias tool (RoB 1) (Higgins 2011). We transformed these RoB 1 assessments into RoB 2 assessments as follows. One author (ET, FS) first completed an independent RoB 2 assessment (blind to the RoB 1 assessment). She then compared this with the previous RoB 1 assessment. Differences or uncertainties were resolved through discussion with a second reviewer (FS, ET) and, where necessary, by involving a third author (JPTH, JS, TM). Detailed answers to signalling questions for all outcomes are available in Figshare (doi).

To draw an overall conclusion about the risk of bias in a synthesised result across included studies, we used the methods set out in Table 14.2.a of the Cochrane Handbook for Systematic Reviews of Interventions (Schünemann 2019). We used our overall risk of bias assessment for each result in the review to inform GRADE (see Summary of findings and assessment of the certainty of the evidence) and for sensitivity analysis (see Sensitivity analysis).

Measures of treatment effect

We measured intervention effects on BMI, zBMI, and BMI percentile using an unstandardised mean difference (MD) between intervention groups and computed 95% confidence intervals. Most studies reported arm-level data rather than contrast level data. Where contrast level data were reported, they often arose from models that were either not fully explained or involved a high level of covariate adjustment. For these reasons, we used the arm level data (in preference to contrast level data) to calculate mean differences in the change of zBMI/BMI/BMI

percentile from baseline to post-intervention. In accordance with our prioritisation of arm level data, we calculated mean differences from (in order of preference) (i) post-intervention means adjusted for baseline values, (ii) mean change from baseline reported in the study (change scores), (iii) change from baseline calculated from unadjusted baseline and post-intervention means. In the absence of arm level data, we used contrast level data if it could be interpreted as a measure of mean difference in outcome change. We provide details of these calculations in section 4.1 of Appendix 4. For serious adverse events we intended to measure intervention effects using risk ratios where possible

Unit of analysis issues

We examined each cluster-RCT to determine whether the analysis accounted for clustering. For results that were not adjusted for clustering, we created an approximate analysis by inflating the standard error of the estimated intervention effect according to an estimated 'design effect' (Higgins 2019a). This required an estimate of the intra-cluster correlation coefficient (ICC), describing the relative variability within and between clusters. For studies that did not report an ICC we used an external estimate based on other cluster-RCTs in the review. Given the values of ICC reported in these other trials, we chose a value of ICC=0.02 for trials with clusters at the classroom and school level. We performed a sensitivity analysis with ICCs of 0 and 0.04. We chose not to adjust for clustering on the family level as cluster sizes were very small. We provide details of the cluster adjustment methods and choice of ICC in section 4.3 of Appendix 4.

Furthermore, we report all values of unadjusted and adjusted standard errors plus the data used to calculate them in supplementary data in Appendix 5.

We addressed RCTs with more than two intervention groups according to guidance in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins 2019a). For RCTs with more than two experimental (or comparator) arms relevant to the same meta-analysis, we combined the arms to create a single pairwise comparison. See section 4.2 of Appendix 4 for details. For cross-over trials we included only the first period, as pre-specified in our study protocol (Moore 2022).

Dealing with missing data

We examined the extent and reasons for missing participants data as part of the risk of bias assessment of each included RCT. We did not impute missing participants data. Missing summary data were handled as reported in sections 4.2.1.4 and 4.2.1.5 of Appendix 4.

Assessment of heterogeneity

We used the I-squared statistic to quantify the degree of inconsistency across results, supplemented by a P value from a test of homogeneity to measure the strength of evidence of statistical heterogeneity (Deeks 2019).

Assessment of reporting biases

We assessed risk of bias arising from (non)reporting bias and selective reporting bias using a preliminary version of the ROB-ME (Risk of bias due to Missing Evidence) tool (Page 2020), which is based on the framework described in the Cochrane Handbook for Systematic Reviews of Interventions (Page 2019). For meta-analyses with more than 10 studies this included examination of contour-enhanced funnel plots and the Egger test for funnel plot asymmetry.

Data synthesis

We performed meta-analyses of zBMI scores, BMI and BMI percentile using the generic inverse variance method with a random-effects model (Deeks 2019) and method of moments estimate of among-study variance. Our main comparisons are:

- dietary intervention versus no intervention/control;
- activity intervention (including those targeting sedentary behaviour, sleep, play and exercise) versus no intervention/control;
- intervention with both dietary and activity components versus no intervention/control;
- intervention with both dietary and activity components versus dietary intervention alone;
- intervention with both dietary and activity components versus activity intervention alone; and
- dietary intervention versus activity intervention.

We analysed the mean differences described in the Measures of treatment effect section. We analysed differences that were adjusted for clustering (including our own approximate adjustments) in preference to analyses that were not adjusted for clustering. Decision rules regarding which effect measure to extract and analyse, when multiple measures are presented, are described in the Data extraction and management and Measures of treatment effect sections. All the studies eligible for meta-analysis were included in the primary analyses.

Synthesis if data cannot be combined with meta-analysis

We supplemented the meta-analyses with comments about the potential impact of studies from which data were not suitable for inclusion in the meta-analyses.

Serious adverse events

Due to the diversity of measures used to define adverse events, and the sparsity of data for this outcome, we tabulated information about serious adverse effects and summarised the results narratively.

Subgroup analysis and investigation of heterogeneity

We explored heterogeneity in the primary analyses by performing the following pre-planned subgroup analyses according to study-level characteristics and participant-level characteristics:

- main setting of the intervention. This was coded as 'school'; 'school and home'; 'home'; or 'other'. After-school programmes were coded as 'school'. The 'other' category included settings such as community, web, health service and telehealth. Studies in mixed settings were coded according to the following rules:
    - school and other was coded as 'school',
    - home and other was coded as 'home',
    - school and home and other was coded as 'school and home', unless 'other' was clearly the main setting and the other elements were minor (e.g., intervention was carried out in a community setting but with some short homework tasks);
- duration of the intervention. This was coded as short (< 9 months), medium (9 months to < 15 months) and long (15 months or more). In multi-arms studies where the interventions had different duration, we used the mean duration to calculate the duration category.
- income status of country (high-income country vs non-high-income country, using World Bank criteria); and
- socioeconomic status (low vs mixed, based on categorisations as described by the trial authors).

- Tests for subgroup differences were based on standard heterogeneity tests as described in Chapter 10, section 10.11.3.1 of the Cochrane Handbook (Deeks 2019).

Sensitivity analysis

We performed sensitivity analyses to examine the robustness of our findings to inclusion of results assessed as being at high risk of bias by repeating analyses with such results omitted. No studies reported using self-reported measures of BMI/zBMI/BMI percentile, so this planned sensitivity analysis was not necessary. We investigated the impact of imputing ICCs in cluster-RCTs, as described in the section Unit of analysis issues.

Summary of findings and assessment of the certainty of the evidence

We prepared summary of findings tables for each of our main comparisons (i.e., dietary intervention vs control, activity interventions vs control and dietary and activity interventions vs control) using RevMan Web. Each summary of findings table summarises the size and certainty of effects of the interventions for BMI; zBMI and serious adverse events at short-, medium- and long-term follow-ups. We based our assessments of certainty on the five GRADE considerations (overall risk of bias, consistency of effect, imprecision, indirectness and publication bias) and the criteria that we have used are reported in Appendix 1. We followed the methods described in the Cochrane Handbook for Systematic Reviews of Interventions (Schünemann 2019).

Two authors worked independently to make GRADE judgements, resolving any disagreements by discussion. All decisions to rate down certainty in the results were justified using footnotes, with comments added to aid readers' interpretation of the tables. We documented and incorporated the GRADE judgements into reporting of results for each outcome.

Results

Description of studies

Results of the search

The study selection process is summarised in the PRISMA flowchart reported in Figure 1. From the studies included in the previous version of this review (Brown 2019) we identified 92 studies in the 5-11 age group. We included 82 of these, we excluded nine as they did not meet methodological eligibility criteria (see Excluded studies for further details) and one study is ongoing. From the update searches from Hodder 2022 we identified 132 studies in the 5-11 age group. We brought forward 113 studies: of these, we included 60, we excluded 19 (see Excluded studies for further details) and 53 studies are potential ongoing. From our new searches, after deduplication, two review authors screened 6121 records by title. From citation searching, 81 reports were identified and assessed for eligibility, therefore a total of 702 reportes were screened at full text; of these we excluded 508 reports of studies that were not eligible for inclusion in this review. We finally included 172 studies in our review, we also included three reports of two studies awaiting classification and 126 reports of 97 potential ongoing studies.

Included studies

Summaries of each of the 172 included studies are provided in the Characteristics of included studies. We summarised additional material relating to the study design, participants, intervention, setting, comparisons, serious adverse events, costing, PROGRESS characteristics and studies excluded from the meta-analyses in Table 1; Table 2; Table 3; Table 4; Table 5; and Table 6. Studies are ordered within these tables to correspond to the order in which they appear in subsequent forest plots.

Study design

Forty-six of the included studies were individually randomised (27%) and 126 were cluster randomised (73%; see Characteristics of included studies). Three of the cluster-RCTs were factorial design trials and three were nested cohort trials. The majority of included studies were 2-arm studies (n = 155, 90%), eight had 3 arms (5%), seven had 4 arms (4%), and two had 5 arms (1%). In most cluster-RCTs, the unit of allocation was the school (n = 64, 51% of the cluster-RCTs), in some it was the classroom (n = 16, 13%) or the family/household (12, 10%); in the remainder the unit of allocation was the after school programme or centre (n = 5, 4%); the community (n = 3, 2%); the primary care clinic (n = 2, 2%); the scout troop (n = 1, 1%); the school store (n = 1, 1%); the municipality (n = 1, 1%). In most RCTs the unit of allocation was the individual, however, in 18 studies (39% of the RCTs) the unit of allocation was the parent/child dyad.

Study setting

Details of the study setting in the included studies can be found in Characteristics of included studies. Most studies were conducted in North America (n = 79, 46%), with most of these in the USA (n =65; 38%); the remainder were conducted in Europe (n = 57, 33%), with 15 being conducted in the United Kingdom (9%); Australasia (n = 15, 9%); Asia (n = 15, 9%); South America (n = 6, 3%); the Middle East and North Africa (n = 6, 3%) (Figure 2). Based on the World Bank classification of countries by income, most studies were conducted in high-income countries (n = 146; 85%), 23 studies (13%) in upper-middle income countries, and three studies (2%) were conducted in lower-middle-income countries.

Participants

Details of the participants in the included studies can be found in Characteristics of included studies and Table 1.

In most of the studies the participants were a mix of genders (150 studies; 87%); 13 (8%) studies were conducted only in girls, and 3 (2%) only in boys. Fifty-five studies (32%) specifically target disadvantaged children and/or families in a particular setting (e.g., school/community/area) or a school or community within a disadvantaged area. In most studies (n = 159, 92 %), participants were selected from the general population, and in 13 studies (8%) participants from a specific subset of the population were selected: six studies only recruited participants at risk of developing overweight or obesity (based on their baseline weight status, or for having a parent that was with overweight or obesity), one study recruited participants among Hispanic immigrant families (study set in the USA), one study recruited children with at least one parent born in another country or children that were spoken to in a different language from that spoken in their home country in the first 3 years of life, one study recruited children from two different sociocultural and linguistic regions in Switzerland with a high proportion of migrant population; one study recruited participants at risk of chronic disease, one study recruited children considered as sedentary and moderate active, one study recruited healthy children aged 4–6 y daily consumers of ≥1 serving of whole-fat dairy, with >70% of their dairy consumed or prepared at home. In 76 studies (44%) children with physical disabilities were excluded and in 58 studies (34%) children with mental disabilities were excluded.

Interventions

Details of the interventions in the included studies can be found in Characteristics of included studies and Table 2. Most studies investigated one intervention against a control (n = 155, 90%). Of the 17 multi-arm studies, 11 studies (65% of the multi arm studies) compared versions of the same type of interventions against a control, two studies (12%) compared two types of interventions against a control, and four studies (24%) compared three types of intervention against a control. Four studies (2%) used a 2x2 factorial design so that these studies had 4 arms.

In 90 studies (52%) the intervention was reported to be based on one or more theories, the most common being the Social Cognitive Theory (n = 49, 28%) and the Social Ecologic Model (n = 18, 10%). The majority of the interventions were implemented for less than 9 months (n = 86, 50%), 47 interventions (27%) were implemented for a period between 9 and less than 15 months and 39 interventions (23%) were implemented for 15 or more months. Note that in one multi-arm study (Barnes 2021) two arms received the intervention for 9 months and one arm received it for 5-6 months. In this case the intervention duration was coded as short. The shortest intervention was a 5–10-minute counselling session during an initial dental visit and the longest was conducted for 4 years.

Most studies compared a combined dietary and activity intervention with a control group (n = 96, 56%); 50 studies (29%) compared an activity intervention with control and 28 (26%) compared a dietary intervention with control (Figure 2). One of the three-arm study compared both a dietary and an activity intervention with a control group. The other three-arm study compared both a dietary and activity intervention and a dietary intervention with a control group. All of the four-arm studies compared dietary intervention, activity intervention and dietary and an activity intervention with a control group. Eight studies reported head-to-head comparisons: six compared an activity intervention with a dietary and activity intervention; five compared an activity intervention with a

dietary intervention, and five compared a dietary intervention with a dietary and activity intervention. In six studies the comparison was between two versions of the same type of intervention: four compared two combined dietary and activity interventions, and two compared two activity interventions.

Most interventions were conducted in schools (n = 111, 65%); others were conducted in the community (n = 15, 9%), in the home (n = 8, 5%) or in a clinical setting (n = 7, 4%). Some interventions were conducted in more than one setting (n = 38, 22%). In 14 studies 98%), the interventions were exclusivelly or substancially online/digital interventions. Three interventions (2%) were delivered as telehealth (entirely or in combination with another setting). For the purpose of meta-analyses, we classified studies into the following subgroups according to the main setting of the intervention (i.e., the setting where most of the intervention was carried out): school (n = 115, 67%), home (n = 13, 8%), school + home (n = 11, 6%), other (n = 33, 19%) (Figure 2).

More details of some key characteristics of the interventions (ordered by type of intervention) are reported below.

Dietary interventions

Among the 28 studies in which dietary interventions were implemented: in six (21%) the intervention included a home activity (note that in three of these the intervention was partially set at home); in six studies (21%) the intervention was experienced by the children individually, in 15 studies (54%) it was experienced as a group and in seven studies (25%) it was experienced both individually and as a group. In only two studies (7%) the intervention was delivered electronically (either exclusively or significantly) and in four studies (14%) there was a minor component that was delivered electronically. Most of the studies (16, 57%) delivered multicomponent interventions (i.e., included three or more components). In 13 studies (46%) the intervention had an explicit component of modifying the child's behaviour, in 21 studies (75%) the intervention had an explicit component that provided education or information for the child, in 21 studies (75%) the intervention had an explicit component aiming to change the social environment of the child and in ten studies (36%) the intervention had an explicit component aiming to change the physical environment of the child.

Activity interventions

Among the 54 studies in which dietary interventions were implemented: in ten (19%) the intervention included a home activity (note that in only three of these the intervention was partially set at home); in four studies (7%) the intervention was experienced by the children individually, in 40 studies (74%) it was experienced as a group and in ten studies (19%) it was experienced both individually and as a group. In only two studies (4%) the intervention was delivered electronically (either exclusively or significantly) and in three studies (6%) there was a minor component that was delivered electronically. Only less than half of the studies (21, 39%) delivered multicomponent interventions. In 44 studies (81%) the intervention had an explicit component of modifying the child's behaviour, in 17 studies (31%) the intervention had an explicit component that provided education or information for the child, in 29 studies (54%) the intervention had an explicit component aiming to change the social environment of the child and in 20 studies (37%) the intervention had an explicit component aiming to change the physical environment of the child.

Dietary and activity interventions

Among the 100 studies in which combined dietary and activity interventions were implemented, in over half (57, 57%) the intervention included a home activity (note that only in 15 of these the intervention was set at home, either exclusively or partially); in 13 studies (13%) the intervention was experienced by the children individually, in 50 studies (50%) it was experienced as a group and in 37 studies (37%) it was experienced both individually and as a group. In only ten studies (10%) the intervention was delivered electronically (either exclusively or significantly) and in nine studies (9%) there was a minor component that was delivered electronically. The majority of the studies (84, 84%) delivered multicomponent interventions. In most of the studies (77, 77%) the intervention had an explicit component of modifying the child's behaviour, in 91 studies (91%) the intervention had an explicit component that provided education or information for the child, in 86 studies (86%) the intervention had an explicit component aiming to change the social environment of the child and in only 32 studies (32%) the intervention had an explicit component aiming to change the physical environment of the child.

Comparisons

Details of the intervention comparisons reported in the included studies can be found in Characteristics of included studies and Table 2. The nature of control groups varied across the 172 included studies. In the majority (n = 139, 81%), the comparison group was "no active intervention" (i.e. reported as no intervention, usual care, or waiting list comparisons). Some studies (n = 20, 12%) included an active control comparison in which the type of the intervention was not eligible for inclusion (e.g. 'friendship-building'/social support type activities; youth drug and alcohol prevention program; an oral health programme; a programme for improving self-esteem and social efficacy). As both "no active intervention" and "attention control" interventions were not expected to affect the outcomes, in the meta-analyses we coded such comparison as "controls". In six studies (3%) the comparison was made against the same type of intervention (four were dietary and activity interventions and two were activity interventions); in two studies the comparator had a minimal component of dietary and activity intervention, however, for the purpose of meta-analyses, we classified the comparator in these studies as control.

Outcomes

Details of all outcomes reported in the included studies can be found in Characteristics of included studies and Table 1; Table 2; Table 3; Table 4; Table 5. The most common measures of adiposity reported were BMI (n = 109, 63%), zBMI (n = 96, 56%), and BMI percentile (n = 26, 15%). Some studies reported only the proportion of

children who were with overweight or obesity (n = 11, 6%) and one study (1%) reported only the proportion of children who were with obesity Three studies (2%) reported adiposity data in other formats that were not eligible for inclusion in the meta-analyses. Thirty-six studies (21%) reported data on serious adverse events (Table 3), seven (4%) reported data on observed serious adverse events (e.g. injuries and other illness) that were related to participation in the study and one study reported one mortality case, however it is not reported whether this was related to the intervention.

Funding sources

Details of funding sources reported in the included studies can be found in Characteristics of included studies. The majority of the studies declared non-industry funding such as funding from not-for-profit charitable organisations and government institutes (n = 132, 77%). Twenty studies (12%) described mixed funding from both industry and not-for-profit organisations, four studies (2%) were funded wholly by industry, two studies (1%) declared that no funding was received, and fourteen studies (8%) did not report any details on funding. Mixed- and industry-funded studies received sponsorship from food suppliers (n = 13), pharmaceutical industry (n = 6), private healthcare services (n = 3), coal industry (n = 1), the manufacturer of the intervention videogames (n = 1), a home improvement retail corporation (n = 1), and the manufacturer of the stand-up desks used in the study (n = 1). Sixty-two studies (36%) declared that both research and writing of the trial reports had been done independently from the funders. Two studies (1%) reported evidence that writing, and research may not have been independent from the funding: one study reported that several of the authors were employed by the sponsor to create the program or to conduct the research or consulted with the Institute on the design or analysis; one other study reported that one of the sponsors participated in the study design.

Implementation factors

Economic information

Details of economic information reported in the included studies can be found in Table 4. Of the 172 trials identified, 78 studies (45%) mentioned resources associated with the trial or the intervention or referenced a linked economic evaluation. Of these, 15 studies either did not provide any cost values (e.g. “children received small incentives”) or noted that an economic evaluation will be conducted, but additional searches did not identify a linked analysis. Twenty-eight studies reported only trial-related costs. These were predominantly incentives participants received for data collection and participation and were received by participants in all study arms. These would not typically be included in an economic evaluation. In a further two studies it was unclear whether incentives were limited to one arm, therefore they could be considered either study-related or intervention costs (e.g. prizes for good behaviour).

Five studies reported a full economic evaluation within the trial paper. A full economic evaluation was defined as combining both costs and outcomes. The majority were cost-utility analyses, reporting cost per QALY ICERs. Other analyses were cost-effectiveness analyses (e.g. cost per % reduction in body fat or BMI units) or cost-benefit analyses. Just one study reported healthcare resource data, which comprised clinician time to deliver the intervention. No economic evaluations obtained participant data on healthcare resource use (e.g. GP visits). Four studies that were implemented in non-clinical settings included education sector costs that reflected school staff time for training and/or delivery of the intervention.

A total of 17 studies provided some intervention cost data but not a full economic evaluation or cost analysis. The data varied from an overall estimate (e.g. the cost of the intervention was €28 per month per child), a non-specific targeted payment (e.g. schools received a startup fund of NZ$15,000) to providing costs of individual components of the intervention (e.g. average meal cost was €1.50 , clinicians received payment of $35 per session). An evaluation of a nutrition intervention considered the economic burden for families, estimating changes in the cost of packed lunches. In the majority, the data was not sufficient to estimate the full cost of an intervention and provided just an insight into the costs involved. For almost all studies it was unclear who would fund the actual intervention outside of the trial setting.

Equity and disadvantage – PROGRESS characteristics

Details of PROGRESS characteristics reported in the included studies can be found in Table 5. The vast majority of the studies (n = 169, 98%) reported baseline data on at least one PROGRESS characteristic, with only three studies (2%) mentioning none of them. Data on place of residence were reported by 88 studies (51%); race/ethnicity/culture/language by 107 studies (62%); parent(s) occupation by 24 studies (14%); gender/sex by 166 studies (97%); religion by 4 studies (2%); parent(s) education by 67 studies (39%); socioeconomic status by 105 studies (61%); social capital by one study (<1%).

Forty eight studies (28%) reported on the impact of at least one PROGRESS characteristics on the effectiveness of the intervention (i.e. test for interaction, effect modification or subgroup analysis); the impact of place of residence was assessed in five studies (3%); the impact of race/ethnicity/culture/language was assessed in nine studies (5%); the impact gender/sex was assessed in 42 studies (24%); the impact of parent(s) education was assessed in seven studies (4%); the impact of socioeconomic status was assessed in 14 studies (8%). None of the studies reported on the impact of parent’s occupation.

Studies awaiting classification and ongoing

Two of the identified studies are awaiting classification and details are reported in Characteristics of studies awaiting classification. In one study (Larruy-Garcia 2022) it was unclear whether the mean age of the participants was > 5 years, and thus eligible for inclusion in our review and we were unable to obtain such information from

the authors. One study awaits translation (Widhalm 2022). We identified 97 potential ongoing studies (126 records) from Trial Registers, conference abstracts and published protocols and papers, and details are reported in Characteristics of ongoing studies. The papers of these studies which include BMI outcomes, when published if currently ongoing, will need to be reviewed to assess whether they fully meet the inclusion criteria of this review, before being included in future updates.

Of the 97 potential ongoing studies identified, 52 (54%) were conducted in North America, with most of these in the USA (n =45; 46%); the remainder were conducted in Europe (n = 15, 15%), with 3 being conducted in the United Kingdom (3%); Australasia (n = 5, 5%); Asia (n = 13, 13%); South America (n = 6, 6%); the Middle East and North Africa (n = 6, 6%). Based on the World Bank classification of countries by income, most ongoing studies were conducted in high-income countries (n = 73; 75%), 17 (17.5%) in upper-middle income countries, seven (7%) in lower-middle-income countries, and one study was conducted in across three countries (two lower-middle-income countries and one upper-middle income country).

The type of intervention was dietary in 22 studies (23%), activity in 14 (14%) and dietary and activity in 54 studies (56%); 4 studies (4%) were multi arms and reported on more than one type of intervention and in three studies the type of intervention is unclear. In 16 of the ongoing studies (16%) the interventions were mainly online/digital interventions, which is a higher percentage compared with the included studies (n = 14, 8%).

The main setting of these studies was school in 49 studies, home in 12 studies and community (some in primary care, church, and afterschool clubs) in 31 studies. The setting was mixed in 5 studies.

We note that many of the ongoing studies listed here were expected to complete data collection over 2 years ago, and for some this was over 5 years ago. We understand that the Covid pandemic may have impacted on planned intervention delivery and data collection, and on author's capacity to write up study findings for publication. For the next update of this review, where these study findings remain unpublished, we suggest that the study authors (the contact author and senior author, if they are different) are approached to ask for an update.

Excluded studies

Details of the 30 excluded studies we identified that were most likely to be considered eligible at initial reading are reported in Characteristics of excluded studies. From Brown 2019, we excluded nine studies: eight had fewer than 3 clusters of 5-11 year old children per intervention group (Coleman 2005; Herscovici 2013; Lubans 2011; Muckelbauer 2010; Reed 2008; Robbins 2006; Sallis 1993; Sevinc 2011) and one did not measure BMI at follow-up as required by our eligibility criteria (Christiansen 2013). We also excluded 18 studies from Hodder 2022 updated searches (six were included in the review and 12 were ongoing studies). Amonge the studies included in Hodder 2022, we excluded three studies due to ineligible study design (Madsen 2015; Meng 2020; Waters 2017) and three studies due to ineligible aim of the intervention (Madsen 2021; Polonsky 2019; Prina 2014). In Meng 2020, the participants in the control group were selected by a non-randomized method; in Madsen 2015, the participants aged 5-11 were recruited from only two clusters/group; Waters 2017 was a repeated cross-sectional study with a nested longitudinal subsample; in Madsen 2021 the intervention was around measurement and reporting of BMI measures to the children's parents; in Polonsky 2019 the intervention consisted of providing free breakfast, with main aims around improving nutritional intake and reducing hunger with a focus on behaviour, concentration and academic performance; in Prina 2014 the interventions examined different types of information given to parents on the weight status of their child. The interventions in Madsen 2021 and Prina 2014 raise awareness of the child's BMI and, while excluded from the current review, are potentially effective and useful policy interventions. Of the 11 studies that we excluded from the list of ongoing studies in the Hodder 2022 review, we excluded four studies due to ineligible study design (in Gruber 2015 and Mattos 2018 participants were assigned to the intervention by a non-randomized allocation; Beets 2014 was a repeated cross-sectional group randomized controlled trial; in NCT03069274 2017 the numbe rof cluster was <3 per group), six studies due to outcome of interest not being measured (Braun 2016; Braun 2019; NCT00061165 2003; NCT03469752 2018; NCT03479658 2018; NCT03885115 2019); one study due to ineligible population (NCT01845480 2013; the study targetted children living with overweight and obesity); one study (Parkinson 2015) due to ineligible aim of the intervention (i.e., to improve parents' recognition of their child's weight status).

We excluded 12 further studies identified by our database searches that were initially assessed as eligible, but which were deemed ineligible during data extraction. Six of these were excluded on the basis of study design: Allender 2021 and Jones 2020 are cross-sectional studies; in De Oliveira 2015, Dong 2021 and NCT05358444 2022 participants were assigned to the intervention by non-randomized allocation; in Perry 2021 the number of clusters was less than 3 per group. In Fernald 2009 the mean age at baseline was less than 5 years. In 5 studies our outcome of interest not measured (NCT03422926 2018; NCT04863040 2021; NCT04864574 2021; NCT05417347 2022; NCT05468216 2022). In one study the population was not eligible for inclusion (Fernald 2009; the age of the particiants at baseline as <5 years).

Risk of bias in included studies

Traffic light plots of RoB 2 assessments (domain-level judgments and overall) for each individual result are reported alongside each study result in the relevant forest-plots and risk of bias tables are located after the characteristics of studies sections. Since each of the 149 studies may have contributed to more than one meta-analysis, we assessed the risk of bias in 265 results. Overall, 11 results (4%) were at judged as "Low" risk of bias, 150 (57%) were judged as "Some concerns" and 104 (39%) were judged as "High" risk of bias. Most

judgements of high risk of bias were due to missing outcome data (n= 67, 25%) and randomization (and time of recruitment in cluster-RCT; n = 54, 20%). Supporting statements for each domain judgment are reported in the Risk of bias (tables) and detailed answers to signalling questions for all outcomes are available in Figshare (DOI to be generated).

Results of our assessments using the preliminary ROB-ME tool for risk of bias due to missing evidence are presented in Table 7. Thirty-nine meta-analyses were judged as "Some concerns" due to potential for missing studies that are likely to have eligible results (traditional publication bias). Twenty-eight of these meta-analyses had no missing results in the included studies; in 11 meta-analyses, results were missing from included studies, but we judged that the synthesized effect estimate would be unlikely to be impact by missing results. Four meta-analyses were judged at "High" risk of bias due to results being missing from the included studies that had the potential to impact on the synthesised effect estimate.

Effects of interventions

See Summary of findings table 1, Summary of findings table 2 and Summary of findings table 3.

Overview of evidence

We present the results by comparison, and within that by outcome, and within that by time point (short, medium or long term as defined in the Types of outcome measures section in the methods). Of the 172 studies included in this review, 149 studies (87%) were included in meta-analyses. Among these, 98 reported BMI, 90 reported zBMI, 22 reported BMI percentile and ten reported the proportion of children living with obesity or overweight (from which we derived zBMI if the sample size was over 100). For each outcome, we provide a summary forest plot presenting the results for all comparisons and all three timepoints. Forest plots displaying results of individual studies can be found in each comparison section. We focus on findings for average effects across studies within each subset. Importantly, heterogeneity was generally high across the analyses. We present findings from our pre-specified subgroup analyses and note that heterogeneity was generally not well explained by subgrouping factors.

Details of the 23 included studies not contributing to meta-analyses, and reasons why they did not contribute, are reported in Table 6. In three studies (2%), the results were reported narratively and in eleven studies (6%) the results reported were not usable for inclusion in the meta-analyses. We present findings from these studies alongside the meta-analysis results. In a further two studies (1%), outcomes were measured at follow up, but results are not reported, and in two studies (1%) measurement of the outcome(s) at eligible follow-up(s) was planned (e.g. listed in the trial registry and/or study protocol) but results are not reported (and we found no evidence that it was measured). In five studies (3%) the comparison was not eligible for inclusion in the meta-analysis (i.e. the comparison was between two versions of the same type of intervention). In addition to the excluded studies, we also report that evidence was missing for some time points from seven included studies (4%).

Dietary interventions versus control

We found 28 studies (42473 participants) that compared dietary interventions versus control and of these 24 studies (20410 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. We found that dietary interventions on average, compared with control, have little to no effect on BMI at short term (12 weeks from baseline to < 9 months) follow-up (MD 0 ; 95% CI: -0.10 to 0.10; I^2 0%, P=0.66; 5 studies; 2107 participants; very low-certainty evidence; Analysis 1.1), at medium (9 months to <15 months) follow-up (MD -0.01; 95% CI: -0.15 to 0.12; I^2 43%, P=0.08; 9 studies; 6815 participants; low-certainty evidence; Analysis 1.2) or at long term (15 months or more) follow-up but the evidence is very uncertain (MD -0.17; 95% CI: -0.48 to 0.13; I^2 8%; P=0.3; 2 studies; 945 participants; low-certainty evidence; Analysis 1.3). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6).

In addition to the studies included in the meta-analyses, one study (Hooft van Huysduynen 2014) reported the data narratively and found no effect of dietary interventions compared with control on BMI at short term follow-up (Table 6). Zota 2016 reported adiposity results as odd ratios of changing the weight status from overweight or obese classification to normal weight. The authors reported that children in the intervention group had 61 % higher odds of improving BMI from being with overweight or obesity to normal weight, when measured at a medium term follow-up. Two other studies measured the effect of dietary interventions on BMI at short term follow-up: Cunha 2013 measured BMI at both 6 months and at 9 months from baseline, however the results are for the group coefficient and group x time coefficient, and we were able to include only the results from the 9 months follow-up in our meta-analyses. In Marsigliante 2022 results suggests that the intervention may reduce adiposity, when compared with control, however, it is unclear whether the data reported are from BMI or percentile measurements and whether the authors reported a standard deviation or a standard error.

zBMI

Meta-analyses results for zBMI are reported in Figure 4. We found that dietary interventions compared with control, probably do not reduce zBMI at short term follow-up (MD -0.06; 95% CI: -0.13 to 0.01; I^2 93%; P<0.00001; 8 studies; 33695 participants; moderate-certainty evidence; Analysis 1.4), or medium term follow-up (MD -0.04;

95% CI: -0.10 to 0.02; I^2 80%; P<0.00001; 9 studies; 7048 participants; moderate certainty evidence; Analysis 1.5); furthermore, the evidence suggests that dietary interventions compared with control do not reduce zBMI at long term follow-up (MD -0.05; 95% CI: -0.10 to 0.01; I^2 67%; P=0.006; 7 studies; 5285 participants; low-certainty evidence; Analysis 1.6). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6).

In addition to the studies included in the meta-analyses, one study (Warren 2003**)** measured percentage of participants that were with overweight or obesity at the long term follow-up and found no effect of the intervention (Table 6). We excluded the results from this study from the meta-analysis because the sample sizes did not meet our threshold for implementing transformations from proportions to mean zBMI.

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We that dietary interventions compared with control have little to no effect on BMI percentile at short term but the evidence is very uncertain (MD 1.90; 95% CI: -3.44 to 7.24; I^2 49%; P=0.14; 3 studies; 394 participants; very low-certainty evidence; Analysis 1.7). Similarly, the evidence suggests that dietary interventions compared with control do not reduce BMI percentile at medium term (MD -0.94; 95% CI: -2.65 to 0.78; I^2 24%; P=0.27; 3 studies; 4363 participants; low evidence; Analysis 1.8) or long term (MD -1.49; 95% CI: -4.8 to 1.82; I^2 77%; P=0.04; 2 studies; 776 participants; low-certainty evidence; Analysis 1.9) follow-up. Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6).

Serious adverse events

Details of serious adverse events are reported in Table 3. Five studies (1913 participants) reported data on serious adverse events (de Ruyter 2012; Fulkerson 2015; Ickovics 2019; NCT00224887 2005; Nicholl 2021), and of these only one study (de Ruyter 2012) reported serious adverse events that may have occurred as a result of the intervention, including headache (none in intervention, 1% of the participants in the control group), allergy (1% in both the intervention and control group), behavioural problems (1% in the intervention and 0.5% in the control group) and abdominal discomfort (2% in both the intervention and the control group). Adverse events were reported by 21 non-completers as a reason to stop drinking the beverages and by 7 children who completed the study.

Activity interventions versus control

We found 50 studies (44020 participants) that compared activity interventions versus control and of these 43 studies (42615) participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. The evidence suggests that activity interventions on average, compared with control, do not reduce BMI at short term follow-up (MD -0.02; 95% CI: -0.17 to 0.13; I^2 86%; P<0.00001; 14 studies; 4069 participants; low-certainty evidence; Analysis 2.1) or at long term follow-up (MD -0.07; 95% CI; -0.24 to 0.10; I^2 64%; P=0.007; 8 studies; 8302 participants; low-certainty evidence; Analysis 2.3). In contrast there was evidence that activity interventions likely results in a slight reduction of BMI at medium term follow-up (MD -0.11; 95% CI: -0.18 to -0.05; I^2 16%; P=0.27; 16 studies; 21286 participants; moderate-certainty evidence; Analysis 2.2). Of the 16 studies included in the meta-analysis, six were at high risk of bias. Sensitivity analysis removing studies at high risk of bias did not materially change the results of the meta-analyses (Appendix 6) and funnel plots of BMI results at short term and medium-term follow-up did not show evidence of small-study effects (Appendix 7).

In addition to the studies included in the meta-analyses, three studies measured the effect of activity interventions on BMI at short term follow-up but the data were not eligible for inclusion in the meta-analyses (Table 6): in Di Maglie 2022 the authors reported a beneficial effect of the intervention but it is unclear whether the data reported are from BMI or percentile measurements and whether they reported a standard deviation or a standard error. Macias-Cervantes 2009 reported the BMI results as median (IQR) and found no effect of the intervention. Riiser 2020 reported the results as proportion of children with BMI <25 or BMI ≥25 and shows no effect of the intervention. One study, Tanskey 2017, measured BMI at short term and medium-term follow-up but results were not reported in a way that the results at short-term follow up were eligible for inclusion in the meta-analysis (regression coefficient for study group (relative to control) described as a factor associated with mean change in BMI expressed on a per month basis). Furthermore, two studies measured the effect of activity interventions on BMI at medium term follow-up but the data were not eligible for inclusion in the meta-analyses: in Salmon 2008 the authors showed that the intervention may result in a slight reduction in BMI, however, results are reported as BMI units of difference from the sex–age population median and we are unsure how to interpret the effect estimate; Pindus 2015 reported the BMI results as median (IQR) and found little to no effect of the intervention. Finally, Riiser 2020 reported the results at the long term follow-up as proportion of children with BMI <25 or BMI ≥25 and shows no effect of the intervention**.**

zBMI

Meta-analyses results for zBMI are reported in Figure 4. The findings reflect those for BMI. The evidence suggests that activity interventions, when compared with control, do not reduce zBMI at short term (MD 0.02; 95% CI: -0.07 to 0.02; I^2 35%; P=0.17; 6 studies; 3580 participants; low-certainty evidence; Analysis 2.4) or long

term (MD -0.02; 95% CI: -0.09 to 0.04; I^2 55%; P=0.05; 6 studies; 6940 participants; low-certainty evidence; Analysis 2.6) follow-up. In contrast, we found that activity interventions, when compared with control, likely results in a slight reduction in zBMI at medium term follow-up (MD -0.05; 95% CI: -0.09 to -0.02; I^2 48%; P=0.03; 13 studies; 20600 participants; moderate-certainty evidence; Analysis 2.5). Of the 13 studies included in the meta-analysis, five were at high risk of bias. Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6) and a funnel plot of zBMI at medium term follow-up did not show evidence of small-study effects (Appendix 7).

In addition to the studies included in the meta-analyses, Madsen 2013 reported the data narratively and found no effect of activity interventions compared with control on zBMI at short term follow-up (Table 6). Furthermore, three studies reported data that were not eligible to be included in the meta-analyses: Muller 2016 and Warren 2003 measured percentage of participants that were overweight or with obesity at the long term follow-up and found no evidence of effect of the intervention and some evidence of a beneficial effect of the activity intervention, respectively, compared with control. We excluded the results from these two studies from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to mean zBMI. Tanskey 2017, measured zBMI at short term and medium term follow-up but results were not reported in a way that the results at short-term follow up were eligible for inclusion in the meta-analysis (regression coefficient for study group (relative to control) described as a factor associated with mean change in BMI expressed on a per month basis). In one study, Salmon 2022, zBMI measurements were planned at short term follow-up but data are not reported, and we have no evidence that it was measured.

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. The evidence suggests that activity interventions, when compared with control, do not reduce BMI percentile at short term follow-up (MD -0.74; 95% CI: -4.1 to 2.62; 1 study; 27 participants; low certainty evidence; Analysis 2.7); furthermore, we found that activity interventions have no effect on BMI percentile at long term follow-up (MD -0.8; 95% CI: -2.74 to 1.13; I^2 19%; P=0.29; 3 studies; 860 participants; very low certainty evidence; Analysis 2.9) but the evidence is very uncertain. In contrast, we found that activity interventions, when compared with control, may reduce BMI percentile at medium term follow-up but the evidence is very uncertain (MD -2.26; 95% CI: -4.42 to -0.10; 1 study; 621 participants; very low certainty evidence; Analysis 2.9). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analysis (Appendix 6).

In addition to the studies included in the meta-analyses, Donnelly 2009 reported the data narratively and found no effect of activity interventions compared with control on BMI percentile at long term follow-up (Table 6). Furthermore, data from Pindus 2015 were not included in the meta-analysis: the authors reported the results as median (IQR) and found that the intervention may results in a slight reduction in BMI percentile at the medium term follow-up.

Serious adverse events

Details of serious adverse events are reported in Table 3. Eleven studies (21278 participants) reported data on serious adverse events (Breheny 2020; Ickovics 2019; Jones 2015; Ketelhut 2022; Martinez-Vizcaino 2014; Martinez-Vizcaino 2020; Martinez-Vizcaino 2022; Muller 2019; Wang 2018; Wendel 2016; Yin 2012). Of these, two studies reported occurrence of serious adverse events: Martinez-Vizcaino 2014 reported that dizziness during baseline venipuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of the study. No other adverse events were reported by students during the health examinations. Two minor ankle sprains occurred during the sessions of the program (9 months incidence risk: 0.4 %). Yin 2012 reported that the incident rate of adverse events (e.g. musculoskeletal injuries) was 0.03 in Year 1 (20 mild; 3 moderate; 1 severe); 0.02 in Year 2 (4 mild; 6 moderate; 2 severe); and 0.01 in Year 3 (5 mild; 2 severe).

Dietary and activity interventions versus control

We found 96 studies (109268 participants) that compared combined dietary activity interventions versus control and of these 88 studies (104663) participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in in Figure 3. We found that dietary and activity interventions on average, when compared with control, may result in a slight reduction in BMI at short term follow-up (MD -0.11; 95% CI: -0.21 to -0.01; I^2 72%; P<0.00001; 27 studies; 16066 participants; low-certainty evidence; Analysis 3.1). Of the 27 studies included in the meta-analysis, 12 were at high risk of bias. We also found that dietary and activity interventions, compared with control, likely results in a reduction of BMI at medium term follow-up (MD -0.11; 95% CI: -0.21 to 0.00; I^2 74%; P<0.00001; 21 studies; 17547 participants; moderate-certainty evidence; Analysis 3.2). Of the 21 studies included, six were at high risk of bias. In contrast, the evidence suggests that dietary and activity interventions on average, compared with control, do not reduce BMI at long term follow-up (MD 0.03; 95% CI: -0.11 to 0.16; I^2 72%; P<0.00001; 16 studies; 22098 participants; low-certainty evidence; Analysis 3.3). Sensitivity analysis removing studies at high risk of bias resulted in loss of evidence for a beneficial effect on BMI in the short term (MD -0.07; 95% CI: -0.21 to 0.07; 15 studies; 8788 participants) and medium term (MD -0.07; 95% CI: -0.19 to 0.06; 15 studies; 14183 participants) but did not change the overall results of the meta-analysis for BMI measured at the long term follow-up (Appendix 6). Funnel plots did not show evidence of small-study effects at any of the follow-up time (Appendix 7).

In addition, Anand 2007 narratively reported no effect of dietary and activity interventions compared with control on BMI at short term follow-up (Table 6). A further study, Lynch 2016, reported BMI results as median and found no effect of the intervention. In Gortmaker 1999 data are reported as proportion of children with obesity (where obesity status was calculated according to an index based on BMI and triceps skinfold measures), measured at long term follow-up; however BMI data are not reported. Also, in Treviño 2004, BMI was measured at the short follow-up and results are not reported. In one study, Liu 2022, BMI measurements were planned at long term follow-up but data are not reported, and we have no evidence that BMI was measured.

zBMI

Meta-analyses results for zBMI are reported in Figure 4. The evidence suggests that dietary and activity interventions, when compared with control, results in a slight reduction in zBMI at short term follow-up (MD -0.03; 95% CI: -0.06 to 0.00; I^2 58%; P=0.0001; 26 studies; 12784 participants; low-certainty evidence; Analysis 3.4); furthermore, dietary and activity interventions likely result in reduction of zBMI at medium term follow-up (MD -0.05; 95% CI: -0.07 to -0.02; I^2 77%; P<0.00001; 24 studies; 20998 participants; moderate-certainty evidence; Analysis 3.5). Of the 24 studies included in the meta-analysis, six were at high risk of bias. In contrast, the evidence suggests that dietary and activity interventions, when compared with control, do not reduce zBMI at long term follow-up (MD -0.02; 95% CI: -0.06 to 0.01; I^2 88%; P<0.00001; 22 studies; 23594 participants; low-certainty evidence; Analysis 3.6). Sensitivity analysis removing studies at high risk of did not change the overall results of the meta-analysis (Appendix 6) and funnel plots did not show evidence of small-study effects (Appendix 7) based on visual inspection and test for asymmetry.

In addition to the studies included in the meta-analyses, data from four studies were not eligible for inclusion in the meta-analyses (Table 6): in Johnston 2013, results are reported as odds of changing baseline weight status classification, and the authors found no effect of the intervention in to reduce the likelihood of normal-weight children to develop overweight or obesity, when compared with normal-weight children in the control group (OR: 1.66, ns). In Topham 2021 zBMI was measured at short term and long term follow-ups but data are reported as coefficient for 'intervention condition' from a random intercept model and we are only able to include in the meta-analyses the results at the long term follow-up. Warren 2003 measured percentage of participants that were overweight or with obesity at the long term follow-up and found no effect of the intervention compared with control (see dietary intervention vs control comparison for details of Warren 2003 ineligibility). In Huys 2020, zBMI at medium term follow-up was measured but results are not reported. In Carlin 2021 and Liu 2022, zBMI measurements were planned at short term and long term follow-up, respectively, but data are not reported, and we have no evidence that it was measured.

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found that dietary and activity interventions, when compared with control, likely do not reduce BMI percentile at short term follow-up (MD -0.73; 95% CI: -0.50 to 1.97; I^2 0%; P=0.58; 5 studies; 1036 participants; moderate-certainty evidence; Analysis 3.7); furthermore, we found that dietary and activity interventions, when compared with control, and have little to no effect on BMI percentile medium term (MD -0.64; 95% CI: -1.85 to 0.56; I^2 64%; P=0.008; 8 studies; 3823 participants; low-certainty evidence; Analysis 3.8) or long term follow-up (MD -0.67; 95% CI: -3.05 to 1.72; I^2 82%; P=0.0002; 5 studies; 1765 participants; very low-certainty evidence; Analysis 3.9) but the evidence is very uncertain. Sensitivity analysis removing studies at high risk of did not change the overall results of the meta-analysis (Appendix 6).

Serious adverse events

Details of serious adverse events are reported in Table 3. Nineteen studies (27882 participants) reported data on serious adverse events (Adab 2018; Beech 2003; Caballero 2003; Carlin 2021; Fulkerson 2022; Gortmaker 1999; Griffin 2019; HEALTHY Study Group 2010; Ickovics 2019; Kubik 2021; Li 2019; Liu 2019; Marcus 2009; NCT02067728 2014; Puder 2011; Ramirez-Rivera 2021; Sahota 2019; Williamson 2012; Xu 2015); of these, four studies reported occurrence of serious adverse events**.** In Beech 2003 few adverse events and injuries were reported among the pilot study participants in Memphis. During the 12-week intervention, injuries were reported by 2 girls (11%) in the comparison group, and one girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by one girl (5.5%) in the comparison group, and 2 girls (9.5%) in the parent-targeted group. The authors reported that none of the above adverse events were judged by the Coordinating Center to be related to study participation, but the Center deemed 2 of the injuries to be possibly related to participation in the intervention. They also reported that an elevated cholesterol value was reported for one participant and notification was made to the family. In Fulkerson 2022all-cause mortality was reported for 0.9% of the participants in intervention group but it is not reported whether this was related to the intervention received (reported in the trial registration results section); no other serious adverse events were reported. In Gortmaker 1999 and in the HEALTHY Study Group 2010 low levels of extreme dieting behaviour were observed in both the intervention and control groups.

Activity interventions versus dietary interventions

We found 5 studies (4891 participants) that compared activity interventions versus dietary interventions, and of these 4 studies (4673 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. We found activity interventions, when compared with dietary interventions, probably do not reduce BMI at medium term (MD -0.25; 95% CI: -0.55 to 0.06; I^2 0%; P=0.55; 2 studies; 1644 participants; moderate-certainty evidence; Analysis 4.1). We found no studies reporting BMI at short term or long term follow-up. Sensitivity analysis removing one study at high risk of bias did not change the overall results of the meta-analyses (Appendix 6).

zBMI

Meta-analyses results for BMI are reported in Figure 4. We found that activity interventions, when compared with dietary interventions, likely results in a slight reduction in zBMI at medium term (MD -0.11; 95% CI: -0.22 to 0.00; I^2 0%; P=0.52; 2 studies; 1644 participants; moderate-certainty evidence; Analysis 4.2). Of the two studies, one was at high risk of bias; sensitivity analysis removing this study did not change the overall result of the meta-analysis (Appendix 6). We found no studies reporting zBMI at short term or long term follow-up.

In addition to the studies included in the meta-analyses, data from one study were not eligible for inclusion in the meta-analyses Table 6). Warren 2003 measured percentage of participants that were overweight or with obesity at the long term follow-up and found little to no effect of the intervention compared with control (see dietary intervention vs control comparison for details of Warren 2003 ineligibility).

BMI Percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found that activity interventions, compared with dietary interventions, have little to no effect on BMI percentile at medium term follow-up, but the evidence is very uncertain (MD -0.04; 95% CI: -2.05 to 1.97; 1 study; 683 participants; very low-certainty evidence; Analysis 4.3). Furthermore, an activity intervention, when compared with a dietary intervention, may increase BMI percentile at long term follow-up (MD 2.30; 95% CI: 0.27 to 4.33; 1 study; 330 participants; very low-certainty evidence; Analysis 4.4), but the evidence is very uncertain. We found no studies reporting BMI percentile at short term follow-up.

Serious adverse events

Details of serious adverse events are reported Table 3. One study (756 participants) reported data on serious adverse events (Ickovics 2019), but they found that none occurred as a result of the intervention.

Dietary and activity interventions versus Dietary interventions

We found 5 studies (3288 participants) that compared dietary and activity interventions versus dietary interventions, and of these 4 studies (3070 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. We found that dietary and activity interventions, when compared with dietary interventions, likely do not reduce BMI at medium term (MD -0.16; 95% CI: -0.42 to 0.10; I^2 0%; P=0.45; 2 studies; 456 participants; moderate-certainty evidence; Analysis 5.1). We found no studies reporting BMI at short term or long term follow-up.

zBMI

Meta-analyses results for BMI are reported in Figure 4. The evidence suggests that dietary and activity interventions, when compared with dietary interventions, do not reduce zBMI at medium term (MD -0.03; 95% CI: -0.10 to 0.04; I^2 0%; P=0.89; 2 studies; 456 participants; low-certainty evidence; Analysis 5.2). We found no studies reporting BMI at short term or long term follow-up.

In addition to the studies included in the meta-analyses, data from one study were not eligible for inclusion in the meta-analyses Table 6). Warren 2003 measured percentage of participants that were overweight or with obesity at the long term follow-up and found little to no of effect of the intervention compared with control (see dietary intervention vs control comparison for details of Warren 2003 ineligibility).

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found that dietary and activity interventions when compared with dietary interventions have little to no effect on BMI percentile at medium term (MD -1.03; 95% CI: -0.94 to 3.00; 1 study; 705 participants; very low-certainty evidence; Analysis 5.3) or long term (MD -0.13; 95% CI: -2.12 to 1.86; 1 study; 304 participants; very low-certainty evidence; Analysis 5.4) follow-up, but the evidence is very uncertain. We found no studies reporting BMI percentile at short term follow-up.

Serious adverse effects

Details of serious adverse events are reported in Table 3. One study (756 participants; Ickovics 2019) reported data on serious adverse events, but they found that none occurred as a result of the intervention.

Dietary and activity interventions versus Activity interventions

We found 6 studies (3443 participants) that compared dietary and activity interventions versus activity interventions, and of these 5 studies (3219 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. We found that dietary and activity interventions, when compared with activity interventions, likely do not reduce BMI at short term (MD 0.34; 95% CI: -0.25 to 0.93; I^2

0%; P=0.7; 2 studies; 95 participants; moderate-certainty evidence; Analysis 6.1) or medium term (MD 0.19; 95% CI: -0.12 to 0.49; I^2 0%; P=0.96; 2 studies; 509 participants; moderate-certainty evidence; Analysis 6.2); furthermore, we found that dietary and activity interventions, when compared with activity interventions, have little to no effect on BMI at long term follow-up, but the evidence is very uncertain (MD -0.08; 95% CI: -0.43 to 0.27; 1 study; 261 participants; very-low certainty evidence; Analysis 6.3).

zBMI

Meta-analyses results for zBMI are reported in Figure 4. We found that dietary and activity interventions, when compared with activity interventions, likely do not reduce zBMI at short term (MD -0.12; 95% CI: -0.30 to 0.06; 1 study; 35 participants; moderate-certainty evidence; Analysis 6.4); furthermore, we found that dietary and activity interventions, when compared with activity interventions, have little to no effect on zBMI at medium term (MD -0.07; 95% CI: -0.42 to 0.28; I^2 90%; P=0.001; 2 studies; 509 participants; low-certainty evidence; Analysis 6.5) or long term follow-up (MD -0.04; 95% CI: -0.13 to 0.05; 1 study; 261 participants; very-low certainty evidence; Analysis 6.6), but the evidence is very uncertain.

In addition to the studies included in the meta-analyses, data from one study were not eligible for inclusion in the meta-analyses (Table 6). Warren 2003 measured percentage of participants that were overweight or with obesity at the long term follow-up and found little to no effect of the intervention, when compared with control (see dietary intervention vs control comparison for details of Warren 2003 ineligibility).

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found we found that dietary and activity interventions, when compared with activity interventions, have little to no effect on BMI percentile at medium term follow-up (MD -1.03; 95% CI: -0.94 to 3.00; 1 study; 705 participants; very low-certainty evidence; Analysis 6.7), but the evidence is very uncertain. In contrast, we found that dietary and activity interventions, when compared with activity interventions, may reduce BMI percentile at long term follow-up, but the evidence is very uncertain (MD -2.43; 95% CI: -4.46 to -0.4; 1 study; 330 participants; very low-certainty evidence; Analysis 6.8). We found no studies reporting BMI percentile at short term follow-up.

Serious adverse effects

Details of serious adverse events are reported in Table 3. Three studies (1078 participants) reported data on severe adverse events Ickovics 2019; Robinson 2003 and Robinson 2010). Of these only in one study (Robinson 2003) injuries were reported by 2 girls (7.4%) in the treatment group, and 3 girls (9.1%) in the active control group. Other adverse events (problems requiring a visit to a medical care provider) were reported by 4 girls (14.8%) in the treatment group, and 6 girls (18.2%) in the active control group. One injury in the treatment group was judged to be related to participation in the study (a broken finger). All other injuries and other adverse events in both groups were judged to be unrelated to study participation.

Dietary interventions vs dietary interventions

We found no studies that compared two dietary interventions (i.e. with no control group).

Activity intervention vs Activity intervention

We found two studies (1278 participants) that compared two Activity interventions (i.e. with no control group).

BMI

We found one study reporting BMI at (Tessier 2008) and found that multiple short sessions (3 or 4 sessions) of physical education compared with 1 or 2 session(s) did not change the speed of increase in BMI. Furthermore, we found one study that planned to measure BMI at short term follow-up but results are not reported and we have no evidence that BMI was measured (Razani 2018; Table 6).

zBMI and BMI percentile

We found no studies reporting zBMI or BMI percentile.

Serious adverse events

Details of serious adverse events are reported in Table 3. We found one study (128 participant) that reported data on serious adverse events (Razani 2018). The authors reported that there were no serious adverse events (including all causes mortality), however, it is not clear if these results refer to the parents or the children, or both.

Dietary and Activity intervention vs Dietary and Activity intervention

We found four studies (525 participants) that compared the effect of two different types of dietary and activity interventions (i.e. with no control group; Table 6).

BMI

We found no studies reporting BMI.

zBMI

One study, Epstein 2001, measured zBMI at short and medium term follow-up. The study compared two intervention that included the same physical activity component, however, for the dietary component, one intervention aimed at increasing fruit and vegetables intake and the other one aimed at reducing fat and sugar

intake. The authors reported that the percentage of children that were overweight was stable over time, suggesting that there was no beneficial effect of either intervention.

BMI percentile

Three studies measured BMI percentile at short term follow-up and two studies measured BMI percentile at medium term follow up. Branscum 2013 compared a theory-based dietary and activity intervention with a knowledge-based dietary and activity intervention and found no difference for the interaction (group-by-time) for BMI percentile at short term follow up. Hannon 2018 compared a dietary and activity intervention delivered to the mothers with the same intervention delivered to the mothers and their children. The authors reported that participating children from the mothers and children intervention group showed a reduction in BMI percentile at 3 months (short term follow-up) and at 12 months (medium term follow-up). In contrast, no effect of the intervention was observed in the children in the mothers-only group. Muzaffar 2019 compared a peer-led dietary and activity intervention with the same intervention that was adult-led. The authors reported no effects of the peer-led dietary and activity intervention, compared with the adult-led intervention, on on BMI percentile at short and medium term follow-up.

Serious adverse events

We found no studies reporting serious adverse events.

Subgroup analyses

We conducted pre-specified subgroup analyses by main setting of the interventions (school, home, school and home, other), country income status (high income vs non-high income) and participants socioeconomic status (low vs mixed) and duration of the intervention (short, medium, long). Results for all individual subgroups are presented in Appendix 8.

Although some tests for subgroup differences were statistically significant at a 5% significance level, in most cases these arose from subgroups containing single studies and they reflected the heterogeneity pervasive among the studies. However, in some tests for subgroup difference (in which more than one study per group was included), substantial differences were observed between groups. For example, activity interventions, compared with control, appeared to be more effective at reducing zBMI in children in non-high-income countries when compared with the effects in studies in high income countries, however such a difference was only observed at medium term follow-up. Similarly, dietary and activity interventions appeared to be more effective at reducing BMI percentile in studies that targeted children from low socio-economic status families or targeted places or areas of relative deprivation, compared with children in studies in which socioeconomic status was mixed when measured at long term follow-up. In contrast, dietary and activity interventions appeared to be more effective at reducing BMI in studies in which socioeconomic status was mixed, when measured at short term follow-up compared with studies in which socioeconomic status was low. Importantly, our sub-group analysis shows that activity interventions, compared with control, appear to increase BMI in children in non-high-income countries, while no effect was observed in studies in high income countries, however such a difference was only observed at short term follow-up (see Appendix 8 for detailed results).

We also observed that the effectiveness of some interventions was different depending on the duration of the intervention: for example, activity interventions of medium duration were more effective at reducing BMI when measured at medium term (i.e. at the end of the intervention), than when measured either weeks before (short term follow-up) or several months after (long term follow-up) the end of the intervention. We observed a similar pattern for zBMI, measured in children receiving dietary and activity interventions combined, when compared with control. We also observed a similar pattern for BMI measured in children receiving dietary and activity interventions combined, when compared with control, and for zBMI measured in children receiving activity interventions only, when compared with control, although the test for subgroup difference was not statistically significant in these analyses. Interestingly, we found that duration of intervention had no impact on the effectiveness of dietary only interventions (see Appendix 8 for detailed results).

Note that children receiving an intervention with a long duration that had their adiposity outcomes measured at short or medium term (as well as long) will have only received the intervention for the short or medium time frame when those observations were made.

Sensitivity analysis

Different ICCs

In our main analysis we imputed an ICC = 0.02 in cluster-RCTs that had not been analysed according to the cluster design. In our sensitivity analyses we investigated the impact of imputing ICCs of 0 and 0.04 and we found no material differences in the overall results (Appendix 6).

Discussion

Summary of main results

This review includes 172 studies (189,707 participants) of interventions for the prevention of obesity in children aged from 5 to 11 years. The majority of the studies compared an intervention involving strategies to improve both dietary intake and physical activity levels with a control group. Interventions were mostly delivered at school,

with some being delivered at home, in the community or within a primary care setting. Most interventions were implemented for less than 9 months, with the shortest intervention conducted over one session and the longest over 4 years. Over half of the interventions were based on one or more theories of behaviour change, the most common being social cognitive theory.

Meta-analyses of results from 149 studies suggest that a physical activity intervention delivered on their own or in combination with dietary interventions, compared with control, may reduce increases in measures of adiposity (or fatness) in children aged 5 to 11 years. Specifically, we found that activity interventions delivered on their own might reduce increases in adiposity (measured as BMI, zBMI and BMI percentile, mostly moderate certainty evidence at medium-term time point (9 to <15 months; Summary of findings table 2). We also found that physical activity interventions delivered in combination with dietary interventions reduce increases in BMI and zBMI at short- and medium-term time points (low- and moderate-certainty evidence at the short-term and medium-term time points, respectively; Summary of findings table 3).

An important observation in most of our meta-analyses was of high statistical heterogeneity, i.e. that effects varied substantially across studies within the comparisons. Prespecified subgroup analyses by main setting of the interventions (school, home, school and home, other), country income status (high income vs non-high income) and participants' socioeconomic status (low vs mixed) did not provide an explanation for the heterogeneity observed among the studies. However, subgroup by duration of the intervention (short, medium, long) may explain some of the differential effects of activity and activity and dietary interventions on BMI and zBMI. This heterogeneity might be due to the interventions pooled within each category (Diet, Physical activity, Diet combined with physical activity) being variable in nature, intensity and duration; their only common feature was the intended mechanism by which they worked. It is also possible that the heterogeneity is due, at least in part, to variability in the fidelity of the interventions, although we did not collect data on this.

All interventions involved some level of provision of information. Most interventions that aimed to change and improve the dietary behaviours of children (with or without also changing physical activity levels) sought to provide the children with information and also to change the children's social environment, enabled and guided by their parents, teachers or other responsible adults. Most interventions that aimed to change and improve physical activity behaviours sought to enable and/or guide choice by changing the childrens' physical environment (at school or at home). Further exploratory work may be warranted to identify if there are contexts/intervention characteristics that may explain this and identify potentially effective approaches.

Fifty-five studies specifically targeted individuals or communities of low socioeconomic status (also known as disadvantaged or underserved). As highlighted by McNulty 2019, the preferred way of addressing health disparities is to target the health disparity population exclusively. Of note, although these 55 studies were included in our analysis exploring differences in impact of an intervention between individuals of low vs mixed socio-economic status, their findings were unable to contribute to our learning because, usually, all participants were considered low socio-economic status.

The vast majority of studies (169/172) collected and reported data at baseline on at least one PROGRESS characteristic (Place, Race, Occupation, Gender, Religion, Education, Socio-economic status, Social status). However, only 48 studies reported on the impact of at least one PROGRESS characteristic on the effectiveness of the intervention; place or residence (5 studies); race/ethnicity/culture/language (9 studies); gender/sex (42 studies), parent(s) education (5 studies) and socio-economic status (14 studies). Although we understand the reluctance of researchers to perform multiple, post-hoc analyses of this type, the dearth of evidence in this review on the impact of interventions on health inequalities is a significant limitation.

Only 36 studies reported data on severe adverse events, and, of these, seven observed serious adverse events related to the interventions. These were mainly injuries relating to exercise, but also included extreme dieting behaviour (low levels in both intervention and control groups were reported in two studies) and other illness (allergies, headache, abdominal discomfort). One study reported dizziness during baseline venepuncture. One study recorded mortality for one participant, but whether this was related to the intervention is not reported.

Overall completeness and applicability of evidence

Most studies were undertaken in general populations of high-income countries. We identified 23 studies from upper-middle-income countries and three from a lower-middle income country. In most of the studies the participants were a mix of genders (150 studies), 13 studies were conducted only in girls, and three only in boys. Fifty-five studies specifically targeted disadvantaged children (or families) in a particular setting (e.g. school/community/area) or specifically targeted a school or community within a disadvantaged area. While the majority of studies were conducted among the general population, 13 studies targeted children considered "at risk" of obesity based on their (or their parents) weight status, physical activity and dietary behaviours, or ethnic background. Given that public health policy makers require evidence of the impact of interventions to prevent obesity in adolescents who are in the greatest need (disadvantaged, underserved), they can be reasonably confident of the completeness and applicability of the evidence reviewed here. Most interventions identified were school-based.

A lack of completeness of evidence was identified for certain individuals within our society (population), interventions and outcomes. First, 76 studies excluded children with physical disabilities and 58 studies excluded children with mental disabilities. Second, we did not identify any studies (that met our inclusion criteria) that used a 'whole systems' or 'whole school' approach, or were focussed on improving the wider (i.e. beyond the

home, school and community) environment. Furthermore, although zBMI and/or BMI outcomes were reported by the majority of studies, some studies (including those published in the last 10 years) only reported BMI percentile or other body weight-related outcomes (e.g. proportion of children living with overweight and obesity). Most studies did not report on serious adverse events.

Due to the fact that the majority of evidence (73%) identified was from school-based interventions, the recommendations from this review are mostly applicable for policy makers, local education authorities and schools, and health professionals who work with schools. These stakeholders can be reasonably confident of the completeness of the evidence reviewed for school-based interventions for adolescents. Importantly, increasing physical activity levels and eating a healthier diet have health and well-being benefits (outcomes) beyond the prevention of obesity and there is evidence that these behaviours track from childhood to adulthood. Indeed, major health conditions that make the greatest contribution to the burden of healthcare in adulthood in most high and middle-income countries are driven by unhealthy and risky behaviours, including low levels of physical activity and an unhealthy diet. Tackling these behaviours during adolescence should therefore be a priority. For children and their parents/carers, the evidence reviewed (albeit it limited in some respects and of variable quality) provides some reassurance that interventions to prevent obesity do not appear to cause harm, including the promotion of eating disorders.

Quality of the evidence

We used the RoB 2 tool to assess the risk of bias of the 265 results from the 149 studies that were included in the meta-analyses. Overall, most of the results (150) were judged as “Some concerns”, while 11 results were at judged as “Low risk of bias”. 104 results were judged as “High risk of bias”, mostly because of missing outcome data and time of participants recruitment in cluster-RCTs. We tested the effect of removing studies rated at "High risk of bias" (Appendix 6).

We used GRADE to assess the certainty of evidence of effects; we downgraded almost all results to 'moderate', 'low' or ‘very low’ certainty depending on the proportion of results at high risk of bias, the level of imprecision and heterogeneity, the generalisability of the results and the amount of missing evidence. Reasons for downgrading for each of the GRADE criteria are reported below.

Risk of bias

Of the 43 outcomes (i.e., BMI, zBMI and BMI percentile at short-, medium- and long-term follow-up) that were included in meta-analyses, 23 were downgraded one level (12 outcomes) or two levels (11 outcomes) due to high risk of bias (i.e., the studies at high risk of bias contributed > 30% of the weight in the meta-analysis). Most of the results in the downgraded outcomes were judged at high risk of bias due to missing outcome data (60 results), bias due to the randomization process (42 results), bias due to selection of the reported result (1 results) and bias due to deviations from intended interventions (11 results). The other 15 outcomes were not downgraded due to risk of bias as the results at high risk of bias contributed ≤ 30% of the weight in the meta-analysis or there were no results at high risk of bias included in the meta-analysis. We did not downgrade outcomes with a high number of results judged as some concern as such judgement was mostly due to lack of information.

Imprecision

Of the 43 outcomes included in meta-analyses, 25 were downgraded one level due to imprecision (the number of participants included in each meta-analysis was < 3,000 and there was no clear evidence of an effect). The number of participants was less than 100 in three outcomes, between 100 and 500 in eight outcomes, between 500 and 1000 in nine outcomes, between 1000 and 2000 in four outcome and 2107 in one outcome. The other 18 outcomes were not downgraded as the number of participants was > 3,000 per outcome.

Inconsistency

Of the 43 outcomes included in meta-analyses, 23 were downgraded one level due to inconsistency. Twenty outcomes were downgraded due to moderate to high heterogeneity and point estimates and confidence intervals varying considerably. Of these, fourteen outcomes reported considerable heterogeneity (I^2>60%), one reported substantial heterogeneity (I^2>50%) and four reported moderate heterogeneity (I^2>30%). Three outcomes reported no or low heterogeneity (I^2<30%) but were downgraded due to point estimates and confidence intervals varying considerably.

Indirectness

Of the 43 outcomes included in meta-analyses, three were downgraded one level due to indirectness (i.e., substantial contribution of the results of studies in highly specific population). Specifically, we had concerns over these outcome including results from studies on children that are at risk of developing obesity, mainly due to their lifestyle: one study was conducted in healthy children, daily consumers of at least one serving of whole-fat dairy, with >70% of their dairy consumed or prepared at home; one study targeted children with high sedentary levels, and one study targeted children at high risk of developing overweight and obesity and children that were overweight. The other 40 outcomes only included data from the general population.

Non-reporting bias

Of the 43 outcomes included in meta-analyses, five were downgraded one level due to non-reporting bias. Missing evidence in these outcomes was due to results being reported narratively (three studies), results

reported in a format that was ineligible for inclusion in the meta-analyses (3 studies) and results data being measured but not reported (three studies). For all outcomes in which evidence was missing, the meta-analyses showed no effect of the interventions, but the size of the missing data was relatively high therefore there was potential for missing data to impact on the result. We did not downgrade 4 outcomes in which the interventions had a beneficial effect on measures of adiposity, as well as seven outcomes in which the interventions did not affect adiposity (fatness). In these 11 outcomes evidence was missing from a relatively small number of participants and therefore we judged that missing data did not have an impact on the effect estimate. For the remaining 27 outcomes there was no evidence of missing data.

Overall, our confidence in the evidence is reduced mainly due to the high proportion of studies judged at high risk of bias (mainly due to missing participants data and the randomisation process), imprecision of the results (studies were very small or there were not enough studies with data contributing to the evidence for some of the outcome) and inconsistency of the results across the different studies.

Potential biases in the review process

Our review updates part of a previous Cochrane Review using the same eligibility criteria and largely the same methodology (Brown 2019). Following the original review, we included only studies that stated the (or one of a limited number of) main aim of changing diet, physical activity, sedentary behaviour, sleep, play or structured exercise to help prevent obesity in children. We therefore excluded studies of similar interventions that did not report such an aim. There is potential for this to bias our selection of studies if the reporting of primary studies' aims has been influenced by their findings. If in any doubt, we checked the aim with that provided in the published protocol or trial register where possible. We restricted eligibility to studies providing evidence of having measured BMI at baseline and follow up so that we could examine changes from baseline. Again, this restriction may have led to exclusion of studies of similar interventions to those we included.

Following the previous review, we also grouped studies into somewhat crude comparisons according to the broad target of behaviour change (diet or physical activity or both) of the intervention. This led to a diversity of specific intervention approaches within comparisons and probably accounts for some of the subsequent statistical heterogeneity. We were unable to determine the specific causes of this heterogeneity with our planned analyses. Further investigation of how the variation in intervention approaches and intervention fidelity impact on outcomes may be valuable, including how these relate to the wider determinants of health.

We made some additions to the planned methods as set out in the protocol due to the design details of studies that we included in this review. We collected and analysed additional data where adiposity was only reported as BMI percentile (rather than BMI or zBMI).

Outcome reporting bias may be operating if studies with systematically different results reported different outcome measures (Dwan 2010; Kirkham 2010), although we regard this as unlikely. Evidence of possible suppression of uninteresting findings is addressed as part of our GRADE assessment. Finally, because we are looking at general populations of children rather than clinical populations, and the main aim of many of our interventions of interest was not exclusively the prevention of obesity (for example many studies focussed on improving diet or physical activity levels to improve health in general, although one of the stated aims was the prevention of obesity); many RCTs reported a wide variety of other outcomes that we did not examine in this review.

Agreements and disagreements with other studies or reviews

Other comprehensive reviews on this topic have found similar results as those reported in this review, in that there is a modest effect or no effect of interventions, that target individual change, to prevent obesity in adolescents. Of course, one can always find the rare study that shows that an intervention is effective, but the evidence base taken together suggests that the effect of these interventions is, at best, modest. Compared with previous reviews, including the previous version of the Cochrane review on preventing obesity in children, this review includes the largest number of studies and children. The stark increase in the number of studies published over the past 5–8 years reflects the focus and effort on tackling obesity in primary school-aged children by research funding bodies and researchers. Although the confidence in the certainty of results remains moderate or low, due to methodological issues of the studies, the increased volume of evidence available for this review provides readers and stakeholders with reassurance that the results, at least for school-based interventions, are unlikely to change with the addition of further studies which meet the same inclusion criteria.

Authors' conclusions

Implications for practice

This review update provides policy makers with a robust evidence base because it is restricted to randomised controlled trials (RCTs), and it includes almost three times as many (172 compared with 86) studies relevant to children aged 5 to 11 years included in the previous version of this review (Brown 2019). The body of evidence in this review suggests that a range of activity interventions, and interventions that combine diet with physical activity, can have a modest beneficial effect on developing obesity (i.e. gaining excess weight compared with what children of this age may otherwise experience).

The long-term clinical significance, at a population level, of a very small benefit of an intervention (compared with control) over the short/medium term, is difficult to assess and, at best, minor. However, we know that the diet and physical activity behaviours that are adopted in childhood track throughout life (Craigie 2011). The potential cumulative effect of small but sustainable changes towards a healthier diet and a more physically active lifestyle could, at least in theory, reap long-term benefits for the promotion of healthy weight for individuals, communities and populations (Chen 2019). A healthy diet and a being physically active have many health and well-being benefits for children beyond the promotion of a healthy body weight, including positive associations with academic achievement (Faught 2017).

The WHO Commission on Ending Childhood obesity suggests that part of the failure of interventions is due to the fact that they target individual behaviour change (WHO 2016). The WHO Commission suggests that upstream interventions may be particularly important, and more effort is required in this area. Example interventions for children include replacement of packed lunch with school meals rich in fruit and vegetables and implementation of individual physical exercises during routine learning activities. It is now acknowledged that tackling obesity requires a systems approach, and policy initiatives across government departments should be joined up (Rutter 2016; Rutter 2017)

From our exploratory analyses, we found no indication that interventions to prevent obesity in children are less effective in those with low socio-economic status. The preferred way of addressing health disparities is to target the health disparity population exclusively (McNulty 2019), and we identified 55 (of 172) such studies. Most studies (76/172) excluded children from taking part in the trial if they had a physical or mental disability, and note this potential source of inequity in this review, with reference to the WHO guidelines on physical activity sedentary behaviour in children living with disability (WHO 2020).

Another important finding is that only eight of the 36 studies that reported relevant data found serious adverse events, mainly injuries relating to exercise, but also headaches and abdominal discomfort, and, importantly, only low levels of extreme dieting behaviour were reported by two studies. Only a few studies assessed the costs and cost effectiveness of interventions included in this review. On this basis, it is not possible to say whether these interventions are cost effective. Evidence from newly identified studies from upper- and lower-middle-income countries is an important contribution to this review (26 of 172), in terms of context and external validity, particularly for policy makers in those countries. Of note, a higher proportion of ongoing studies, compared with included studies, were conducted in upper- and low- middle income countries (compared with high-income countries) and were online/digital interventions (compared with in-person interventions). Given the sharp rise in the prevalence of childhood obesity in many upper- and low- middle income countries over the last 5 years, fuelled by the Covid pandemic, it is reassuring to know that more research activity relating to this global public health priority is being conducted in these countries and that more relatively low-cost online/digital interventions are being assessed for effectiveness.

Implications for policy

The interventions included in this update mainly focused on changing individual (personal) behaviours and were mainly conducted in schools, with some being delivered at home, in the community, or within a primary care setting. A school setting may be a relatively easy setting to target, however, some primary school-aged children who are hard-to-reach are disengaged with school, even at this young age, but do have meaningful affiliations with local youth groups and sports clubs, and some have meaningful involvement with faith-based groups. Social media and peer pressure also play an important role in shaping energy-balance related behaviours in this age group, particularly 9-11 year-olds.

We recognise that the methods we chose to employ, including the aggregating of all types of interventions together under one of three categories (diet, activity, or diet combined with activity), may create results of limited value to policymakers deciding on which specific interventions within each category would 'work best' in their context. However, within these categories, hierarchies of specific interventions by observed effectiveness could be misleading. The effectiveness of the same intervention is likely to vary by age and sex (even within the 5–11-year age group) and context (e.g. type of school provision), and the feasibility of implementation is likely to be dependent on local resources. Furthermore, policymakers who are responsible for implementing specific policies for the prevention of obesity in children need to ensure that such policies 'fit' within the wider public health strategy and initiates of the community and population they serve. However, this review does provide policymakers with information about whether such policies should best focus on diet, activity, or both, and more detailed information about each intervention within these categories (and by country and setting) is provided if policymakers require further information.

We did not identify interventions for this review that aimed to take a (whole) systems approach to preventing obesity in children. Local health authorities and national guidance usually champion the importance of taking such an approach in tackling obesity (incorporating both prevention and treatment initiatives). However, research studies (mainly evaluations) designed to assess the impact of implementing such an approach are not traditional RCTs and therefore did not meet our inclusion criteria.

An explanation or potential opportunity to enhance the impact of interventions that aim to prevent obesity in children is through greater application to implementation science. There are some suggestions that the effects of health innovations can be enhanced by up to 12 times with potent implementation approaches (Durlak and DuPre 2008). A recent Cochrane review found that the use of implementation strategies may result in large increases in implementation of interventions, and slight improvements in measures of diet and physical activity (Wolfenden 2022). As implementation science advances, the application of it could be important to amplify the effects of behavioural interventions to prevent obesity in children.

Implications for research

We do not anticipate the effect sizes we found in this review to change significantly with the addition of more school-based interventions that target individual-level energy balance-related behaviours in children. However, we do recommend that further research in children should include a wider range of community settings (including faith-based groups, local youth groups and local sports clubs, and social media-based and digital-based interventions). We also recommend that future research in this area proactively includes children with disabilities, and include collection of data on serious adverse events, inlcuding hating disorders.

For existing and ongoing studies that would meet the inclusion criteria of this review, we suggest that interventions and strategies to prevent obesity in childhood should include follow-up over several years, and we understand that funding issues for such follow-up work can be of existing studies that have been completed. Such follow-up data could provide important information on the sustainability of behaviour change and impact on weight as children transition from the primary school

years into secondary school and puberty. We understand the barriers to conducting this type of work, including funding challenges, ethical approval and data protection issues. We also understand the perceived higher prestige attached to primary research compared with secondary or follow-up research. We urge funding bodies and journal editors to place a higher value on this type of research activity. We also suggest that a better understanding of process and implementation, using evaluation methods by which one can better compare the results of one study with the next (and summarise the information for reviews such as this), would be extremely useful. This type of activity is critical for the successful translation of interventions from one context to another, and across different countries.

We also urge researchers to collect baseline information on gender and other PROGRESS (place, race, occupation, gender, religion, education, socio-economic status, social status) factors, including socio-economic status, and also to analyse the effect of the intervention by these factors. We understand the reluctance of researchers to perform multiple, post-hoc analyses of this type however these are necessary if we are to provide confidence for practice and policy that the interventions we deem effective do not increase inequalities.

Going forward, we suggest the need to rethink the priorities and methods for research that aims to prevent obesity in children aged 5-11 years. This may include a focus on valuing and conducting research that assesses the impact of multilevel, community, or other interventions that better address systemic and structural factors related to obesity, including those that take a 'whole systems approach', and do not rely on traditional randomised controlled trials. We suggest that research in this field also needs to look beyond diet and activity behaviours as the focus of interventions and instead explore both a focus on the wider environment and political factors which drive obesity, and also the wider determinants of health which drive inequalities in dietary intake and food insecurity, physical activity and physical activity insecurity, and obesity. The research community needs to help and support policymakers and stakeholders in bringing the totality of the evidence base together in a balanced and accessible format.

We urge researchers and funding bodies in all countries to continue to support research on childhood obesity in low- and middle-income countries, and better understand the experiences of nutrition transition and rapid weight gain. In the context of some countries, this research should aim to address the double burden of malnutrition.

Finally, we support the research recommendations set out by the WHO Commission on Ending Childhood Obesity (WHO 2017).

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Editorial and peer-reviewer contributions

Cochrane Public Health supported the authors in the development of this review.

The following people conducted the editorial process for this article:

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The views expressed in this review are those of the authors and do not necessarily represent those of the NHS, the NIHR, NIHR ARC, or the NHMRC.

Data and analyses

Comparison 1

Dietary vs Control (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 BMI short term	5		Mean Difference (IV, Random, 95% CI)	0.00 [-0.10, 0.10]
1.2 BMI medium term	9		Mean Difference (IV, Random, 95% CI)	-0.01 [-0.15, 0.12]
1.3 BMI long term	2		Mean Difference (IV, Random, 95% CI)	-0.17 [-0.48, 0.13]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.4 zBMI short term	8		Mean Difference (IV, Random, 95% CI)	-0.06 [-0.13, 0.01]
1.5 zBMI medium term	9		Mean Difference (IV, Random, 95% CI)	-0.04 [-0.10, 0.02]
1.6 zBMI long term	7		Mean Difference (IV, Random, 95% CI)	-0.05 [-0.10, 0.01]
1.7 Percentile short term	3		Mean Difference (IV, Random, 95% CI)	1.90 [-3.44, 7.24]
1.8 Percentile medium term	3		Mean Difference (IV, Random, 95% CI)	-0.94 [-2.65, 0.78]
1.9 Percentile long term	2		Mean Difference (IV, Random, 95% CI)	-1.49 [-4.80, 1.82]

Comparison 2

Activity vs Control (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.1 BMI short term	14		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.17, 0.13]
2.2 BMI medium term	16		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.18, -0.05]
2.3 BMI long term	8		Mean Difference (IV, Random, 95% CI)	-0.07 [-0.24, 0.10]
2.4 zBMI short term	6		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.07, 0.02]
2.5 zBMI medium term	13		Mean Difference (IV, Random, 95% CI)	-0.05 [-0.09, -0.02]
2.6 zBMI long term	6		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.09, 0.04]
2.7 Percentile short term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
2.8 Percentile medium term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
2.9 Percentile long term	3		Mean Difference (IV, Random, 95% CI)	-0.80 [-2.74, 1.13]	

Comparison 3

Dietary and Activity vs Control (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
3.1 BMI short term	27		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.21, -0.01]	
3.2 BMI medium term	21		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.21, 0.00]	
3.3 BMI long term	16		Mean Difference (IV, Random, 95% CI)	0.03 [-0.11, 0.16]	
3.4 zBMI short term	26		Mean Difference (IV, Random, 95% CI)	-0.03 [-0.06, 0.00]	
3.5 zBMI medium term	24		Mean Difference (IV, Random, 95% CI)	-0.05 [-0.07, -0.02]	
3.6 zBMI long term	22		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.06, 0.01]	
3.7 Percentile short term	5		Mean Difference (IV, Random, 95% CI)	0.73 [-0.50, 1.97]	
3.8 Percentile medium term	8		Mean Difference (IV, Random, 95% CI)	-0.64 [-1.85, 0.56]	
3.9 Percentile long term	5		Mean Difference (IV, Random, 95% CI)	-0.67 [-3.05, 1.72]	

Comparison 4

Activity vs Dietary (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
4.1 BMI medium term	2		Mean Difference (IV, Random, 95% CI)	-0.25 [-0.55, 0.06]	
4.2 zBMI medium term	2		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.22, -0.00]	
4.3 Percentile medium term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
4.4 Percentile long term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	

Comparison 5

Dietary and Activity vs Dietary (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
5.1 BMI medium term	2		Mean Difference (IV, Random, 95% CI)	-0.16 [-0.42, 0.10]	
5.2 zBMI medium term	2		Mean Difference (IV, Random, 95% CI)	-0.03 [-0.10, 0.04]	
5.3 Percentile medium term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
5.4 Percentile long term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	

Comparison 6

Dietary and Activity vs Activity (All studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
6.1 BMI short term	2		Mean Difference (IV, Random, 95% CI)	0.34 [-0.25, 0.93]	
6.2 BMI medium term	2		Mean Difference (IV, Random, 95% CI)	0.19 [-0.12, 0.49]	
6.3 BMI long term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size	
6.4 zBMI short term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
6.5 zBMI medium term	2		Mean Difference (IV, Random, 95% CI)	-0.07 [-0.42, 0.28]	
6.6 zBMI long term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
6.7 Percentile medium term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	
6.8 Percentile long term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected	

History

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Contributions of authors

FS assessed studies for inclusion, collected data and information on risk of bias, extracted data, analysed the data, assessed the certainty in the body of evidence and interpreted of data, amended the methods from the protocol, wrote the results and discussion sections and was responsible for project administration.

AD extracted data, analysed the data, amended the methods from the protocol, wrote the results, edited and provided advice on the manuscript.

ET assessed studies for inclusion, collected data and information on risk of bias, extracted data, edited and provided advice on the manuscript.

THMM developed the concept of the review, produced the infographic, advised on risk of bias assessments, edited and provided advice on the manuscript.

SD designed the search strategies, conducted the searches, amended the methods from the protocol, edited and provided advice on the manuscript.

KB extracted and analysesd the costing data, edited and provided advice on the manuscript.

JS developed the concept of the review, extracted data, provided advice on risk of bias assessment, edited and provided advice on the manuscript.

GY extracted data, edited and provided advice on the manuscript.

SMP extracted data, edited and provided advice on the manuscript.

FH extracted data, edited and provided advice on the manuscript.

RKH provided lists of records and of completed data extraction forms, edited and provided advice on the manuscript.

LW edited and provided advice on the manuscript.

JPTH developed concept for the review update, acquired funding, acted as the co-lead senior author, checked data extraction, provided advice on risk of bias assessment, assessed the certainty in the body of evidence and interpreted of data, edited and provided advice on the manuscript.

CDS developed concept of the review, acted as the co-lead senior author, amended the background, checked data extraction, wrote the discussion and edited and provided advice on the manuscript. CDS is the guarantor for the review.

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- **Rebecca K Hodder:** reports working as a Program Manager, Hunter New England Population Health, Hunter New England Local Health District, responsible for the delivery of chronic-disease prevention programs in secondary schools. RH works as a research associate for Cochrane Public Health and had no role in the editorial process for the review.
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Differences between protocol and review

We changed the author list to reflect contributions to the review.

We ran a search for retractions and corrigenda.

We added BMI percentile as an outcome as we found studies reporting only this interpretation of BMI.

We changed the coding of the sub-group analysis by setting and socioeconomic status to reflect the setting and population of the included studies.

We did not:

- undertake additional analyses ('syntheses without meta-analysis') using methods based on P values and directions of effect. We made extensive efforts to estimate intervention effects from diversely reported results (e.g. from regression coefficients, from P values and from analyses based on dichotomised BMI scores (Higgins 2019b)). However, very few of the studies not included in meta-analyses provided this basic information;
- undertake SMD sensitivity analyses; we observed that studies included importantly different age ranges (e.g. many in single year groups but others across multiple year groups), so that the SDs for BMI used for the standardization would be expected to reflect mainly the spread of age ranges rather than the differences in the measurement scale (section 8.2, Cochrane Handbook Chapter 8; Higgins 2022).
- write to authors to request missing data due to scarsity of time and resources
- undertake subgroup analyses according to sex because not enough studies presented subgroup analyses by sex.

Characteristics of studies

Characteristics of included studies [ordered by study ID]

Adab 2018

Study characteristics	
Methods	Study name: WAVES study (West Midlands ActiVe lifestyle and healthy Eating in School children study) Study dates: recruitment took place between April and May 2011 (group 1 schools and pupils) and from January to May 2012 (group 2 schools and pupils) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 15 months; 30 months; 39 months
Participants	Participants: 2462 Setting: fifty-four state primary schools in the West Midlands Country: United Kingdom Country income: high income Recruitment: Quote: "All state primary schools in the West Midlands (UK) which included school years 1 to 5 (children aged 5 to 10 years) and that were within a 35 mile radius of the University of Birmingham were eligible for inclusion. Schools were approached by letter, followed by a phone call and a visit to interested schools. All Year 1 pupils (aged 5 to 6 years) in participating schools were eligible to take part. An invitation letter, information leaflet and consent form were distributed through schools to parents/carers of eligible pupils." % of eligible population enrolled: schools: 16% (155/980; invited and assessed/eligible); 36% (54/149; recruited/assessed for eligibility); children: 60% (1470/2462; consented/eligible); Age (years): mean: 6.3 (SD 0.3) Gender/Sex: 51.1% boys
Interventions	Theory: Theoretically informed (no further details) Intervention type: dietary and activity Intervention group(s) participants: 1134 Comparator type: non-active intervention Comparison group participants: 1328 Comparison: dietary and activity vs control

	Setting of the intervention: school + community Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (30 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN97000586 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institute for Health Research (NIHR) Health Technology Assessment Programme (project reference No 06/85/11). The funder had no role in study design, data collection, data analysis, data interpretation, or writing of the report." DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work." General notes: to allow measurement of a large number of children in a limited timeframe within study resources, schools were recruited and randomised into two groups (27 schools in each group) one year apart. Data from the 39 months follow-up is reported only from schools in group 1.

Anand 2007

Study characteristics	
Methods	Study name: SHARE-AP ACTION Study design: cluster RCT N of arms: 2 Unit of allocation: family (parent(s) + ≥ 1 child) Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 93 Setting: six Nations Reserve in Ohsweken, Ontario Country: Canada Country income: high income Recruitment: partecipants were recruited within the Six Nations Indian Reserve in Ontario, Canada % of eligible population enrolled: NR Age (years): mean: intervention: 10.9 (SD 2.9); control: 9.9 (3.2) Gender/Sex: intervention: 37.5% boys; control: 39.5% boys
Interventions	Theory: Protection Motivation Theory, Social Learning Theory, Normative Influences and Theories of Persuasion Intervention type: dietary and activity Intervention group(s) participants: 46 (at baseline) Comparator type: non-active intervention Comparison group participants: 47 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narrativelly
Notes	Clinical Trial Registry: NCT00334269 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Canadian Institutes of Health Research (CIHR) Grant number: MCT 64076. DOI: NR General notes: BMI at baseline is reported separatelly for children and adolescents and narrative results of BMI at follow-up are reported for the whole population

Annesi 2016

Study characteristics	
Methods	Study name: YF4L (Youth Fit 4 Life) Study design: cluster RCT N of arms: 2 Unit of allocation: after-school care sites Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 3 months; 9 months
Participants	Participants: 114 Setting: YMCA-managed after-school care sites in the southeastern United States Country: United states Country income: high income Recruitment: participants were registered users of YMCA-managed after-school care sites in the southeastern United States % of eligible population enrolled: NR Age (years): mean: 7.2 (SD 1.1) Gender/Sex: 46.5% boys
Interventions	

	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 72 (at baseline) Comparator type: non-active intervention Comparison group participants: 42 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term (3 months) BMI medium term; BMI percentile medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: Quote: "This research received no specific funding" DOI: "The authors declare that they have no competing interests." General notes: NR

Annesi 2017

Study characteristics	
Methods	Study name: YF4L (Youth Fit 4 Life) Study design: cluster RCT N of arms: 2 Unit of allocation: after-school care sites Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 3 months; 9 months
Participants	Participants: 141 Setting: YMCA-managed after-school care sites in the southeastern United States Country: United states Country income: high income Recruitment: participants were registered users of YMCA-managed after-school care sites in the southeastern United States % of eligible population enrolled: NR Age (years): mean: 10 (SD 0.90) Gender/Sex: 55% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 86 (at baseline) Comparator type: non-active intervention Comparison group participants: 55 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (3 months) BMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: Conflict of interest: none declared. General notes: the number of cluster for this study is not repoted; a similar study was conducted by the same authors in a cohort of children aged 5-8; therefore, we presume that the study was conducted in the same after-school sites and we have extracted the number of clusters reported in Annesi 2016 study to be the same in Annesi 2017 study

Baranowski 2003

Study characteristics	
Methods	Study name: Baylor GEMS Study design: RCT N of arms: 2 Unit of allocation: parent/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 35 Setting: communities in Houston, Texas Country: United States Country income: high income Recruitment: Quote: "All participating girl-parent dyad were volunteers who responded to radio advertisements, a GEMS-FFFP recruitment Website, fliers, presentations made to various church or other social groups serving the African-American community, and postcards sent to lists of names and addresses obtained from selected schools in the Houston area. Further

	details regarding our recruitment strategies are described in Story 2003." % of eligible population enrolled: children: NR; Age (years): mean: 8 (SD 0.3) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 19 Comparator type: non-active intervention Comparison group participants: 16 Comparison: dietary and activity vs control Setting of the intervention: community + home Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was largely funded by a grant from the National Heart Lung and Blood Institute, U01 HL-65160. This work is also a publication of the United States Department of Agriculture (USDA/ARS) Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas, and was funded, in part, by federal funds from the USDA/ARS under Cooperative Agreement No. 58-6250- 6001. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organizations imply endorsement from the US government." DOI: NR General notes: PROGRESS data for the whole cohort extracted from Story 2003

Baranowski 2011

Study characteristics	
Methods	Study name: Escape from Diab Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 5 months
Participants	Participants: 153 Setting: communities in Texas and North Carolina Country: United States Country income: high income Recruitment: children were recruited primarily with advertisements on a radio station whose listening audience included parents of children in the targeted age groups from ethnic minority communities (African-American, Hispanic). % of eligible population enrolled: children: 68% (153/225) Age: 10 years: 42.5%; 11 years: 32.7%; 12 years: 24.8% Gender/Sex: 56.2% boys
Interventions	Theory: Social Cognitive Theory, Self-determination and Persuasion Theories Intervention type: dietary and activity Intervention participants: 103 Comparator type: Attention control (minimal activity intervention) Comparison participants: 50 Comparison: dietary and activity vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI short term; BMI percentile short term (5 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00570466 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was primarily funded by a grant from the National Institute of Diabetes and Digestive and Kidney Diseases (5 U44 DK66724-01). This work is also a publication of the U.S. Department of Agriculture (USDA/ARS) Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston TX, and had been funded in part with federal funds from the USDA/ARS under Cooperative Agreement No. 58-6250-6001. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organization simply endorsement from the U.S. government." DOI: "Richard Buday (author of the publication) is the president of Archimage, Inc, the company that created Diab and Nano. No other financial disclosures were reproted by the authors of this paper." General notes: the duration of the intervention is not clearly reported; in the previous review from Brown 2019 it is reported as 3 months

Barbeau 2007

Study characteristics	
Methods	

	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 201 Setting: eight local elementary schools in Augusta, Georgia Country: United States Country income: high income Recruitment: Quote: "Subjects were recruited from eight local elementary schools using fliers. All black girls in grades 3, 4, and 5 were eligible if they met the eligibility criteria. Subjects and their parents attended information sessions and signed informed consent/assent forms in accordance with the Medical College of Georgia Human Assurance Committee. " % of eligible population enrolled: schools: NR; children: 90% (278/309); Age (years): mean: 9.5 Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 118 (at baseline) Comparator type: non-active intervention Comparison group participants: 83 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the NIH (Grant HL64972)" DOI: NR General notes: the authors found in previous studies that accepting only one sibling per family resulted in eligible and interested potential subjects not signing up for the study. Therefore, they decided at the outset that they would accept sisters into this study to increase its acceptability on the part of subjects and their parents.

Barnes 2015

Study characteristics	
Methods	Study name: MADE4Life Program Study design: cluster RCT N of arms: 2 Unit of allocation: mother + ≥ 1 daughter Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 20 weeks (8 weeks + 3 months)
Participants	Participants: 48 Setting: an Australian community Country: Australia Country income: high income Recruitment: Quote: "Mothers and their primary school-aged daughters (5–12 years) were recruited from an Australian community through media releases, school newsletter advertisements, school presentations to students and parents, local newspapers, and local television news. Mothers were screened for eligibility by telephone questionnaire. % of eligible population enrolled: families: 91% (40/44) Age (years): mean: 8.5 (SD 1.7) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory and operationalized key constructs of self-efficacy, social support, and outcome expectations Intervention type: activity Intervention group(s) participants: 25 Comparator type: non-active intervention Comparison group participants: 23 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (20 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: ACTRN12611000622909 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "MADE4Life was funded by the 2011 Seed Funding Grants from the Priority Research Centre in Physical Activity & Nutrition, University of Newcastle." DOI: NR General notes: NR

Barnes 2021

Study characteristics	
Methods	Study name: PACE; SWAP IT Study design: cluster RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: PACE: 9 months; SWAP IT: 5-6 months; PACE + SWAP IT: 9 months Follow-up time(s): 9 months
Participants	Participants: 815 Setting: twelve catholic primary schools, located within the Hunter region of New South Wales Country: Australia Country income: high income Recruitment: Quote: "Primary schools located within the Hunter region were eligible for inclusion in the trial if they satisfied the eligibility criteria. Recruitment packages, including a study information statement and consent form, were progressively distributed to the principals of potentially eligible schools in random order. schools were asked to sign a written consent form to confirm participation in the study, with recruitment continuing until the required sample (n = 12) was reached. All students aged 5–12 years (Kindergarten to Grade 6) attending participating schools were invited to participate in the trial, with anthropometric outcomes solely assessed for children in Grades 4–6. A recruitment package consisting of a study information statement and consent form were distributed to parents by school staff on behalf of the research team." % of eligible population enrolled: schools: 60 % (12/20); 57.8% (916/1586; percent of students that provided consent) Age (years): mean: grades 4-6 (typically aged 9 to 12 years): grade 4: 35.5% ; grade 5: 35.7%; grade 6: 28.8% Gender/Sex: 48.2% boys
Interventions	Theory: SWAP IT: Behaviour Change Wheel; PACE: Theoretical Domains Framework Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention group(s) participants: SWAP IT intervention: 283 Physically Active children in Education (PACE) intervention: 163 SWAP IT + PACE Combined: 202 (at baseline) Comparator type: non-active intervention Comparison group participants: 167 (at baseline) Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12616001228471 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was supported by Hunter Children's Research Foundation (HCRF); Hunter Medical Research Institute (HMRI); and Hunter New England Population Health. CB is supported by a co-funded industry scholarship between Hunter New England Population Health and University of Newcastle; LW is supported by an NHMRC Career Development Fellowship (APP1128348), Heart Foundation Future Leader Fellowship (101175), and a Hunter New England Clinical Research Fellowship; RS is supported by an NHMRC TRIP Fellowship (APP1150661). None of the funding bodies had a role in the design, data collection, analysis or interpretation of data." DOI: "The authors declare that they have no conflicts of interest." General notes: the authors used factorial analyses to assess the synergistic effect of dietary and activity interventions

Beech 2003

Study characteristics	
Methods	Study name: Memphis GEMS pilot study Study design: RCT N of arms: 3 Unit of allocation: parent/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 60 Setting: communities in Memphis, tennessee Country: United States Country income: high income

	Recruitment: girls and their families were recruited through public service announcements on several local African-American radio stations, participation of GEMS investigators in live radio talk shows, and flyers distributed at local elementary schools. Further details regarding our recruitment strategies are described in Story 2003 % of eligible population enrolled: children: NR; Age (years): mean: 8.9 (SD 0.8) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention participants: child targeted: 21 parent targeted: 21 Comparator type: attention control Comparison participants: 18 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by grant numbers UO1-HL62662, UO1-HL62663, UO1- HL62668, UO1-HL62732, and UO1- HL65160, from the National Heart, Lung, and Blood Institute. (Rochon 2003)" DOI: NR General notes: NR

Bohnert 2013

Study characteristics	
Methods	Study name: GIG ASPs (Girls in the Game after-school programmes) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 30 weeks Follow-up time(s): 30 weeks
Participants	Participants: 133 Setting: five public schools in Chicago, Illinois Country: United States Country income: high income Recruitment: Quote: "The randomized controlled trial took place at five public schools that were designated GIG after-school sites. All schools were located in underserved, urban low-income communities. Brief announcements about the study and GIG program were made 2 weeks prior to Time 1 data collection. Consent forms were handed out at these sessions and sent home with all female students accompanied by a cover letter from the principal investigator and an intake form for the GIG Program. Participants in this study were volunteers in the third to fifth grade, aged 8 to 12." % of eligible population enrolled: children: 100% (133/133) Age (years): mean: 9.13 (SD 1) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory and Sociocultural Theory Intervention type: dietary and activity Intervention group(s) participants: 96 Comparator type: non-active intervention Comparison group participants: 37 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by a seed grant from the Chicago Consortium to Lower Obesity in Chicago Children (CLOCC:AU 508485). None of the authors have any financial involvement with this organization." DOI: "The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article." General notes: NR

Brandstetter 2012

Study characteristics	
Methods	Study name: URMEL - ICE (Ulm Research on Metabolism, Exercise, and Lifestyle Intervention in Children) Study design: cluster RCT N of arms: 2 Unit of allocation: school

	Unit of analysis: individual Intervention period: 10 months Follow-up time(s): mean days: intervention: 427 (SD 60.7); control: 463 (SD 67.3)
Participants	Participants: 1119 Setting: elementary schools in Ulm and adjacent regions in Southern Germany Country: Germany Country income: high income Recruitment: Quote: "All principals of elementary schools within the Ulm region were informed in writing about the study (with support by the local Department of Education). They were asked to invite first-grade teachers to participate in the study. Teachers often consulted the pupils' parents before agreeing to participate. Parents were informed at parent-teacher conferences and provided signed written informed consent for their children to participate in assessments and clinical investigations." % of eligible population enrolled: schools: 100% (32/32); children: 78% (1119/1427); Age (years): mean: intervention: 7.6 (SD 0.4); control: 7.5 (SD 0.4) Gender/Sex: 53.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 540 Comparator type: non-active intervention Comparison group participants: 579 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (15 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study has been funded by the Baden-Württemberg Stiftung (Stuttgart, Germany)" DOI: "The authors declare that they have no conflicts of interest." General notes: the intervention and control group differed in the time lag between the two points of measurements

Branscum 2013

Study characteristics	
Methods	Study name: Comics for Health Study design: cluster RCT N of arms: 2 Unit of allocation: after school program Unit of analysis: individual Intervention period: 4 weeks Follow-up time(s): 4 months
Participants	Participants: 183 Setting: twelve YMCA sponsored after school programs from the Olentangy Local school district Country: United States Country income: high income Recruitment: Quote: "Recruitment procedures were consistent at each site, as controlled by the program facilitator. The benefit of working with a licensed after-school care provider, such as the YMCA, was that parents were required to be physically present when picking up their children. Therefore, during first few weeks of the study the program facilitator was able to approach parents of potential participants and explain the details of the study in order to collect parent permission forms. From Branscum 2011: For the purpose of this study a convenience sample of twelve YMCA sponsored after school programs were selected from the Olentangy Local school district." % of eligible population enrolled: children: 53.5% (98/183) Age (years): mean: intervention: 8.9 (SD 0.9); control: 9.1 (SD 1) Gender/Sex: intervention: 47% boys; control: 57% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention participants: 94 Comparator type: attention control (minimal activity intervention) Comparison participants: 89 Comparison: dietary and activity vs dietary and activity Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (dietary and activity interventions)
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: "The authors have declared no conflict of interest." General notes: PROGRESS data extracted from Branscum 2011

Breheny 2020

Study characteristics	
Methods	Study name: Daily Mile Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 4 months; 12 months
Participants	Participants: 2280 Setting: fourty trimary schools in the South of Birmingham Country: United Kingdom Country income: high income Recruitment: Quote: "All Birmingham, UK schools with at least 20 pupils in school years 3 (aged 7–8 years) and 5 (aged 9–10 years) were eligible for participation in the Birmingham Daily Mile study. Initially eligible schools from an ethnically and socio-economically diverse part of the city (Northfield) were invited to participate and schools that expressed an interest in the trial were enrolled. Subsequent pragmatic invitation of eligible schools from a wider area was used to reach the recruitment target of 40 schools whilst ensuring the final sample included schools that varied in terms of ethnic make-up and levels of deprivation. Schools were approached by email, summarising the study and inviting them to attend a briefing event where the study would be described in detail. If unable to attend the briefing they could obtain further information and discuss participation with the study coordinator at another opportunity. Follow-up communication was by email and telephone. Pupils from one class in years 3 and 5 at participating schools were invited to take part in study measurements.2 % of eligible population enrolled: schools: 37% (40/108); children: NR; Age (years): mean: 8.9 (SD 1) Gender/Sex: 52.4% boys
Interventions	Theory: Behaviour Change Theory Intervention type: activity Intervention group(s) participants: 1153 Comparator type: non-active intervention Comparison group participants: 1127 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (4 months) zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN12698269 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by Birmingham City Council and was facilitated by a collaboration between Birmingham City Council, SportBirmingham, Services for Education and the University of Birmingham. The National Institute for Health Research in England under its Career Development Fellowship fund (CDF- 2015-08-013) supported KB and EF. The views expressed in this publication are those of the authors and do not necessarily reflect those of the UK NHS, the National Institute for Health Research, or the Department of Health for England. There are no other relationships or activities that could appear to have influenced the submitted work." DOI: "There are no relationships or activities that could appear to have influenced the submitted work." General notes: tntervention schools were encouraged to implement The Daily Mile in all year groups, however outcome measurements were obtained only from children in years 3 and 5. The study is set in South Birmingahm, third deprived city in the UK, but the final sample included schools that varied in terms of ethnic make-up and levels of deprivation.

Brown 2013

Study characteristics	
Methods	Study name: Journey to Native Youth Health Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 76 Setting: two American Indian reservations in north-central and southwestern Montana Country: United States Country income: high income Recruitment: Northern Plains Indian youth 10-14 years old living on 2 American Indian reservations in north-central and southwestern Montana were recruited for the study % of eligible population enrolled: children: 82% (76/93); Age (years): mean: 11.4 (SD 1.1) Gender/Sex: 50% boys
Interventions	Theory: Transtheoretical Model, Stages of Change, Social Cognitive Theory Intervention type: dietary and activity Intervention participants: 38 Comparator type: attention control Comparison participants: 38 Comparison: dietary and activity vs control

	Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; zBMI short term; BMI percentile short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Caballero 2003

Study characteristics	
Methods	Study name: Pathways Study Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 3 years
Participants	Participants: 1704 Setting: seven American Indian schools serving American Indian communities in Arizona, New Mexico, and South Dakota Country: United States Country income: high income Recruitment: Quote: "A total of 41 schools in 7 American Indian communities were enrolled. All schools worked in partnership with a par- ticipating academic institution. Children were enrolled in the study, and baseline measurements were made at the end of the 2nd grade." % of eligible population enrolled: schools: NR; children: 83% (1704/2058) Age (years): mean: 7.6 (SD 0.6) Gender/Sex: 51.7 boys
Interventions	Theory: Social Learning Theory and principles of American Indian culture and practice Intervention type: dietary and activity Intervention group(s) participants: 879 Comparator type: non-active intervention Comparison group participants: 825 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by National Heart, Lung, and Blood Institute grants U01-HL-50869, -50867, -50905, -50885, and -50907." DOI: "None of the atuhors had financial interests related to this study. " General notes: trandomization stratified by participants % of body fat

Cao 2015

Study characteristics	
Methods	Study name: FIS (Family-Individual-School-Based Comprehensive Intervention) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 1 year; 2 years; 3 years
Participants	Participants: 2446 Setting: fourteen primary schools in a district of Shanghai Country: China Country income: upper middle income Recruitment: Quote: "All 26 primary schools in a district of the city were divided into three groups according to average obesity prevalence quartile among all first-grade students in 2011. According to the economic level of the communities in which the schools were located and the condition of school sports fields and canteens, four of seven schools with high obesity prevalence were selected and divided into intervention and control groups randomly by sortation. Similarly, six of 12 schools with middle obesity prevalence and four of seven with low obesity prevalence were selected and divided into intervention and control groups." % of eligible population enrolled: schools: 54% (14/26); children: 100% (2446/2446); Age (years): mean: intervention: 7.01 (SD 0.44); control: 6.81 (SD 0.24); Gender/Sex: 53.8% boys

Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1287 Comparator type: non-active intervention Comparison group participants: 1159 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (1 year) zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was supported by an award (Award Number 12GWZX0301) from the Shanghai Municipal Health Bureau. The content is the sole responsibility of the authors and does not necessarily represent the official views of the Shanghai Municipal Health Bureau." DOI: "No financial disclosures were reported by the authors of this paper. " General notes: NR

Carlin 2021

Study characteristics	
Methods	Study name: IPAP (Intelligent Personal Assistant Project) Study design: cluster RCT N of arms: 2 Unit of allocation: parent + 1 to 2 child(ren) Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 4 months (outcome measurement was planned but it is not reported if it was measured)
Participants	Participants: 34 Setting: Western Trust area of Northern Ireland Country: United Kingdom Country income: high income Recruitment: phase 1: Quote: "All families attending a community-based obesity prevention project, Safe Wellbeing Eating & Exercise Together (SWEET) as a family, were invited to participate in the study./Families are recruited to the SWEET project via social media sites, flyer distributions in schools, and local paper advertisements. Before approaching families, permission was obtained from the Healthy Lifestyle Coordinator of the Healthy Living Centre where the project was being delivered. Members of the research team attended the first session of the project and provided a verbal overview of the research study." phase 2: Quote: "Potentially eligible families were invited to take part in the study (not restricted to those attending the SWEET project) through a number of recruitment strategies. Local community group leaders were contacted and asked to provide permission for a member of the research team to approach families (parents) at relevant events, for example, parent or child groups, youth club, sports training sessions etc." % of eligible population enrolled: phase 1: families: 73% (11/15); children: NR; phase 2: families: 94% (15/16); children: NR; Age (years): mean: phase 1: 9.1 (SD 2); phase 2: 7.9 (SD2) Gender/Sex: phase 1: 44% boys; phase 2: 56% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: phase 1: 16 (at baseline); phase 2: 18 (at baseline) Comparator type: non-active intervention Comparison group participants: NR Comparison: dietary and activity vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI (planned) Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: measurement of the outcome at follow-up(s) was planned but results are not reported (there is no evidence that it was measured)
Notes	Clinical Trial Registry: ISRCTN16792534 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was funded by the GetAMoveOnNetwork+ (Engineering and Physical Sciences Research Council grant EP/NO27299/1). The funder had no role in the study design, data collection and analysis, decision to publish, or preparation of the paper." DOI: Conflict of interest: none declared General notes: zBMI data at follow-up not reported but height and weight were measured and zBMI is listed as secondary outcome in the trial registration but not in the main article. Quote: "All participant outcome measures were assessed at baseline and follow-up (12 weeks)." This pilot feasibility study was conducted in 2 phases. For phase 1, families who were attending a community-based weight management project were invited to participate, whereas phase 2 recruited families not currently receiving any additional intervention.

Chai 2019

Study characteristics

Methods	Study name: Back2Basics (Family telehealth consultations) Study design: RCT N of arms: 3 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 46 Setting: communities in New South Wales, New Castle, Tamworth, Armidale Country: Australia Country income: high income Recruitment: Quote: "Participants were children aged 4 to 11 years and their parents who consented to attend assessments at one of the three study sites in New South Wales, Australia, and to access the online intervention using their own electronic devices. The eligible child BMI was set to be above the mid-point of the healthy weight category (BMI ≥21.5 kg/m2) in order to be inclusive in recruiting children with overweight or obesity. Families were recruited to one metropolitan (i.e. Newcastle) and two rural sites (i.e. Tamworth, Armidale) between July 2017 and May 2018. Extensive recruitment strategies were used to distribute study information (including a direct link to the online screening survey) through networks surrounding the Hunter New England region: John Hunter Children's Hospital dietetics clinic (a regional tertiary weight management service; only one of three centres in New South Wales offering such service), health professional networks (including flyers mailed out to 136 general practitioners), 92 primary schools, family-friendly community venues (e.g. libraries, gyms, cafes), contemporary media (television news, newspaper and radio), and social media networks targeted to the Newcastle, Tamworth and Armidale regions." % of eligible population enrolled: families: 55% (46/83) Age (years): mean: 9 (SD 2.3) Gender/Sex: 59% boys
Interventions	Theory: CALO-RE taxonomy of behaviour change techniques, Behaviour-change techniques Intervention type: dietary Intervention group(s) participants: Back2Basics family intervention (telehealth): 16 Back2Basics family intervention (telehealth + SMS): 15 Comparator type: non-active intervention Comparison group participants: 15 Comparison: dietary vs control Setting of the intervention: telehealth Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study received funding from NIB foundation through the Hunter Medical Research Institute. The funding body was not involved in the research design, implementation, data collection, analysis and interpretation, or writing of the manuscript. LKC is supported by the University of Newcastle International Postgraduate Research Scholarships, Barker PhD Award Top-up Scholarship, and Emlyn and Jennie Thomas Postgraduate Medical Research Scholarship through the Hunter Medical Research Institute. CEC is supported by an NHMRC Senior Research Fellowship and a Faculty of Health and Medicine, Gladys M Brawn Senior Research Fellowship, the University of Newcastle. TLB is supported by a Faculty of Health and Medicine, Early Career Brawn Fellowship, the University of Newcastle." DOI: "The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article. " General notes: to reduce the waiting time for families who enrolled early, families commenced the programme in six different cohorts at various time frames ranging from July 2017 to April 2018 and attended their respective data collection sessions for each time point.

Chen 2010

Study characteristics	
Methods	Study name: ABC study (Active Balance Childhood study) Study design: RCT N of arms: 2 Unit of allocation: mother/child dyad Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 5 months mean (intervention: 6 months; control: 4 months); 7 months mean (intervention: 8 months; control: 6 months; see Notes)
Participants	Participants: 67 Setting: San Francisco Bay area of California Country: United States Country income: high income Recruitment: Quote: "Children 8-10-year old who self-identified as Chinese, and their mothers, were invited to participate in this study. Participants were recruited from Chinese language programs in the San Francisco Bay area. Research assistants described the study to potential children and gave them an introduction letter and research consent form to take home to their parents." % of eligible population enrolled: dyads: 97% (67/69); Age (years): mean: 8.97 (SD 0.89) Gender/Sex: 56.7% boys
Interventions	Theory: Behaviour-change techniques related to healthy eating Intervention type: dietary and activity Intervention group(s) participants: 35

	Comparator type: non-active intervention Comparison group participants: 32 Comparison: dietary and activity vs control Setting of the intervention: study center + home Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months; see Notes) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This publication was made possible by grant number KL2RR024130 to J.L.C. from the National Center for Research Resources, a component of the National Institutes of Health (NIH) and NIH Roadmap for Medical Research, Chinese Community Health Care Association community grants and in part by NIH grant DK060617 to M.B.H." DOI: NR General notes: we notice an inconsistency in the reporting of the follow-up points between the main text and figure 1, as well as between the intervention and control group in figure 1 in Chen 2010a and figure 1 in Chen 2010b

Choo 2020

Study characteristics	
Methods	Study name: The Three-Healthy Program (Healthy Children, Healthy Families, Health Communities Program) Study design: cluster RCT N of arms: 2 Unit of allocation: community centre Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 120 Setting: eight community child centers in the Seongbuk municipal county, Seoul Country: South Korea Country income: high income Recruitment: the principal investigator contacted a steering group of 26 community child centers in Seongbuk county, and visited each one to explain the purpose and characteristics of the study. Eight centers agreed to participate, which had a total of 261 children, and then were randomly allocated to the intervention group (four centers) and the control group (four centers). % of eligible population enrolled: community centers: 31% (8/26); children: 88% (107/121); Age (years): mean: 10 (SD 1.23) Gender/Sex: 54.8 boys
Interventions	Theory: Cognitive Learning Theory Intervention type: dietary and activity Intervention group(s) participants: 62 Comparator type: non-active intervention Comparison group participants: 58 Comparison: dietary and activity vs control Setting of the intervention: community + home Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN11347525 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was supported by the National Research Foundation of Korea grant funded by the Korea government (MSIP) (No. NRF-2014R1A2A1A11050974" DOI: "The authors declare no conflict of interest." General notes: this study was was a cluster-randomized controlled trial, embedded in a larger parent study, 'Development and Effects of the Healthy Children, Healthy Families, Healthy Communities Program (i.e. The Three-Healthy Programme) for Obesity Prevention among Vulnerable Children: Using the Ecological Perspective' conducted from 2014 to 2017

Clemes 2020

Study characteristics	
Methods	Study name: Stand Out In Class Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 4.5 months Follow-up time(s): 7 months
Participants	Participants: 176 Setting: eight government-funded primary schools located in the City of Bradford Country: United Kingdom Country income: high income Recruitment: Quote: "Government-funded primary schools located in the City of Bradford were invited to participate in the

	study. The following three-stage recruitment process was adopted for schools: 1) head teachers/senior teachers were sent an email detailing the study, which included a copy of an Information Sheet for Schools; 2) 2 days after sending the email, the schools were contacted via telephone and the reception team were asked to confirm receipt of the email; 3) a follow-up telephone call was made to establish the schools' interest or otherwise in participating in the study. A designated lead teacher was identified for each interested school who was then given full details of the study and what their involvement would entail. Consenting schools were asked to nominate a year 5 class and were provided with invitation packs for the parents/guardians of children within these classes. All children within participating classes were eligible to take part in the evaluation." % of eligible population enrolled: schoold: 33% (8/24); children: 75% (176/234) Age (years): mean: 9.3 (SD 0.5) Gender/Sex: 56% boys
Interventions	Theory: COM-B with Behaviour Change Wheel, Theoretical Domains Framework Intervention type: activity Intervention group(s) participants: 86 Comparator type: non-active intervention Comparison group participants: 90 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN12915848 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was funded by the National Institute for Health Research (NIHR) Public Health Research Programme (reference: 14/231/20). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care." DOI: "The sit-stand desks used in this study were supplied via an in-kind donation from Ergotron Inc., USA. The company played no role in the study design, data collection or data analyses, or in the preparation of this paper. The company had no relevant interests/rights in terms of project outcomes and uses. JS notes that she has a potential conflict of interest as her husband owns a business to manufacture height-adjustable desks for schools. These desks were not used in this research, and she was not involved in the data analysis. The remaining authors declare no other competing interests." General notes: NR

Coleman 2012

Study characteristics	
Methods	Study name: Healthy ONES (Healthy Options for Nutrition Environments in Schools) Study design: cluster RCT (nested cohort design) N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 12 months; 24 months
Participants	Participants: 1273 Setting: eight low-income schools in South Carolina Country: United States Country income: high income Recruitment: a low-income school district volunteered for participation in the study. All schools agreed to participate. A total of 827 second and third grade and 446 sixth grade students were eligible for the study and approached for consent. % of eligible population enrolled: schools: 100% (8/8); children: 45.5% (579/1273); Age (years): mean: 8.9 (SD 1.6) Gender/Sex: 43% boys
Interventions	Theory: Ecological and Developmental Systems Theories, Behavioral Ecological Model Intervention type: dietary Intervention group(s) participants: 647 Comparator type: non-active intervention Comparison group participants: 626 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with obesity Outcome(s) included in the meta-analysis: zBMI medium term (12 months) zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding for this study was provided by the United States Department of Agriculture (USDA) National Research Initiative (NRI) award #2007-55215- 05323 / (2007-55215-18241)." DOI: "The authors declare that they have no competing interests." General notes: NR

Crespo 2012

Study characteristics	
Methods	Study name: APN (Aventuras para Niños) Study design: cluster RCT N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 1 year; 2 years; 3 years
Participants	Participants: 581 Setting: thirteen primary schools in the South Bay region of San Diego County, adjacent to the United States - Mexico border Country: United States Country income: high income Recruitment: project staff contacted the principal of each school, described the study objectives and methods, determined whether inclusion criteria were met and obtained consent to participate in and be randomized to one of the four conditions. Parents were recruited directly on school grounds, during school presentations, and through fliers sent home with students. % of eligible population enrolled: schools: 65% (13/20); children: 99% (808/818); Age (years): mean: 5.9 (SD 0.9) Gender/Sex: 50% boys
Interventions	Theory: Health Belief Model, Social Cognitive Theory, Structural Model of Health Behavior Intervention type: dietary and activity Intervention group(s) participants: Aventuras para Niños (APN)- family/Home + school/Community (Fam + Comm) Intervention: 165 Aventuras para Niños (APN)- family/Home (Fam-only) Intervention: 198 Aventuras para Niños (APN) - school/Community (Comm-only) Intervention: 218 Comparator type: non-active intervention Comparison group participants: 227 Comparison: dietary and activity vs control Setting of the intervention: school + community/home/school + community + home (multi-arm study) Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI medium term; BMI percentile medium term (1 year) zBMI long term; BMI percentile long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The Aventuras para Niños study was funded by the National Heart, Lung and Blood Institute (5R01HL073776). Additional support was provided to Dr. Elder and Dr. Ayala by the Centers for Disease Control and Prevention (5U48DP000036), to Dr. Ayala by the American Cancer Society (RSGPB 113653), to Dr. Arredondo by the American Cancer Society (PFT-04-156-01), and to Dr. Crespo by the National Institute of Diabetes and Digestive and Kidney Diseases (F31DK079345) and the National Heart, Lung and Blood Institute (T32HL079891)." DOI: "The authors have no conflicts of interest to declare." General notes: the Aventuras para Niños (APN) study was a three-year, 2 × 2 factorial design randomized controlled community trial with thirteen schools randomized to one of four conditions

Cunha 2013

Study characteristics	
Methods	Study name: PAPPAS (Parents, students, and teachers for healthy eating) Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 6 months; 9 months
Participants	Participants: 574 Setting: twenty municipal schools in Duque de Caxias, Rio de Janeiro, Brazil. Country: Brazil Country income: upper middle income Recruitment: Quote: "This district has 35 municipal schools, and 20 schools with fifth grade classes were selected; these were all located in areas not considered high risk for violence. The sample included most of public schools from Duque de Caxias, and the dropout rate was low. The sample included 20 classes from 20 schools (1 class in each school)." % of eligible population enrolled: schools: 100% (20/20); children: 100%: (574/574); Age (years): mean: intervention: 11.2 (SD 1.3); control: 11.2 (SD 1.3) Gender/Sex: intervention: 52.3% boys; control: 51.4% boys
Interventions	Theory: Transtheoretical Model Intervention type: dietary Intervention group(s) participants: 281 Comparator type: non-active intervention Comparison group participants: 293 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (9 months)

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01046474 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by Foundation of Support of Research of the State of Rio de Janeiro - FAPERJ (E261029422008); National Counsel of Technological and Scientific Development - CNPQ (474288/2009-9); Pan American Health and Education Foundation - PAHEF. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript" DOI: "The authors declared that no competing interests exist." General notes: different students entered and left the study at different points in time: "During the school year, a number of students left the school and others joined. In addition, some students who did return the signed informed consent at baseline did so in the middle of the school year (phase 2) or during the third phase of the study."

Damsgaard 2014

Study characteristics	
Methods	Study name: OPUS (The Optimal Well-Being, Development and Health for Danish Children through a Healthy New Nordic Diet (OPUS) School Meal Study) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 823 Setting: nine primary schools in Zealand and Lolland-Falster Country: Denmark Country income: high income Recruitment: schools were recruited by telephone and e-mail. Inclusion criteria for schools were as follows: (1) location in the eastern part of Denmark (Zealand and Lolland-Falster); (2) at least four classes at the third- and fourth-grade levels; (3) suitable kitchen facilities available for food preparation; (4) high motivation for participation as determined by the study team(23). All the 1021 third- and fourth-grade children at the nine included schools were invited to participate in the study. Written information about the study was given to the parents, and oral information about the study was given to both parents and children % of eligible population enrolled: schools: 23% (9/39); children: 81% (823/1019); Age (years): mean: 10 (SD 0.6) Gender/Sex: 52.1% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 398 Comparator type: non-active intervention Comparison group participants: 425 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01457794 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The OPUS study was supported by the Nordea Foundation (grant no. 02-2010-0389). Danæg A/S, Naturmælk, Lantma¨nnen A/S, Skærtoft Mølle A/S, Kartoffelpartnerskabet, AkzoNobel Danmark, Gloria Mundi and Rose Poultry A/S provided foods in kind for the study. The Nordea Foundation and the food sponsors had no role in the design and analysis of the study or in the writing of this article. A. A. has received royalties from the sale of New Nordic Diet cookbooks from FDB/Coop. " DOI: "One author has received royalties from the sale of New Nordic Diet cookbooks from FDB/Coop. Remaining authors declare no conflict of interest." General notes: NR

Davis 2021

Study characteristics	
Methods	Study name: TX (Texas) Sprouts Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (10 months) Follow-up time(s): 10 months
Participants	Participants: 3302 Setting: sixteen primary school located within 60 miles of the University of Texas at Austin (UT-Austin) campus, Texas Country: United States Country income: high income Recruitment: Quote: "All schools had to meet the following inclusion criteria: (1) high proportion of Hispanic children (>50%);

	(2) high proportion of children participating in the free and reduced lunch (FRL) program (>50%); (3) location within 60 miles of the University of Texas at Austin (UT-Austin) campus; and (4) no existing garden or gardening program. The 2014–2015 Texas Education Agency (TEA) directory of schools in Texas contained 8,653 active public elementary schools in Texas and 582 schools had a distance of less than 60 miles from UT-Austin. Only 79 of these schools had over 50% or more Hispanic students in each of grades 3–5. Seventy-three of the schools had 50% or more students participating in the FRL program in each one of the 3rd-5th grades. All 73 schools were invited to participate: 20 schools from five different independent school districts agreed to participate. Research staff visited all 20 schools to ensure that the school did not have an existing garden or gardening program. The first 16 out of the 20 schools to provide letters of support were randomly assigned to either the intervention (n=8 schools) or control group (delayed intervention; n=8 school). The four remaining schools were placed on a contingency list, in case any of the 16 randomly assigned schools dropped out. Of the 16 randomly assigned schools, two schools declined to participate due to their academic status and were replaced with two of the schools on the contingency list. Due to budgetary concerns and the large enrollment in schools, two schools measured only 4th and 5th grade students instead of 3rd-5th grade students. All 3rd-5th grade students and parents at the recruited schools were contacted to participate via information tables at “Back to School” and “Meet the Teacher” evening events, flyers sent home with students, and teachers making class announcements in the fall after the garden had been built at the school. All recruitment materials were available in both English and Spanish." % of eligible population enrolled: schools: 22% (16/73); children: 74% (3125/4239); Age (years): mean: 9.23 (SE 0.02) Gender/Sex: 47.4% boys
Interventions	Theory: Social Ecological-Transactional Model Intervention type: dietary Intervention group(s) participants: 1491 (at baseline) Comparator type: non-active intervention Comparison group participants: 1811 (at baseline) Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term; BMI percentile medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02668744 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This clinical study was funded by the National Institutes of Health [1R01HL123865, 2015–2020). Whole Kids Foundation, c, and Sprouts Healthy Communities Foundation gave funding for garden builds and enhancements. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." DOI: "The authors declare that they have no competing interests." General notes: NR

De Bock 2013

Study characteristics	
Methods	Study name: Ene mene fit Study design: cluster RCT N of arms: 2 Unit of allocation: preschool Unit of analysis: individual Intervention period: 6-9 months Follow-up time(s): 6 months; 12 months
Participants	Participants: 1028 Setting: thirty-nine preschools in three distinct regions of Baden-Wu¨rttemberg, Country: Germany Country income: high income Recruitment: children who enrolled at one of the preschools participating in the state-sponsored health promotion programme “Komm mit in das gesunde Boot” (“Come aboard the healthy boat”) were eligible % of eligible population enrolled: preschools: 85% (39/46); children: 80% (826/1028; children with informed consent/eligible children); Age (years): mean: 5.05 (SD or SE 0.2) Gender/Sex: 52% boys
Interventions	Theory: General Systems Theory Intervention type: activity Intervention group(s) participants: 534 Comparator type: non-active intervention Comparison group participants: 494 Comparison: activity vs control Setting of the intervention: school + community Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months) BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00987532 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by a grant from the Baden- Wu¨rttemberg Stiftung. FDB is supported by the European Social Fund and by the Ministry of Science, Research and the Arts Baden-Wu¨rttemberg. Neither the funding bodies nor any company played a role in the design of the study, data collection, analysis or interpretation of the results, the

	decision to publish, or the contents of the report. Experts paid by the Baden-Wu¨rttemberg Stiftung have developed the statesponsored PA program, but were not involved with the development of the participatory parent-focused intervention." DOI: "No financial disclosures were reported by the authors of this paper. " General notes: the current study,"Ene mene fit", is a cluster-randomized trial embedded within the state sponsored programme " Come aboard the healthy boat" ("Komm mit in das gesunde Boot". It uses a two level sampling strategy involving both preschools from three geographic regions that had formally applied for participation in the state-sponsored programme and the parents of children enrolled at these sites. One preschool (8 children) from the intervention group withdrew consent because teacher disliked measurements; one preschool (9 children) from the control group declined measurement because teacher disliked measurements.

de Greeff 2016

Study characteristics	
Methods	Study name: F&V (Fit en Vaardig op school) Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 22 weeks Follow-up time(s): 22 weeks
Participants	Participants: 378 Setting: twelve different schools in the Northern Netherlands Country: Netherlands Country income: high income Recruitment: Quote: "Data were obtained from 388 children across 12 different schools in the northern part of the Netherlands. From every school, the second- or third-grade class was randomly assigned to the intervention group." % of eligible population enrolled: schools: NR; children: 97% (376/388) Age (years): mean: 8.1 (SD 0.7) Gender/Sex: 55% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 183 Comparator type: non-active intervention Comparison group participants: 195 9 (note: data from ten children were excluded from the analysis as were consudered outliers) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (22 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study is supported by a national educational grant from the Ministry of Education, Culture and Science (ODB10015)." DOI: NR General notes: NR

De Heer 2011

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 4 months
Participants	Participants: 646 Setting: six schools in El Paso Texas Country: United States Country income: high income Recruitment: the authors approached 9 schools in El Paso, Texas, in July and August 2008 by contacting the principal and the physical education (PE) teachers; 6 schools (67%) agreed to participate. Selection criteria were school location (for logistical purposes, half of those chosen were located within 5 miles of the University of Texas at El Paso campus), size, socioeconomic status, and percentage of children with limited English proficiency. We recruited students in third, fourth, and fifth grades by making announcements and passing out consent forms during PE classes. % of eligible population enrolled: schools: 67% (6/9); children: 52% (901/1720); Age (years): mean: intervention: 9.24 (SD 0.87); control: 9.10 (SD 1.08); spillover: 9.27 (SD 0.84) Gender/Sex: interveniton: 54.1% boys; control: 55.4% boys; spillover: 48.6%
Interventions	Theory: Ecological Principles, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 292 Comparator type: non-active intervention Comparison group participants: 354 (note: 251 children did not agree to participate in the programme but agreed to be

	surveyed (spillover group)) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; BMI percentile short term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This project was supported by pilot research grants from the Center for Border Health Research through the Paso del Norte Health Foundation and by the National Institutes of Health Hispanic Health Disparities Research Center (grant P20MD002287-01)." DOI: NR General notes: NR

de Ruyter 2012

Study characteristics	
Methods	Study name: DRINK (Double-blind Randomized Intervention Study in Kids) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 18 months Follow-up time(s): 6 months; 12 months; 18 months; 24 months
Participants	Participants: 641 Setting: eight elementary schools in Zaanstreek, Purmerend and Haarlem Country: Netherlands Country income: high income Recruitment: the authors recruited children at eight elementary schools in an urban area near Amsterdam. They enrolled and individually randomly assigned 641 children, stratified according to school, sex, age, and initial body-mass index. Children in the same household received the same type of beverage, but they were unaware of this assignment. % of eligible population enrolled: children: 92% (641/699) Age (years): mean: 8.2 (SD 1.9) Gender/Sex: 53.1% boys
Interventions	Theory: NR Intervention type: dietary Intervention participants: 319 Comparator type: attention control Comparison participants: 322 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6months) zBMI medium term (12 months) zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00893529; NTR1796; Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by grants from the Netherlands Organization for Health Research and Development (120520010), the Netherlands Heart Foundation (2008B096), and the Royal Netherlands Academy of Arts and Sciences (ISK/741/PAH)." DOI: "Disclosure forms provided by the authors are available with the full text of this article at NEJM.org." General notes: NR

Di Maglie 2022

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 160 Setting: two secondary level public schools in Southern Italy Country: Italy Country income: high income Recruitment: The authors selected a sample of 160 children, aged 11.5 ± 0.5 years, belong terming to two schools. These schools have never participated in health promotion programs and are located in two cities with similar socio-economic status.

	% of eligible population enrolled: children: 100% (160/160) Age (years): mean: intervetion: 12.1 (SD 0.5); control: 11.5 (SD 0.5) Gender/Sex: 48.75% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 80 Comparator type: non-active intervention Comparison group participants: 80 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: it is unclear whether the data repoted are from BMI or percentile measurements and whether they reported a standard deviatin or a standard error.
Notes	Clinical Trial Registry: NR Funder(s) type: no funding received Writing and/or research independent from funder(s): n/a Funding details: Quote: "This research received no external funding. The authors declare that they have no competing interest and they have ethics approval and consent to participate." DOI: "The authors declare that they have no competing interest and they have ethics approval and consent to participate." General notes: participants in this study were children regularly practicing school physical education and/or sporting activities such as basketball, soccer, swimming, and volleyball.

Diaz-Castro 2021

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 103 Setting: a center for primary and secondary education in the Malaga region Country: Spain Country income: high income Recruitment: Quote: "A total of 122 students were asked to participate in the study. During the enrolment phase, 14 students refuse to participate, mainly because they were already performing sports extracurricular activities several days per week after school hours, and one of them because he had a chronic disease (diabetes). Moreover, 5 students who agreed to participate in the study, finally left it because parents did not complete the informed consent form. The boys were studying during the second semester in a Center for Primary and Secondary Education in the Malaga region (Spain)." % of eligible population enrolled: children: 85% (103/121) Age (years): mean: intervetion: 11.16 (SD 0.18); control: 11.21 (SD 0.17) Gender/Sex: 100% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 52 Comparator type: non-active intervention Comparison group participants: 51 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "JM-F was supported by a Postdoctoral Contract (Perfeccionamiento de Doctores) from the University of Granada" DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: NR

Donnelly 2009

Study characteristics	
Methods	Study name: PAAC (Physical Activity Across the Curriculum) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual

	Intervention period: 3 years Follow-up time(s): 2.5 years
Participants	Participants: 1527 Setting: twenty-four elementary schools in Northeast Kansas Country: United States Country income: high income Recruitment: Quote: "Twenty-four elementary schools in Northeast Kansas were randomized to receive PAAC or to serve as control. Randomization was stratified by school size and rural versus urban location. All students in the respective grades in the schools randomized to PAAC participated in PAAC since it was adopted as a curriculum. Prior to enrollment in the study, a standardized, power point presentation was made by the study investigators at each school to assure that the school staff understood all the obligations associated with participation. The targeted enrollment into the study was to have 27% of the students classified as minorities and 50% of the students will be receiving free or reduced meals." % of eligible population enrolled: NR Age (years): mean (SD): grade 2: female intervention: 7.7 (SD 0.3); female control: 7.8 (0.4); male intervention: 7.7 (0.4); male control: 7.8 (0.3); grade 3: female intervention 8.7 (0.4); female control: 8.7 (0.4)); male intervention: 8.7 (0.3); male control: 8.8 (0.4) Gender/Sex: 48.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 814 Comparator type: non-active intervention Comparison group participants: 713 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (2.5 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by grant NIH NIDDK R01 061489 from the National Institute of Diabetes and Digestive and Kidney Disease, Bethesda, MD. The authors would like to thank the International Life Sciences Institute for Health Promotion for educational materials" DOI: NR General notes: pata reported as narrative only for BMI percentile outcome

Drummy 2016

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 107 Setting: seven primary schools in Northern Ireland Country: United Kingdom Country income: high income Recruitment: one hundred fifty children aged 9 and 10 in seven primary schools in Northern Ireland were invited to participate in the study. The schools were a convenience sample of primary schools. % of eligible population enrolled: schools: NR; children: 80% (120/150); Age (years): mean: 9.5 Gender/Sex: NR
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 54 Comparator type: non-active intervention Comparison group participants: 53 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: Conflict of interest: none declared General notes: the follow up appears to be at the end of intervention, which lasted 12 weeks, but it is not clearly stated

Duncan 2019

Study characteristics	
Methods	Study name: Healthy Homework Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 6 months
Participants	Participants: 1200 Setting: sixteen primary schools from Auckland and Dunedin Country: New Zealand Country income: high income Recruitment: Quote: "A total of 16 primary schools from Auckland (n = 10) and Dunedin (n = 6) were randomly selected to participate in the study from a sampling frame of all eligible schools. One Year 3, Year 4, and Year 5 class from each school were then selected to participate; simple random sampling was used in instances where there were two or more classes per year. Year 6 classes were excluded to permit final follow-up measurements. At the intervention schools, all children in the selected classes received the Healthy Homework programme as part of the schools' curricula." % of eligible population enrolled: schools: 94% (16/17); children: 56% (675/1200); Age (years): mean: intervention: 8.71 (SD 0.99); control: 8.74 (SD 1.04) Gender/Sex: 48.3% boys
Interventions	Theory: Social Cognitive Theory, Theory of Reasoned Action and Planned Pehaviour Intervention type: dietary and activity Intervention group(s) participants: 600 Comparator type: non-active intervention Comparison group participants: 600 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12618000590268 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding for the Healthy Homework study was provided by a Health Research Council of New Zealand Project Grant (10–207)" DOI: "The authors declare that they have no competing interests." General notes: NR

Elder 2014

Study characteristics	
Methods	Study name: MOVE/me Muevo Study design: cluster RCT N of arms: 2 Unit of allocation: recreation centre Unit of analysis: individual Intervention period: 24 months Follow-up time(s): 12 months; 24 months
Participants	Participants: 541 Setting: thirty public recreation centers in San Diego County Country: United States Country income: high income Recruitment: Quote: "Thirty public recreation centers in San Diego County were recruited. Families were recruited through targeted phone calls; 8600 telephone numbers were obtained from a research marketing company. In addition, 1000 families were contacted at public locations, such as libraries, schools, community events (street fairs, special gatherings) and the 30 participating recreation centers. In accordance with the study design, recreation centers were the unit of randomization and individual participating families were the unit of analysis (~18 families per recreation center)." % of eligible population enrolled: recreation centers: NR; families: 46.5% (541/1162; enrolled/screened) Age (years): mean: 6.6 (SD 0.7) Gender/Sex: 45.1% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 271 Comparator type: non-active intervention Comparison group participants: 270 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term; BMI percentile medium term (12 months) BMI long term; zBMI long term; BMI percentile long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00381069 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR

	Funding details: Quote: "This study was supported by the National Institutes of Health grant NIDDK R01DK072994. NCC was supported by grants T32HL079891 and F31KD079345. KC was supported by the Medical Research Council Epidemiology Unit [Unit Programme number U106179474] and the Centre for Diet and Activity Research (CEDAR), a UKCRC Public Health Research: Centre of Excellence. Funding from the British Heart Foundation, Economic and Social Research Council, Medical Research Council, the National Institute for Health Research, and the Wellcome Trust, under the auspices of the UK Clinical Research Collaboration, is gratefully acknowledged." DOI: "The authors have no disclosures or conflict of interest to declare." General notes: NR

Epstein 2001

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 6 months; 12 months
Participants	Participants: 30 Setting: households in Buffalo, New York Country: United States Country income: high income Recruitment: Quote: "Families with at least one obese parent and a 6- to 11-year-old non-obese child were recruited through physician referrals, posters, newspapers, and television advertisements for the Childhood Weight Control and Prevention Programs at the University of New York at Buffalo. A total of 30 families were accepted into the program." % of eligible population enrolled: NR Age (years): mean: increase fruit and vegetable group: 8.8 (SD 1.8); decrease fat and sugar group: 8.6 (SD 1.9) Gender/Sex: 47% boys
Interventions	Theory: Traffic Light Diet Intervention type: dietary and activity Intervention participants: 15 Comparator type: dietary and activity intervention Comparison participants: 15 Comparison: dietary and activity vs dietary and activity Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; proportion of children with overweight Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narrativelly and the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (dietary and activity interventions).
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded in part by National Institutes of Health Grant HD34284" DOI: NR General notes: participant were children at risk of obsity (i.e. one parent was obese)

Fairclough 2013

Study characteristics	
Methods	Study name: CHANGE! (Children's health, Activity and Nutrition: Get Educated!) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 20 weeks; 30 weeks
Participants	Participants: 318 Setting: twelve primary schools in the Wigan Borough in northwest England Country: United Kingdom Country income: high income Recruitment: Quote: "Eligible schools were identified within pre-defined geographical units known as Neighbourhood Management Areas (NMA). school-level socio-economic status (SES) was defined as the percentage of students per school eligible to receive free school meals. Within each NMA, one high and one low socioeconomic status school were randomly selected to take part to ensure representation of the diverse geographical and social contexts present within the locale. Twelve primary schools were approached and recruited to the study. In each school all children within Year 6 (10–11 years old) were invited to take part in the study." % of eligible population enrolled: schools: 100% (12/12); children: 76% (318/420); Age (years): mean: intervention: 10.6 (SD 0.3); control: 10.7 (SD 0.3) Gender/Sex: NR
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 166

	Comparator type: non-active intervention Comparison group participants: 152 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN03863885 Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: "The authors declare that they have no competing interests." General notes: NR

Farmer 2017

Study characteristics	
Methods	Study name: PLAY Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 year Follow-up time(s): 1 year, 2 year
Participants	Participants: 902 Setting: sixteen state primary schools in the Otago region and Waitakere City (within the Auckland region) Country: New Zealand Country income: high income Recruitment: Quote: "State primary schools (years 1–8 that are fully funded by the state and coeducational) with at least 150 pupils, and a school decile ranking of 1–6 were eligible. Eleven schools met these criteria within the Otago region and 31 in Waitakere City. Eleven schools were approached in Otago and 10 in Auckland and recruitment stopped once 16 schools (eight in each region) provided informed consent to participate (November 2010 to March 2011). Pairs of schools were created by matching for region, school roll and decile ranking. Although all children in intervention schools were exposed to the intervention, only children in school years 2 and 4 were invited to participate in outcome assessments." % of eligible population enrolled: schools: 38% (16/42); children: 54.2% (902/1663); Age (years): mean: intervention: 8.0 (SD 1.2); vontrol: 7.9 (SD 1.1) Gender/Sex: 53.6% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 458 Comparator type: non-active intervention Comparison group participants: 444 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (1 year) BMI long term; zBMI long term (2 year) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12612000675820 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The PLAY study was funded by the Health Research Council of New Zealand and the Otago Diabetes Research Trust. VLF was in receipt of a Medicine Award and subsequently a Lottery Health Research New Zealand PhD Scholarship during her PhD study. RWT is partially funded by a Fellowship from the Karitane Products Society (KPS) Limited. The funders had no role in the design of the study; the collection, analysis and interpretation of the data; the writing of the manuscript; or the decision to submit the article for publication." DOI: "The authors declare that they have no conflicts of interest." General notes: NR

Ford 2013

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 15 weeks Follow-up time(s): 15 weeks; 30 weeks
Participants	Participants: 152 Setting: two primary schools located within the South East of England Country: United Kingdom Country income: high income

	Recruitment: Quote: "In total, 174 pupils aged 5–11 years, from two primary schools located within the southeast of England, were invited to take part in the study." % of eligible population enrolled: children: 87% (152/174) Age (years): range 5-11 Gender/Sex: 52% boys (cohort that completed the intervention)
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 77 (at baseline) Comparator type: non-active intervention Comparison group participants: 75 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Foster 2008

Study characteristics	
Methods	Study name: SNPI (School Nutrition Policy Initiative) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 1349 Setting: ten schools in the School District of Philadelphia Country: United States Country income: high income Recruitment: Quote: "The study was conducted in 10 schools in the school District of Philadelphia. schools were the unit of randomization and intervention. Ten schools were selected from among 27 Kindergarten through eighth grad schools with 50% of students eligible for free or reduced- price meals. To obtain pairs of 2 schools per cluster, the 27 schools were first organized into 5 clusters of 4 to 7 schools each, based on school size and type of food service (eg, full service [2 clusters] or heat and serve [3 clusters]). schools within each cluster were approached to participate in a predetermined, random order. When 2 schools in each cluster agreed to participate, the schools were randomly assigned as intervention or control schools. A total of 12 schools were approached; 2 declined and 10 were enrolled.2 % of eligible population enrolled: schools: 37% (10/27); children: 94% (1349/1441); Age (years): mean: 11.2 (SD 1) Gender/Sex: 46.2% boys
Interventions	Theory: Settings-based approach; CDC Guidelines to Promote Lifelong term Healthy Eating and Physical Activity Intervention type: dietary and activity Intervention group(s) participants: 749 Comparator type: non-active intervention Comparison group participants: 600 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI long term; zBMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00142012 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by grants from the Centers for Disease Control and Prevention (R06/CCR321534-01) and the US Department of Agriculture/Food and Nutrition Service through the Pennsylvania Nutrition Education Program as part of Food Stamp Nutrition Education." DOI: NR General notes: number of eligible participants was extracted from Borradaile 2017

Fulkerson 2010

Study characteristics	
Methods	Study name: HOME (Healthy Home Offerings via the Mealtime Environment) Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad

	Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 44 Setting: two elementary schools/after-school programs in Minneapolis Country: United States Country income: high income Recruitment: Quote: "Parent/child dyads were recruited from two elementary schools/after-school programs via flyers, school newsletters, and small group presentations. After-school program staff were hired on a limited basis to aid recruitment efforts and provide childcare services during the intervention sessions. The parent/guardian that prepared most of the household meals and one 8–10 year old child were recruited per household. Interested parents (n=50) were directed to contact the project director by phone, email, or inperson for eligibility screening." % of eligible population enrolled: dyads: 90% (44/49); Age (years): range 8-10 Gender/Sex: 48% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary Intervention group(s) participants: 22 Comparator type: non-active intervention Comparison group participants: 22 Comparison: dietary vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI short term; BMI percentile short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institutes of Health (NIDDK R21 DK72997). The authors do not have a conflict of interest. The funders played no role in the design, implementation or write up of the study." DOI: "The authors do not have a conflict of interest." General notes: pilot study designed to develop, implement, and test the feasibility and acceptability of the HOME program

Fulkerson 2015

Study characteristics	
Methods	Study name: HOME Plus (Healthy Home Offerings via the Mealtime Environment Plus Study) Study design: RCT (staggered-cohort design - see notes) N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 12 months; 21 months
Participants	Participants: 160 Setting: Minneapolis Country: United States Country income: high income Recruitment: staff and volunteers recruited children and their families from community centers using flyers, targeted email lists, in-person presentations/discussions, and some learned of the study by word of mouth. % of eligible population enrolled: children: 81% (160/198) Age (years): mean: 10.3 (SD 1.4) Gender/Sex: 53% boys
Interventions	Theory: Social Cognitive Theory, Socio-Ecological Framework, Behaviour-Change Techniques Intervention type: dietary Intervention participants: 81 Comparator type: attention control Comparison participants: 79 Comparison: dietary vs control Setting of the intervention: home + community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (12 months) zBMI long term (21 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NCT01538615 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Research reported in this publication was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) of the National Institutes of Health (NIH) under Award Number R01DK08400 (J. Fulkerson, PI). The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH. Software support was also provided by the University of Minnesota's Clinical and Translational Science Institute (Grant Number UL1TR000114 from the National Center for Advancing Translational Sciences of the NIH)." DOI: "The authors declare that they have no competing interests." General notes: a staggered-cohort design was used in which two cohorts of families from a large metropolitan area in the upper US Midwest were recruited and randomized to treatment groups one year apart (2011 and 2012).

Fulkerson 2022

Study characteristics	
Methods	Study name: NU-HOME (New Ulm at HOME - Healthy Home Offerings via the Mealtime Environment) Study design: RCT (staggered-cohort design - see notes) N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 8-10 months after baseline
Participants	Participants: 114 Setting: New Ulm or Sleepy Eye communities, Minnesota Country: United States Country income: high income Recruitment: Quote: "The recruitment strategy included distribution of flyers at pediatric clinics and community sites, study information posted in community education brochures, informational sessions at community events, and letters mailed to families with children in the eligible age range served by the local health system and signed by a pediatrician (who was also a member of the Action Team). Study promotion also occurred through marketing channels, distribution through children's backpacks from school, local newspapers and other communications formats. Eligible NU-HOME study participants included 7–10-year-old children and a parent/guardian (hereafter referred to as parents) who lived within a 50-mile radius of the rural New Ulm or Sleepy Eye, Minnesota communities." % of eligible population enrolled: dyads: 80% (114/142) Age (years): mean: 9 (SD 1.1) Gender/Sex: 41.2% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 58 Comparator type: non-active intervention Comparison group participants: 56 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02973815 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by National Institutes of Health (NIH) award 1R01HL123699 (National Heart, Lung, and Blood Institute; NHLBI) as well as award UL1TR002494 (National Center for Advancing Translational Sciences; NCATS) for REDCap software support and statistical services. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NHLBI, the NCATS or the NIH." DOI: "The authors declare that they have no competing interests to dislose." General notes: a staggered-cohort design was used with two cohorts recruited one year apart

Gentile 2009

Study characteristics	
Methods	Study name: Switch programme (Switch what you do, view, and chew) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months; 14 months
Participants	Participants: 1323 Setting: ten elementary schools in Lakeville, Minnesota and Cedar Rapids, Iowa; Country: United States Country income: high income Recruitment: Quote: "All 10 elementary schools in Lakeville, MN and Cedar Rapids, IA, USA, participated in the study. These two school districts were approached due to the requirements of funding agencies. Schools were matched within district by enrollment and percent free/reduced-cost lunch and then randomly assigned to the experimental (three in Cedar Rapids and two in Lakeville) or control (three in Cedar Rapids and two in Lakeville) condition." % of eligible population enrolled: schools: 100% (10/10); children: 65% (1323/2091);

	Age (years): mean: 9.6 (SD 0.6) Gender/Sex: 47% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 670 Comparator type: non-active intervention Comparison group participants: 653 Comparison: dietary and activity vs control Setting of the intervention: school + home + community Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (8 months) BMI medium term (14 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00685555 Funder(s) type: mixed Writing and/or research independent from funder(s): no Funding details: Quote: "In Lakeville, Minnesota, Switch was sponsored by Medica Foundation, the Healthy and Active America Foundation, and Fairview Health Services. In Cedar Rapids, Iowa Switch was sponsored by Cargill, Inc. and the Healthy and Active America Foundation. The Switch program is a program of the National Institute on Media and the Family, a non-profit organization. Several of the authors were employed by the Institute to create the program or to conduct the research (DAG, DAW, MW, SS, RC, and KF), or consulted with the Institute on the design (JCE) or analysis (DWR and RAR)." DOI: "The authors declare that they have no competing interests. " General notes: NR

Gortmaker 1999

Study characteristics	
Methods	Study name: Planet Health Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 18 months (2 school years)
Participants	Participants: 1295 Setting: ten schools located in 4 communities in the Boston, Mass, metropolitan area Country: United States Country income: high income Recruitment: Quote: "Planet Health interventions occurred in 5 schools located in 4 communities in the Boston, Mass, metropolitan area; the 5 control schools were located in the same communities. Recruitment of school systems to participate was based on their willingness to implement the classroom and physical education (PE) interdisciplinary curriculum, a multiethnic student population, and cooperation with random assignment of schools to the intervention or control condition. Informed consent procedures were followed for all students. Five schools required an active consent procedure for the survey and physical measurements; parents (or guardians) needed to return a form regardless of whether they wanted their child to participate. The remaining schools used a passive consent procedure: a letter was sent to all parents describing the project, with the option to sign and return the form if they did not want their child to participate." % of eligible population enrolled: schools: NR; children: NR; Age (years): mean: 11.7 (SD 0.7) Gender/Sex: 52% boys
Interventions	Theory: Behavioural Choice, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 641 (at baseline) Comparator type: non-active intervention Comparison group participants: 654 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: BMI was measured but results are not reported; data are reported as proportion of children that had a weight status classified as obesity according to an index based on BMI and trycep skinfold measures
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "National Institutes of Child Health and Human Development; Centers of Disease Control and Prevention." DOI: NR General notes: data reported as prevalence and incidence of, and remission from, obesity; obesity was defined as composite indicator based on both BMI and triceps skinfold value grater equal or than age and sex-specific 85% percentile;

Greve 2015

Study characteristics	
Methods	Study name: HSN (Healthy Schools Network) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 6 months
Participants	Participants: 16493 Setting: thirty-tree schools in the municipality of Odense Country: Denmark Country income: high income Recruitment: Quote: "There were 40 state schools in Odense municipality in 2009/10. Of these schools, seven either focused on children with special needs or they did not have 9th grade classes, and they were therefore excluded from the sample used for the evaluation. The remaining 33 schools were randomly assigned to a treatment group and a control group." % of eligible population enrolled: schools: 100% (33/33); children: NR (unknown for amount of students, but appears that all schools took part when selected) Age (years): mean: intervention: 10.07; control: 10.22 Gender/Sex: intervention: 51.4% boys; control: 50.9% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 7431 (at baseline) Comparator type: non-active intervention Comparison group participants: 8062 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Griffin 2019

Study characteristics	
Methods	Study name: HDHK-UK (Healthy Dads, Healthy Kids, United Kingdom) Study design: cluster RCT N of arms: 2 Unit of allocation: father + ≥ 1 daughter Unit of analysis: individual Intervention period: 9 weeks Follow-up time(s): 3 months and 6 month
Participants	Participants: 61 Setting: two urban local authority areas of the West Midlands Country: United Kingdom Country income: high income Recruitment: Quote: "Fathers were recruited by the research team who had extensive experience of participant recruitment in a commnuity setting. A range of methods were used over the recruitment period, including flyer distribution and promotion stands at leisure, community and shopping centres, places of worship and large workplace organisations. Recruitment via schools conducted through presentations at school assemblies and teacher meetings, stands at parent evenings, flyer distribution and talking to parents at school pick-up time. The study was promoted on social media (Twitter and Facebook)." % of eligible population enrolled: families: 57% (43/76) Age (years): mean: 7.7 (SD 2.1) Gender/Sex: 100% boys
Interventions	Theory: Family Systems Theory, Social Cognitive Theory Intervention type: dietary and activity Intervention participants: 42 Comparator type: attention control Comparison participants: 19 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 month) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN16724454 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Study funding was granted in October 2015 by the National Institute of Health Research (NIHR) Public Health Research programme (Ref 14/185/13); KJ is partly funded by NIHR Collaborations for Leadership and Health Research and Care West Midlands. The views expressed are those of the authors and not necessarily those of the NHS, the

	NIHR or the Department of Health and Social Care." DOI: "Two of the authors designed the original Healthy Dads, Healthy Kinds programme in Australia." General notes: NR

Grydeland 2014

Study characteristics	
Methods	Study name: HEIA (HEalth In Adolescents) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 months Follow-up time(s): 20 months
Participants	Participants: 2165 Setting: thirty-seven schools in the largest towns/municipalities in seven counties surrounding Oslo Country: Norway Country income: high income Recruitment: eligible schools were those with more than 40 students in the sixth grade and located in the largest towns/municipalities in seven counties in south-eastern Norway. All sixth graders in these schools were invited to participate. % of eligible population enrolled: schools: 21% (37/177); children: 73% (1580/2165); Age (years): mean: intervention: 11.2 (SD 0.3); control: 11.2 (SD 0.3) Gender/Sex: 51.4% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 784 Comparator type: non-active intervention Comparison group participants: 1381 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long term; BMI long term (20 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN98552879 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study HEalth In Adolescents (HEIA) was funded by the Norwegian Research Council (grant number 175323/V50) with supplementary funds from the Throne Holst Nutrition Research Foundation, University of Oslo and the Norwegian School of Sport Science" DOI: Competing interests: None General notes: NR

Ha 2021

Study characteristics	
Methods	Study name: Active 1 + Fun Study design: cluster RCT N of arms: 2 Unit of allocation: parent + ≥ 1 child Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months; 12 months
Participants	Participants: 160 Setting: families from eight local primary schools in Hong Kong Country: China Country income: upper middle income Recruitment: eight local primary schools in Hong Kong responded to invitation and helped recruit families to take part in the trial % of eligible population enrolled: families: 93% Age (years): mean: 10 Gender/Sex: 59.6 % boys
Interventions	Theory: Self-Determination Theory Intervention type: activity Intervention group(s) participants: 83 (at baseline) Comparator type: non-active intervention Comparison group participants: 77 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months) BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	

	Clinical Trial Registry: ACTRN12618001524280 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was funded by the General Research Fund (Project number: 14616117), University Grants Committee, Hong Kong. The funding body wasnot involved in study design, data collection, data analyses, result interpretation, or the preparation of the manuscript." DOI: "The authors declare that they have no competing interests." General notes: a total of 171 families from seven schools were recruited and completed all data collection in the first year (from September 2018). A second cohort of 33 families from one school was recruited and began the trial in September 2019. Unfortunately, data collection and intervention delivery to the second cohort were severely affected due to the outbreak of COVID-19 between January to September 2020. As a result, data from the second cohort was not included in the final analyses.

Habib-Mourad 2014

Study characteristics	
Methods	Study name: Health-E-PALS Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 4 months
Participants	Participants: 374 Setting: eight private and public schools in Beirut Country: Lebanon Country income: lower middle income Recruitment: Quote: "Children were recruited in several phases. schools were approached through the Ministry of Higher Education. A letter explaining all components of the intervention was sent to schools, this was followed by a visit conducted by the researcher to the school principle to further provide details along term with the aims and objectives of the study. All eight schools approached, agreed to participate. schools were asked to select one or two classes of children aged 9-11 years which corresponded to grades Four or Five to participate in the study (Habib-Mourad 2013). All students in Grades 4 and 5 (aged 9–11 years) were invited to take part in the pilot study (Habib-Mourad 2014)." % of eligible population enrolled: schools: 100% (8/8 selected); children: 97% (374/387); Age (years): mean: intervention: 10.3 (SD 0.9); control: 10.1 (SD 1) Gender/Sex: 54.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 193 Comparator type: non-active intervention Comparison group participants: 181 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03040258 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by an Eastern Mediterranean Regional Office Special Grant for Research in Priority Areas of Public Health (EMRO/WHO)." DOI: "The authors declare that they have no competing interests." General notes: pilot study of Habib-Mourad 2020

Habib-Mourad 2020

Study characteristics	
Methods	Study name: Ajyal Salima Program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years; 3 years
Participants	Participants: 1239 Setting: private and public schools in Beirut Country: Lebanon Country income: lower middle income Recruitment: Quote: "Private schools were directly approached by the research team to participate in the study whereas public schools were recruited by the Lebanese Ministry of Education and Higher Education (MEHE). The final list of participating schools included 20 public and 16 private schools. Schools were stratified by type (private and public). Within each participating school, all classrooms in grades 4 and 5 (aged 8–12 years) were approached, and all students in the selected classrooms were invited to participate in the study. Consent forms were sent to the students' parents/guardians to obtain their approval; students also signed assent forms." % of eligible population enrolled: schools: NR; children: 62% (1239/2000);

	Age (years): mean: 9.95 (SE 1.13) Gender/Sex: 46.3% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 698 Comparator type: non-active intervention Comparison group participants: 541 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT04297059 Funder(s) type: industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The intervention was funded by the Nestlé for Healthier Kids Initiative–Nestlé Middle East. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results." DOI: "The authors declare no conflict of interest." General notes: Habib-Mourad 2014 is the pilot study

Haire-Joshu 2010

Study characteristics	
Methods	Study name: PARADE (Partners of all ages reading about diet and exercise) Study design: cluster RCT N of arms: 2 Unit of allocation: sites (community settings) Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 5.7 months (see Notes)
Participants	Participants: 782 Setting: OASIS Intergenerational Reading Program (OASIS) and Big Brothers, Big Sisters Inc. (BBBS) located in St. Louis, Missouri. Country: United States Country income: high income Recruitment: Quote: "Children and the parent of that child were recruited from 119 OASIS Intergenerational Reading Program (OASIS) and Big Brothers, Big Sisters Inc. (BBBS). children enrolled in the tutoring programs at these sites were assessed for eligibility and willingness to participate by tutors." % of eligible population enrolled: sites: NR; children: NR; analysis was performed on was 57.5% of children (those with pre and post test data for child survey outcomes) Age (years): mean: intervention: 8.3 (SD 1.4); control: 8.7 (SD 1.7) Gender/Sex: 49.2% boys
Interventions	Theory: Social Cognitive Theory, Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 418 Comparator type: non-active intervention Comparison group participants: 364 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (5.7 months; see Notes) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding for this work was provided by National Institute of Nursing Research (R01NR05079) and the American Cancer Society (TURPG 0028601)." DOI: "The authors do not have any disclosures." General notes: the authors reported that due to the academic calendar, four months were allotted for delivery of PARADE between conduct of the pre and posttest. The mean time elapsed between pretest and posttest was 5.7 months (SD 2.6) with a minimum of 2.1 months and maximum of 16.2 months

Han 2006

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 3 years

Participants	Participants: 2800 Setting: ten elementary schools in Yangpu district, Shangai Country: China Country income: upper middle income Recruitment: according to the regional orientation, 2 schools in each of thesouth, north, east, west and middle parts of Yangpu district, Shanghai, for a total of 10 schools were selected. Students were selected from grades 1-4. 70 students in each grade in each school were selected. % of eligible population enrolled: schools: NR (10 selected); children: 95% (2673/2800; investigated/surveyed); Age (years): range 6-10 (grade 1-4) Gender/Sex: 52.8% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 1400 Comparator type: non-active intervention Comparison group participants: 1400 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: one review author (G Yang) extracted ther data from this study as it is published in Chinese (English abstract); data are reported as percent of children with obesity and overweight; BMI was measured, but classification criteria were not reported.

Hannon 2018

Study characteristics	
Methods	Study name: ENCOURAGE healthy families study Study design: cluster RCT N of arms: 2 Unit of allocation: mother + ≥ 1 child Unit of analysis: individual Intervention period: 3 months (reported as 16-session weekly program) Follow-up time(s): 3 months; 6 months; 12 months
Participants	Participants: 203 Setting: communies in Indianapolis, Indiana Country: United States Country income: high income Recruitment: Quote: "To identify women with histories of gestational diabetes (GDM) and/or prediabetes, we queried the local electronic medical record (EMR) databases; each mother had at least one child (aged 8-15 years) who participated to provide outcomes measures, regardless of the study arm. With attention to the generalizability of the study, the population recruited is overrepresented by women of minority status and from lower income groups. Recruitment strategies also include health fairs, social media campaigns, flier distribution, university list serves, community sites (churches, pharmacies, clinics), and a partnership with a clinic serving primarily Latino patients." % of eligible population enrolled: mothers: 4% (128/3431; randomized/eligible); Age (years): mean: mothers only: 11.3 (SD 2.6); mothers + children: 11.8 (SD 2.3) Gender/Sex: mother only intervention: 53.4% boys; mother and children intervention: 55.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: mothers-only intervention: 95 Comparator type: dietary and activity intervention Comparison participants: mothers + children intervention: 108 Comparison: dietary and activity vs dietary and activity Setting of the intervention: home + community/community (multi-arm study) Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (dietary and activity interventions)
Notes	Clinical Trial Registry: NCT01823367 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by an investigator-initiated grant from the JPB Foundation and the IUPUI Signature Center Initiative Fund. Sponsors did not contribute the writing of this report or in the decision to submit the article for publication" DOI: "No financial disclosures were reported by the authors of this paper. " General notes: NR

HEALTHY Study Group 2010

Study characteristics	
Methods	Study name: HEALTHY Study Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 3 years
Participants	Participants: 11158 Setting: fourty-twoSchools from seven centers across the country Country: United States Country income: high income Recruitment: Quote: "After a list of potential schools was identified by each center, the principal investigator and the project coordinator contacted the superintendent of schools and other key individuals at the district level and provided them with an overview of the study. Meetings were then scheduled with school principals during which they were given an informational notebook. Sixth grade students were recruited and enrolled during a single campaign focusing on participation in health screenings and data collection procedures. A recruitment packet was provided to every student in the sixth grade during the fall of 2006. The packet contained letters from the study center principal investigator and the school principal to the parents/guardians of the student, a brochure that described the study, its objectives and basic information about data collection, parent informed consent forms, student informed assent forms and a pen to facilitate the completion of materials. Black and Hispanic children of lower socioeconomic status were oversampled, given the fact that these children are at a high risk for both obesity and type 2 diabetes." % of eligible population enrolled: schools: NR (42 schools recruited, not reportyed how many potential schools were identified); children: 59% (6573/11158); Age (years): mean: 11.3 (SD 0.6) Gender/Sex: 47.3% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 5571 Comparator type: non-active intervention Comparison group participants: 5587 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03040258 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by grants (U01-DK61230, U01-DK61249, U01- DK61231, and U01-DK61223) from the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health to the Studies to Treat or Prevent Pediatric Type 2 Diabetes (STOPP-T2D) collaborative group, with additional support from the American Diabetes Association. The following companies and persons provided donations in support of the study's efforts: Discovery Health Channel, General Mills, Jamis Bicycles, Johnson & Johnson, LifeScan, Nestlé, Neutrogena, Nike, Polar, Walgreens, Shaun T and Beachbody, Leslie Sansone, Chef LaLa, Jakob Dylan, Randy Jackson, Jonas Brothers, Massey Brothers, James Edward Olmos, and Jerry Zucker." DOI: "Disclosure forms provided by the authors are available with the full text of this article at NEJM.org." General notes: NR

Hendrie 2011

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: family (parent(s) + ≥ 1 child) Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 24 weeks
Participants	Participants: 145 Setting: seven schools in Adelaide Metropolitan area Country: Australia Country income: high income Recruitment: families were recruited via media publicity (newspaper stories and paid advertisements) and an established volunteer database of families between June 2009 and January 2010. % of eligible population enrolled: schools: 87.5% (7/8); families: 94% (171/182); Age (years): mean: 8.6 (SD 2.9) Gender/Sex: 60% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 76 Comparator type: non-active intervention Comparison group participants: 69 Comparison: dietary vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home

Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (24 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12609000453280 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The research was supported by CSIRO Food and Nutrition Sciences. GS was a Flinders University Nutrition and Dietetics Masters Student. RKG is funded by a NHMRC public health training award (478115). The RCT was funded by Dairy Australia. The study was conducted and this manuscript prepared without input from Dairy Australia (the funding body). Dairy Australia approved this manuscript for publication. All authors declare no conflicts of interest."" DOI: "Neither of the authors declared a conflict of interest." General notes: NR

Hendy 2011

Study characteristics	
Methods	Study name: KCP (Kid's Choice Program) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 200 Setting: an elementary school in a small town in eastern Pennsylvania Country: United States Country income: high income Recruitment: Quote: "The present application of the Kid's Choice Program was conducted in an elementary school in a small town in eastern Pennsylvania, with children who had not participated in earlier KCP applications." % of eligible population enrolled: children: NR; Age (years): range 1st-4th graders Gender/Sex: 49.5% boys (of the 200 average-weight participants that were included in the analysis)
Interventions	Theory: Social Cognitive Theory, Self-determination Theory, Group Socialization Theory Intervention type: dietary and activity Intervention group(s) participants: LIONS: 102 (at baseline) Comparator type: non-active intervention Comparison group participants: TIGERS: 98 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was supported by grants from Penn State University" DOI: NR General notes: NR

Hooft van Huysduynen 2014

Study characteristics	
Methods	Study name: Towards Healthy Diets for Parents Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 20 weeks
Participants	Participants: 186 Setting: communies in Wageningen and surrounded area Country: Netherlands Country income: high income Recruitment: Quote: "Between September 2011 and October 2012, participants were invited to take part in the randomised controlled trial through participant email databases and primary schools in Wageningen and surrounded areas. All parents of a child aged four to twelve years who showed interest were screened for eligibility criteria via a questionnaire." % of eligible population enrolled: parents: 89% (186/209) Age (years): mean: intervention: 9.1 (SD 2.4); control: 8.5 (SD 2.5) Gender/Sex: intervention: 58% boys; control 57% boys
Interventions	Theory: Transtheoretical Model Intervention type: dietary Intervention group(s) participants: 92 (parents) Comparator type: non-active intervention

	Comparison group participants: 94 (parents) Comparison: dietary vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narrativelly
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: the target of the intervention are the parents; BMI data are reported only for the parents

Hopper 2005

Study characteristics	
Methods	Study name: Family Fitness Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 8 months
Participants	Participants: 238 Setting: six elementary schools in Humboldt County, California Country: United states Country income: high income Recruitment: six elementary schools in Humboldt County, California, a predominantly rural area, agreed to participate % of eligible population enrolled: classrooms: NR; children: 62% (238/381; number of children excluded because not eligible is not reported); Age (years): mean: 8.57 (SD 0.63) Gender/Sex: 51% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 142 (at baseline) Comparator type: non-active intervention Comparison group participants: 96 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Support for this study was provided by the National Heart, Lung and Blood Institute, R15 HL 42626-01A4." DOI: NR General notes: NR

Howe 2011

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 106 Setting: five local elementary schools in Georgia Country: United States Country income: high income Recruitment: Quote: "Black boys (8–12 years of age) were recruited from five local elementary schools using study fliers. All 3rd through 5th grade black boys were eligible if they met the eligibility criteria. Twenty-eight percent (300 boys) of the targeted population (1050 boys in 3rd–5th grade) were screened by phone to determine their eligibility to participate in the study. Potential participants and their parent or guardian were invited to attend a group information session where they read and signed the informed consent/assent documents in accordance with the Medical College of Georgia Human Assurance Committee." % of eligible population enrolled: children: 71% (106/149) Age (years) mean: attended participants: 9.7 (SE 0.2); non-attended participants: 9.8 (SE 0.2); Controls: 9.9 (SE 0.2) Gender/Sex: 100% boys

Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 62 Comparator type: non-active intervention Comparison group participants: 44 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the NIH (Grant HL69999)" DOI: NR General notes: NR

Hull 2018

Study characteristics	
Methods	Study name: Healthy Families Study Study design: cluster RCT N of arms: 2 Unit of allocation: parent + ≥ 1 child Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 4 months; 10-24 months (see Notes)
Participants	Participants: 319 Setting: communies in the metropolitan Nashville, tenessee Country: United States Country income: high income Recruitment: Quote: "The lead community partner, Progreso Community Center (PCC), recruits the participants from the community through: (1) distributing flyers at elementary schools to Hispanic students in kindergarten through second grade; (2) distributing flyers at health fairs, community events, and public places; (3) flyers and presentations at PCC, churches, and other local organizations; (4) announcements in Spanish language media (e.g., radio, newspaper); and (5) word of mouth. Interested families call PCC or speak in person with a PCC research staff member to inquire about the study. " % of eligible population enrolled: families: 96% (272/282); children: NR; Age (years): mean: intervention: 6.3; control: 6.2 Gender/Sex: intervention: 46% boys; control: 50% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory, Food Preference Theory Intervention type: dietary and activity Intervention participants: 162 Comparator type: attention control Comparison participants: 157 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (4 months) BMI long term; zBMI long term; (10-24 months; see Notes)) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01156402 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was supported by the National Institutes of Health, grant number P20 MD000516 National Institute on Minority Health and Health Disparities, grant number UL1 RR024975 National Center for Research Resources, grant number UL1 TR000445 National Center for Advancing Translational Sciences, grant numbers R01 DK69465 and P60 DK20593 National Institute of Diabetes and Digestive and Kidney Diseases and grant numbers P30 CA068485 and U54 CA163072 National Cancer Institute. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH." DOI: "No conflict of interest was declared" General notes: the study specifically targets Hispanic immigrant families. Follow-up time: Short-term follow-up assessments were scheduled after completion of the 4-month intensive phase. Long-term follow-up scheduling attempts started at the end of the 12-month period post-randomization, including participants who did not complete short term-term follow-up. Given that multiple attempts were required to schedule families and follow-up time varied, we analysed the short term-term outcome for follow-up assessments that occurred up to 9.9 months after baseline, and the long term-term outcome for follow-up assessments that took place between 10 and 24 months after baseline.

Huys 2020

Study characteristics	
Methods	Study name: Feel4Diabetes-intervention Study design: cluster RCT N of arms: 2

	Unit of allocation: municipality Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 12 months (the outcome was measuret but the results are not reported)
Participants	Participants: 444 Setting: 11 municipality in the Flanders Country: Belgium Country income: high income Recruitment: Quote: "In Flanders (Belgium), 11 municipalities from the tertile with the highest unemployment rates (5.2–12.5%) were randomly selected. Within the municipalities there was participation of 58 primary schools (response rate = 62.4%). Of all invited families (children of first to third grade (6–9 years old) and their parent(s)), 1691 families (response rate = 33.5%) confirmed their participation in the study by completing the informed consent, the Finnish Diabetes Risk Score (FINDRISC, assessing the 10-year risk of developing type 2 diabetes) and the Energy Balance-Related Behavior questionnaire (EBRB-questionnaire) (see Fig. 1). Of these families, 457 families were identified as high-risk (27.0%) (i.e. at least one parent with an increased risk of developing type 2 diabetes based on the score on the FINDRISC)." % of eligible population enrolled: municipalities: 100% (11/11); children: 100% (457/457); Age (years): mean: 8.04 (SD 0.9) Gender/Sex: 49.9% boys
Interventions	Theory: PRECEDE-PROCEED model Intervention type: dietary and activity Intervention participants: 233 (at baseline) Comparator type: Attention control (minimal dietary and activity intervention) Comparison participants: 211 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the outcome was measured at follow-up but results are not reported
Notes	Clinical Trial Registry: NCT02393872 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The Feel4Diabetes study has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement n° 643708. The funding body was not involved in the development of the study design, the collection, analysis and interpretation of data nor in the writing of the manuscript." DOI: "The authors declare that they have no competing interests." General notes: the Feel4Diabetesintervention was tested using a cluster randomized controlled design including intervention and control families across six European countries (i.e. Bulgaria, Hungary, Belgium, Finland, Spain, Greece). For the present study, only the Belgian intervention was evaluated. zBMI data at follow-up not reported but height and weight was measured at follow-up: "All participant outcome measures were assessed at baseline and follow-up (12 weeks)." BMI-z listed a secondary outcome in the trial registration but not in the main article.

Ickovics 2019

Study characteristics	
Methods	Study name: School-Based Policies intervention Study design: cluster RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 1 year; 2 years; 3 years
Participants	Participants: 756 Setting: twelve schools (kindergarten through eighth grade) in New Haven, Conecticut Country: United States Country income: high income Recruitment: Quote: "Twelve schools (kindergarten through eighth grade [K–8]) were randomly selected from among the 50 K–8 district schools. All agreed to participate. Parental consent and student assent were obtained, and participation was entirely voluntary and noncoercive." % of eligible population enrolled: schools: 24% (12/50); children: NR; Age (years): mean: 10.9 (SD 0.62) Gender/Sex: 46.2% boys
Interventions	Theory: NR Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention participants: Policy interventions related to nutrition: 202 Policy interventions related to physical activity: 176 Policy interventions related to nutrition and physical activity: 237 Comparator type: attention control Comparison participants: 141 Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	

	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: BMI percentile long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02043626 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institute of Child Health and Human Development, NIH (1R01 HD070740, JR Ickovicsand MB Schwartz, Multiple PIs), with additional support from the U.S. Centers for Disease Control and Prevention and Yale-Griffin Prevention Research Center (5U48DP000053, JR Ickovics, PI). The funders had no role in the design, implementation, evaluation, or interpretation of this study." DOI: "No financial disclosures were reported by the authors of this paper. " General notes: NR

James 2004

Study characteristics	
Methods	Study name: CHOPPS (Christchurch obesity prevention programme in schools) Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 12 months; 3 years
Participants	Participants: 644 Setting: six junior schools in Christchurch, Dorset Country: United Kingdom Country income: high income Recruitment: children aged 7 to 11 years were recruited from six junior schools % of eligible population enrolled: classroom: NR; children: 71% (644/912). Age (years): mean: 8.7 (SD 0.9) Gender/Sex: 50.3% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 325 Comparator type: non-active intervention Comparison group participants: 319 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) BMI long term; zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was funded from unrestricted educational grants from GlaxoSmithKline, Aventis, and Pfizer and from internal resources within Bournemouth Diabetes and Endocrine Centre. The external funding bodies had no input into protocol development, data collection, or analyses or interpretation. JJ received a research scholarship from the Florence Nightingale Foundation." DOI: "Two authors each had a child attending one of the schools invovled in the Christchurhc obesity prevention project in schools." General notes: antropometric measures were collected at 6 months and 12 months but the outcome at 6 months is not reported; quote from James 2004: "Body mass index was measured in 602 (93.5%) children at six months and 574 (89.1%) at 12 months"; outcome at 3 years is additional; from James 2007: "The children in the three year groups attended junior schools in Christchurch, Dorset. Three years after baseline, the two older year groups had progressed to secondary schools and were tracked using school leaving lists."

Jansen 2011

Study characteristics	
Methods	Study name: Lekker Fit! (Enjoy being fit!) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 2770 Setting: twenty primary schools in low income inner-city neighbourhoods in Rotterdam Country: Netherlands Country income: high income Recruitment: Quote: "Primary schools in inner-city areas of Rotterdam were free to apply for participation in the intervention. A total of 27 schools spontaneously applied. No further exclusion criteria for schools or pupils were applied. Parents and older children received information on the study and parents supplied their consent through the schools. All children were free to

	refuse participation without giving any explanation." % of eligible population enrolled: schools: 74% (20/27); children: NR; Age (years): mean: grade 3-5 group: intervention: 7.7 (SD 1.0); control: 7.8 (SD 1.0); grade 6-8 group: intervention: 10.8 (SD 1.0); control: 10.8 (SD 1.0) Gender/Sex: grade 3-5 intervention: 49.5% boys; grade 3-5 control 49% boys grade 6-8 intervention: 47.2% boys; grade 6-8 control: 51% boys
Interventions	Theory: Theory of Planned Behaviour, Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 1271 Comparator type: non-active intervention Comparison group participants: 1499 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN84383524 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "No details on funding reported in the main article but in the trial registration the funder type is reported as governement (Community of Rotterdam, The Netherlands). The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper." DOI: "The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper." General notes: NR

Johnston 2013

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 477 Setting: seven elementary schools from a large suburban independent school district located southwest of Houston, Texas Country: United States Country income: high income Recruitment: Quote: "All elementary schools from a large suburban independent school district located southwest of Houston, TX were recruited to participate in the study. This school district serves a very diverse student population. schools were contacted via 2 phone calls, an email sent from the research staff to appropriate school personnel, and an e-mail sent by the school district notifying the schools' personnel about the study. Face-to-face meetings were conducted with the individuals representing the 11 schools that responded. Weight-based outcomes were assessed in students enrolled in the second grade during the fall of 2008." % of eligible population enrolled: schools: 17% (7/41); children: NR; Age (years): mean: intervention: 7.8 (SD 0.4); control: 7.7 (SD 0.4) Gender/Sex: intervention: 53.3% boys; control: 45.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: professional-facilitated intervention (PFI): 300 Comparator type: non-active intervention Comparison group participants: Self-Help (SH): 177 Note: Only included participants that were in the normal weight status group at baseline Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data are reported as percentage of students that had their weight status changed to overweight or obesity after intervention
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: changes in zBMIz are reported only for participants with weight status classified as overweight or obese. Data from participants that wer of normal weight are reported as percentage of students who were normal weight at baseline and became overweight or obese at 2 years across treatment conditions and ethnic groups.

Jones 2015

Study characteristics

Methods	Study name: The Wollong termong SPORT Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 7 months; 12 months
Participants	Participants: 37 Setting: communies in low-income areas of Wollong termong Country: Australia Country income: high income Recruitment: children were recruited through advertisements, school newsletters and university emails from low-income areas of Wollong termong, Australia % of eligible population enrolled: children: 75.5% (37/49); Age (years): mean (SD): girls: 9.6 (SD 0.9); boys: 9.9 (SD 0.8) Gender/Sex: 54% boys
Interventions	Theory: Social Cognitive Theory Intervention type: activity Intervention participants: 19 Comparator type: Attention control (minimal dietary and activity intervention) Comparison participants: 18 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (7 months) BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Foundation for Children (2009-204) and the University of Wollong termong. DPC is funded by a of Australia Postdoctoral Research Fellowship (PH 11S 6025). ADO is funded by a National Heart Foundation of Australia Career Development Fellowship (CR11S 6099)." DOI: "There is no conflict of interest." General notes: NR

Kain 2014

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 651 Setting: nine primary public schools in Ñuñoa, a district of Santiago Country: Chile Country income: high income Recruitment: Quote: "There are 10 primary public schools in Ñuñoa, of these, one was excluded because in 2010 one of our students had carried out a pilot program in that school. In 2011, the authors selected the sample for this intervention; it included children from kindergarten to 2nd grade from the 9 schools. They were followed during 12 months (4 in 2011 and 8 in 2012).The total sample size amounted to 1471 children." % of eligible population enrolled: schools: 100% (9/9); children: NR; Age (years): mean: 6.6 (SD 1.07) Gender/Sex: 53.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 651 (at baseline) Comparator type: non-active intervention Comparison group participants: 823 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: NR Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The authors would like to thank the “Corporaci´onMunicipal de Educaci´on y Salud” of ˜ Nu˜noa for funding the study. The authors declare that there is no conflict of interests regarding the publication of this paper." DOI: "The authors declare that there is no conflict of interests regarding the publication of this paper." General notes: NR

Keller 2009

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 365 Setting: communes in Germany Country: Germany Country income: high income Recruitment: Quote: "The pediatricians forwarded the values for height and body weight of their patients pseudonymously to a central CrescNet database. The network CrescNet collected data (participant height and weight) from > 300,000 children and 365 were selected at risk of obesity (age 4-7 years) to participate. " % of eligible population enrolled: children: 100% (365/365) Age (years): mean: intervention: 5.9 (SD 1.4); control: 5.6 (SD 1.2) Gender/Sex: 46.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 180 Comparator type: non-active intervention Comparison group participants: 185 Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The authors declare that they have no financial ties with a company whose product plays an important role in the article (or with a company that distribute a competitor product)." DOI: "The authors declare that they have no financial connections with a company whose product features prominently in the article (or with a company that sells a competing product)." General notes: article in German that we translated using Google Translate. Eligible children were at risk of a chronic disease. There were two subgroups for the intervention group: 59 children were assigned to the active intervention group with willingness to participate (IGa). The 121 children from families who reject the offer of targeted prevention formed the "observed intervention group" (IGo).

Keshani 2016

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 221 Setting: ten eight schools and one class in each school in Shiraz Country: Iran Country income: lower middle income Recruitment: Quote: "Two out of four educational districts were selected randomly; then eight schools and one class in each school were selected. Grade 4 students and their parents participated in this school-based nutrition education intervention." % of eligible population enrolled: schools: NR; children: 77% (171/221) Age (years): range 9.5-10.5 Gender/Sex: 48.5% boys (refers to the sample included in the analysis)
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 110 Comparator type: non-active intervention Comparison group participants: 111 Comparison: dietary vs control

	Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: IRCT2016012626078N2 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by Health Sciences Research Center, affiliated with Shiraz University of medical sciences, Shiraz, Iran." "This study was supported by Shiraz University of Medical Sciences, Shiraz, Iran" DOI: "The authors declared no financial interest." General notes: the clusters are the school; randomization was done at the level of district, then school and one class from each school was selected (method not reported)

Ketelhut 2022

Study characteristics	
Methods	Study name: ExerCube intervention Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weks
Participants	Participants: 823 Setting: an elementary school located in a socially disadvantaged area of Berlin Country: Germany Country income: high income Recruitment: Quote: "The study sample was recruited in August 2020 from an elementary school located in a socially disadvantaged area of Berlin, Germany." % of eligible population enrolled: children: 100% (58/58) Age (years): mean: 10.5 (SD 0.7) Gender/Sex: 52% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 18 (analysed) Comparator type: non-active intervention Comparison group participants: 16 (analysed) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: no funding received Writing and/or research independent from funder(s): n/a Funding details: Quote: "This research received no external funding. ALM N is co-founder and CEO of the spinoff company Sphery (manufacturer of the exergame Sphery Racer used in the study). No revenue was paid (or promised to be paid) to A.L.M.-N., to Sphery, or to the research institutions." DOI: "4 authors declare that they have no conflicts of interest. Besides being a senior researcher at the Zurich University of the Arts, the final author is also co-founder and CEO of the spinoff company Sphery. No revenue was paid (or promised to be paid) to this author, Sphery, or the research institutions." General notes: unclear if the unit of randomization was the student or the classroom

Khan 2014

Study characteristics	
Methods	Study name: FITKids (Fitness improves thinking in kids) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 9 months
Participants	Participants: 220 Setting: seven schools in East-central Illinois Country: United States Country income: high income Recruitment: Quote: "Prepubertal children (8–9 years old) were recruited from 7 schools in eastcentral Illinois. All children in third to fifth grade were targeted, and those who expressed interest were screened for physical disabilities that could limit participation in the after-school program." % of eligible population enrolled: children: 66% (220/334) Age (years): mean: intervention: 8.8 (SD:0.5); control: 8.8 (SD: 0.6) Gender/Sex: 53.2% boys

Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 110 Comparator type: non-active intervention Comparison group participants: 110 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01334359 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funded by the National Institutes of Health (NIH) grant HD055352." DOI: "The authors have indicated they have no potential conflicts of interest to disclose. " General notes: the study took place among 4 cohorts between 2009 and 2013

Kipping 2008

Study characteristics	
Methods	Study name: AFLY5 (Active for Life Year 5) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 5 months Follow-up time(s): 5 months
Participants	Participants: 679 Setting: nineteen schools in South Gloucestershire Country: United Kingdom Country income: high income Recruitment: Quote: "Twenty-seven schools in South Gloucestershire were invited by letter to take part in the study. The schools were informed they would be randomly allocated to ‘‘intervention’’ or ‘‘control’’ groups, with the intervention schools being provided with the teacher training and teaching materials and the control schools being provided with these after the completion of the study. Nineteen schools agreed to be in the study. The timescales for recruiting the schools were short term, which deterred some of the schools from taking part." % of eligible population enrolled: schools: 70% (19/27); children: NR Age (years): mean: intervention: 9.4 (SD 0.5); control: 9.4 (SD 0.49) Gender/Sex: 57.1% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory Intervention type: dietary and activity Intervention group(s) participants: 331 Comparator type: non-active intervention Comparison group participants: 348 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; proportion of children living with obesity Outcome(s) included in the meta-analysis: BMI short term (5 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN50133740 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding was received from the Department of Health via the South West Public Health Group, South Gloucestershire Council, and DAL is funded by a Department of Health Career Scientist Award, which also funded data entry" DOI: Competing interests: None General notes: this study is a pilot study for the larger "Active for life year 5" trial reported in Kipping 2014

Kipping 2014

Study characteristics	
Methods	Study name: AFLY5 (Active for Life Year 5) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6-7 months (2-3 school terms) Follow-up time(s): 7 months; 19 months
Participants	Participants: 2221 Setting: sixty state primary and junior schools in the Bristol City and North Somerset administrative areas Country: United Kingdom Country income: high income Recruitment: Quote: "State primary or junior schools with year 4-6 pupils in the Bristol City and North Somerset

	administrative areas were eligible for inclusion. Between March and July 2011 all state primary and junior schools with children in years 4-6 (age 8-11 years) in the areas covered by Bristol City Council (93 schools) and North Somerset Council (55 schools) were invited to participate. We invited 148 schools to participate, and 63 expressed an interest in taking part; three schools subsequently withdrew their interest. We recruited 60 schools (46 in Bristol and 14 in North Somerset). Once schools had agreed to participate in the study, we sent parents/guardians of children in year 4 a letter and information sheet about the study with an opt-out consent form for their child for each of the measurements." % of eligible population enrolled: schools: 40.5% (60/1480); children: NR; Age (years): mean: intervention: 9.5 (SD 0.3); control: 9.5 (SD 0.3) Gender/Sex: 49.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 1064 Comparator type: non-active intervention Comparison group participants: 1157 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (7 months) zBMI long term (19 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN50133740 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The AFLY5 RCT is funded by the UK National Institute for Health Research (NIHR) Public Health Research Programme (09/3005/04). Funding also from the UK Medical Research Council (MRC) (MC_UU_12013/5), the British Heart Foundation, Cancer Research UK, the Economic and Social Research Council (RES-590-28-0005), the Welsh Assembly Government and the Wellcome Trust (WT087640MA), under the auspices of the UK Clinical Research Collaboration. None of the funders had involvement in the Trial Steering Committee, data analysis, data interpretation, data collection, or writing of the paper" DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: support from research funders in accordance with the funding statement included in the manuscript;no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work, other than that RC is directer of DECIPHer Impact, a not for profit company that is wholly owned by the Universities of Brisol and Cardiff whose purpose is to licence and support the implementation of evidenced based health promotion interventions. " General notes: the pilot study is Kipping 2008. None of the schools or teachers who were involved in the feasibility and pilot work was included in the main trial.

Klesges 2010

Study characteristics	
Methods	Study name: Memphis GEMS Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 1 year; 2 years
Participants	Participants: 303 Setting: communies in Memphis, Tennessee Country: United States Country income: high income Recruitment: recruitment occurred over 5 waves primarily through television and radio ads, and through flyers and presentations in the community. Advertisements described GEMS as a study of healthy growth. Further details regarding our recruitment strategies are described in Klesges et al. 2008 (study protocol): "Girls and their parent/caregiver were recruited primarily through television advertisements featuring one of the study interventionists, a female, African-American adult. In addition, public service announcements were placed on African-American radio stations, and flyers were distributed along term with presentations at elementary schools, African-American churches, and local health fairs. All advertisements indicated that GEMS was a study of healthy growth intended to encourage positive physical and emotional growth, as well as celebrate and instill community pride." % of eligible population enrolled: dyads: 90% (303/337) Age (years): mean: 9.3 (SD 0.9) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 153 Comparator type: attention control Comparison participants: 150 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (1 year) BMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	

	Clinical Trial Registry: NCT00000615 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "National Heart, Lung, and Blood Institute Project Office" DOI: NR General notes: Memphis GEMS phase 1 is described in Beech 2003

Kobel 2017

Study characteristics	
Methods	Study name: Join the Healthy Boat (Baden-Wurttemberg Study) Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 525 Setting: ninety-one primary schools of the state of Baden-Württemberg Country: Germany Country income: high income Recruitment: Quote: "Information about the program and Baden-Württemberg Study were issued during the academic year 2009/2010 using a number of ways, e.g. education and health authorities, and universities of education; electronic newsletter; television and radio; adverts in training catalogs for primary school teachers; participation at trade shows. The recruitment process was also promoted by ten informative events in different parts of Baden-Württemberg. Further, all primary schools of the state of Baden-Württemberg received written information about the program and the structure of the study, asking teachers to participate. Interested teachers contacted the program center. The participation in the program was voluntary, participating teachers had to agree with randomization. Within the larger study, only those classified as having a migration background were included in this sub-sample." % of eligible population enrolled: schools: 97% (91/94); children: 100% (525/525); Age (years): mean: 7.1 (SD 0.7) Gender/Sex: 48.6% boys
Interventions	Theory: Bandura's Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 318 Comparator type: non-active intervention Comparison group participants: 207 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; BMI percentile medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: DRKS00000494 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The school-based health promotion programme "Join the Healthy Boat" and its evaluation study were financed by the Baden-Wurttemberg Foundation, which had no influence on the content of this paper." DOI: "The authors declare that there is no conflict of interests regarding the publication of this paper." General notes: trial nested in the Baden-Wurttemberg Study: only the subsample of children with at least one parent was born abroad or children that were spoken to in another language than German in the first 3 years of life were included in the substudy.

Kocken 2016

Study characteristics	
Methods	Study name: Extra Fit! Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 6 months; 24 months
Participants	Participants: 1112 Setting: fourty-five schools Country: Netherlands Country income: high income Recruitment: a total of about 500 schools were approached for participation in this study. % of eligible population enrolled: schools: 60% (45/75; randmized/agreed to participate); children: NR; Age (years): mean: intervention: 9.2 (SD 0.6); control: 9.1 (SD 0.6) Gender/Sex: 48% boys
Interventions	Theory: Theory of Planned Behaviour Intervention type: dietary and activity Intervention group(s) participants: 615 Comparator type: non-active intervention Comparison group participants: 497

	Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months) zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: Unclear/NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research project was funded by The Netherlands Organization for Health Research and Development (grant 120610007). The food diary/24-h recall and physical activity measurements were supported by the Netherlands Heart Foundation." DOI: "The research project was funded by the Netherlands Organization for Health Research and Development. The food diary/24h recall and physical activity measuremenets were supported by the Netherlands Heart Foundation." General notes: NR

Kovalskys 2016

Study characteristics	
Methods	Study name: SALTEN Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 18 months
Participants	Participants: 760 Setting: Moron, a town in the province of Buenos Aires Country: Argentina Country income: upper middle income Recruitment: participation was voluntary and subsequent to parental signed consent % of eligible population enrolled: schools: NR; children: NR; Age (years): mean: 9.5 Gender/Sex: 48% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 424 Comparator type: non-active intervention Comparison group participants: 336 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): yes Funding details: No funding reported. Note that the funding for the Mini-SALTEN study was reported as : The Coca Cola Foundation provided a scientific grant for the MINI SALTEN study. The International Life Sciences Institute of Argentina provided additional support to the authors and to its' implementation. Competing interests: The authors declare that they have no competing interests. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of manuscripts. DOI: "The authors declare that they have no competing interests. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of manuscripts." General notes: conference abstract, no details about intervention are reported and baseline data are extracted from Kovalskys 2016b

Kriemler 2010

Study characteristics	
Methods	Study name: KISS Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 9 months; 3 years
Participants	Participants: 502 Setting: fifteen schools in Aargau and Baselland provinces Country: Switzerland Country income: high income Recruitment: Quote: "Recruitment started in Autumn 2004, and the actual study took place between August 2005 and July 2006. Intervention and control schools were located in provinces that were comparable as regards socioeconomic status of

	the population and recreational facilities at school. Classes from the intervention and control groups were located in different villages or towns. From study protocol: Recruitment of participating schoolswas based on the willingness of these 95 elementary schools to be randomized either to an intervention group or a control group. " % of eligible population enrolled: schools: 16% (15/95); classrooms: 15% (28/190); children: 93% (502/540); Age (years): mean: 6.9 (SD 0.3) Gender/Sex: 48.8% boys
Interventions	Theory: Social Ecological Model Intervention type: activity Intervention group(s) participants: 297 Comparator type: non-active intervention Comparison group participants: 205 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (9 months) BMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN15360785 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the Swiss Federal Office of Sports (grant number SWI05-013), the Swiss National Science Foundation(grant number PMPDB-114401), and the Diabetes Foundation of the Region of Basel. The funding sources had no role in the design and conduct of the study or in the collection, management, analysis, and interpretation of the data." DOI: Competing interests: None General notes: a higher number of schools in the intervention than in the control group, i.e. a randomization ratio of 3:2, was chosen to gain more experience with the intervention and to reduce costs of the trial

Kubik 2021

Study characteristics	
Methods	Study name: Sn/aPSHOT Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months; 24 months
Participants	Participants: 132 Setting: fifty-four elementary schools in Schools in Minneapolis/St. Paul, Minnesota Country: United States Country income: high income Recruitment: Quote: "Participants were recruited in partnership with an urban (43 elementary schools) and suburban (11 elementary schools) school district located in the St. Paul/Minneapolis, Minnesota metropolitan area. Cohorts of children and parents were recruited annually from 2014 to 2017 and January through May for a total of four cohorts. Recruitment materials were developed in collaboration with school district administrators and included eligibility criteria, study participation requirements, and study staff contact information for enrollment and were distributed to all parents of second-, third-, and fourth-grade students attending a study school." % of eligible population enrolled: dyads: 89.8% (132/147) Age (years): mean: 9.3 (SD 0.9) Gender/Sex: 51% boys
Interventions	Theory: Social-Ecological Framework, the Healthy Learner Model for Student Chronic Condition Management, the Chronic Care Model Intervention type: dietary and activity Intervention participants: 66 Comparator type: attention control Comparison participants: 66 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) BMI long term; zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02029976 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was supported by the National Institute of Nursing Research under Award Number R01NR013473 of the NIH....The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH." DOI: "The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH." General notes: targeted secondary prevention of obesity among 8 to 12 year-old children with a reported BMI ≥75th percentile

Lau 2016

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 80 Setting: one local primary school in Hong Kong Country: China Country income: upper middle income Recruitment: Quote: "Participants were recruited from one local primary school. A prior PA promotion workshop was delivered in the primary school to introduce AVGs and their health benefits. All students in grade four and their parents were invited to the workshop. Five students were invited to perform a trial play session in the workshop. An invitation letter, participant information sheet, and study consent form were delivered to workshop participants (both the students and their parents)." % of eligible population enrolled: children: 54% (80/149) Age (years): mean: 9.23 (SD 0.52) Gender/Sex: 68.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 40 Comparator type: non-active intervention Comparison group participants: 40 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was funded by the General Research Fund (GRF) from Research Grants Council of Hong Kong (project number: GRF 244913)." DOI: "No competing financial interests exist." General notes: NR

Lazaar 2007

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 425 Setting: local state schools in Clermont-Ferrand Country: France Country income: high income Recruitment: Quote: "Four hundred twenty-five (213 girls and 212 boys) healthy children, aged 6–10 years were randomized and recruited from the local state schools to participate in the study. The participating children were representative with regard to the community where the study was carried." % of eligible population enrolled: schools: NR; children: NR; Age (years): mean: 7.4 (SD 0.8) (whole cohort) Gender/Sex: 49.9% boys (total cohort)
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 197 Comparator type: non-active intervention Comparison group participants: 228 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by grants from French National Plan for Nutrition and health (PNNS), the

	Comit´e R´egional Ex´ecutif des Actions de Sant´e d'Auvergne (CREAS), the Caisse R´egionale d'Assurance Maladie d'Auvergne (CRAMA), the Appert Institutes, the town of Clermont- Ferrand and schools' governing bodies of Clermont-Ferrand." DOI: NR General notes: our analyses only included children with weight status classified as normal-weight

Lent 2014

Study characteristics	
Methods	Study name: Healthy Corner Store Initiative Study design: cluster RCT N of arms: 2 Unit of allocation: school-store (school and its surrounding corner stores within a four-block radius) Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 1 year; 2 years
Participants	Participants: 770 Setting: ten schools in Philadelphia, PA Country: United States Country income: high income Recruitment: Quote: "Staff approached principals in a pre-determined random order. Of the 20 eligible schools, 13 were approached, 3 declined and 10 were randomized. The seven schools not approached were in close proximity to other schools or had limited nearby corner stores. The principal of each school sent a letter home describing the study and inviting parents to consent and children to assent for assessments of the child's height and weight, as well as to assessments (intercepts) of corner store purchases made by the children. All children were encouraged to return the consent/assent form regardless of whether or not they agreed to participate. Study staff approached the owners of all corner stores within a four blockradius of each school." % of eligible population enrolled: schools: 50% (10/20); children: 42.6% (767/1802) Age (years): mean: intervention: 10.97 (SD 1.02); control: 10.99 (SD 0.92) Gender/Sex: intervention: 44.6% boys; control: 42.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary Intervention group(s) participants: 436 Comparator type: non-active intervention Comparison group participants: 334 Comparison: dietary vs control Setting of the intervention: school + community Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term; BMI percentile medium term (1 year) BMI long term; zBMI long term; BMI percentile long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The Robert Wood Johnson Foundation (Healthy Eating Research grant #63052) and NIH (F32DK096756). Disclosure: GDF served as a consultant to ConAgra Foods, United Health Group, and Tate & Lyle during the time of this study. GDF and SSV are currently full-time employees of Weight Watchers International. All other authors report no conflict of interest or financial disclosures." DOI: "One author served as a consultant to ConAgra Foods, United Health Group, and Tate & Lyle during the time of this study. Two authors currently full time employees of Weight Watchers International. All other authors report no conflict of interest or financial disclosures." General notes: NR

Levy 2012

Study characteristics	
Methods	Study name: Nutrition on the go Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 7 months
Participants	Participants: 1020 Setting: sixty schools in different municipalities of the State of Mexico Country: Mexico Country income: upper middle income Recruitment: Quote: "The sample was representative of the population attending fifth grade elementary schools in the State of Mexico. Sixty schools were selected at random, of a total of 2,969 public schools in the State of Mexico that receive school breakfasts. Within each school, 17 fifth grade children were also ran domly selected, resulting in a total of 510 children per intervention group in order to have a sufficient sample size at follow-up." % of eligible population enrolled: schools: 2% (60/2969); children: NR (note: the non-response rate expected in this study was ≤5%; Age (years): % of age 10: intervention: 78.6%; control: 75.3% Gender/Sex: intervention: 48.4% boys; control: 50.3% boys

Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 510 Comparator type: non-active intervention Comparison group participants: 510 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by: State system for the comprehensive development of the family, State of Mexico (DIFEM)." DOI: "The authors declare that they have no competing interests." General notes: NR

Li 2010

Study characteristics	
Methods	Study name: Happy 10 program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months; 24 months
Participants	Participants: 4700 Setting: twenty primary schools from DongCheng and ChongWen disctricts (Beijing) Country: China Country income: upper middle income Recruitment: Quote: "We randomly selected two districts, DongCheng and ChongWen, from the eight in urban Beijing. Then ten primary schools from each district were randomly chosen and assigned to be either an intervention or control group." % of eligible population enrolled: districts: 25% (2/8); schools: 26% (20/76); classes: NR; children: 96% (4700/4880); Age (years): mean: 9.3 (SD 0.7) Gender/Sex: 52.3% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 2329 Comparator type: non-active intervention Comparison group participants: 2371 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) BMI long term; zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-TRC-00000053 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was supported by Nutricia Research Foundation (ndr: Independent Charity). The authors declared no conflict of interest to disclose." DOI: "The authors declared no conflict of interest to disclose. " General notes: NR

Li 2019

Study characteristics	
Methods	Study name: CHIRPY DRAGON Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 1641 Setting: fourty non-boarding, state-funded primary schools in traditional urban districts of Guangzhou Country: China Country income: upper middle income Recruitment: Quote: "All non-boarding, state-funded primary schools (clusters) in traditional urban districts of Guangzhou were eligible (n = 353). A research team member (WL) used a random number generator to select 40 schools, which were invited to take part in the trial. Through support from local education and health authorities (an official support letter was sent

	to each of the sampled schools) and personal visits (with written information sheet and consent form) or telephone communication from the research team members, all 40 schools agreed to take part. Using a random number generator, a research team member selected 1 year-one class from each school to participate in study measurements (average number of classes per year is 4; range: 2 to 8). We invited all children in these classes to take part with active consent sought from their parents or guardians." From study protocol: "In line with local cultural practice and based on our previous experience of conducting research in Chinese schools, randomly selected schools will be approached through telephone calls and an official letter that shows project approval and support from the local Education and Health Bureaus. The first 40 school principals who agree to participate will be invited to attend a briefing event at the Guangzhou Centre for Disease Control and Prevention (CDC), together with representatives of their district-level education bureaus and CDC." % of eligible population enrolled: schools: 100% (40/40; randomly chosen from 353 eligible); children: 99% (1630/1641); Age (years): mean: intervention: 6.15 (SD 0.36); control: 6.14 (SD 0.35) Gender/Sex: 54.5% boys
Interventions	Theory: Behaviour Change Techniques, Social Marketing Principles Intervention type: dietary and activity Intervention group(s) participants: 832 Comparator type: non-active intervention Comparison group participants: 809 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN11867516 Funder(s) type: industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded through a philanthropic donation from Zhejiang Yong Ning Pharmaceutical Ltd Co. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." DOI: "One author holds grant from NIHR related to research on childhood obesity prevention. She is chair of the NIHR Public health research funding committee. She was a trustee of the Association for the Study of Obesity. She provided writetn expert evidence for the Health and Social Care Commitee Childhood obesity inquiry. " General notes: baseline data for the whole cohort; data extracted are from the whole cohort and from the children that were non-obese at baseline; the study protocol mentioneda secondary follow-up at 24 months but data are not reported and no evidence that BMI at 24 months was measured.

Lichtenstein 2011

Study characteristics	
Methods	Study name: GiZu Prevention Program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 1 year; 2 years
Participants	Participants: 445 Setting: nine schools in the Rhine-Neckar region Country: Germany Country income: high income Recruitment: Quote: "First and second graders in 9 schools in the Rhine-Neckar region were examined at the start of the 2007 and 2008 school year." % of eligible population enrolled: NR Age (years): mean: 7.3 (SD 0.68) Gender/Sex: NR
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 249 Comparator type: non-active intervention Comparison group participants: 196 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (1 year) zBMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: article in German

Liu 2019

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 year Follow-up time(s): 6 months, 1 year
Participants	Participants: 1889 Setting: twelve schools from Dongcheng District, a central districts in the east of Beijing Country: China Country income: upper middle income Recruitment: Quote: "A convenience sample of twelve schools were selected from Dongcheng District / Within each school, ~150 (142–185) students aged 7–11 years from Grade 3–5 were recruited. Participating schools fulfilled our eligibility criteria: school managers agreeing to implement this program; having at least 200 children from Grade 3–5 per school; not boarding schools; not schools solely for children with special skills; not schools of minor ethnic groups; and no similar program (a focus on weight gain prevention) that would be conducted during the following year after enrolment." % of eligible population enrolled: schools: 100% (12/12); children: 100% (1889/1889); Age (years): mean: 9 (SD 0.67) Gender/Sex: 51.7% boys
Interventions	Theory: ANGELO framework, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 930 Comparator type: non-active intervention Comparison group participants: 959 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (6 months) BMI medium term; zBMI medium term (1 year) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-TRC-13003509 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funded by a grant from China Medical Board (Project No. 11-064)" DOI: "No competing financial interests exist." General notes: NR

Liu 2022

Study characteristics	
Methods	Study name: DECIDE - Children (Diet, Exercise and Cardiovascular Health) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 4 months; 9 months
Participants	Participants: 1392 Setting: twenty-four schools from three socioeconomically distinct Chinese areas: Beijing, Changzhi of Shanxi Province, and Urumuqi of Xinjiang Province Country: China Country income: upper middle income Recruitment: Quote: "We selected 3 socioeconomically distinct regions in China from the eastern (Beijing), central (Changzhi, in Shanxi Province), and western (Urumuqi, in Xinjiang Province) parts of the country. A total of 24 primary schools were selected, with 8 schools in each region (eFigure 1 in Supplement 3). We recruited 1 or 2 grade 4 classes from each school, depending on class size, to ensure that approximately 50 children aged 8 to 10 years were included per school." % of eligible population enrolled: schools: 37% (24/70); children: 82% (1392/1695) Age (years): mean: intervention: 9.6 (0.4); control: 9.6 (0.4) Gender/Sex: 51.5% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 705 Comparator type: non-active intervention Comparison group participants: 687 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (4 months) BMI medium term; zBMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	

	Clinical Trial Registry: NCT03665857 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The design and conduct of the study was supported by grant 2016YFC1300204 from the National Key R&D Program of China (Dr Wang), grants 92046019 (DrWang) and 81903343 (Dr Liu) from the National Natural Science Foundation of China, and grant 2019M650391 from the China Postdoctoral Science Foundation (Dr Liu). The sponsors had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication." DOI: "One author reported serving as a consultant for Medtronic outside of the submitte dwork. No other disclosures were reported." General notes: outcome data at the last follow-up (21 months after baseline as reported in the study protocol) are not reported in the main article.

Llargues 2012

Study characteristics	
Methods	Study name: AVall Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years; 4 years; 6 years; 10 years
Participants	Participants: 278 Setting: sixteen schools in Granollers, Barcelona Country: Spain Country income: high income Recruitment: Quote: "In 2006, the 16 schools in Granollers (10 public schools fully supported by the government and 6 semi-private schools partially supported by the government) were randomly distributed to the intervention or control group stratified according to public or semi-private status, number of first-year's classrooms and socioeconomic status of the local neighborhood. All the children born in 2000 who attended any of the schools in Granollers were eligible to participate." % of eligible population enrolled: schools: 100% (16/16); children: 85% (958/704); Age (years): mean: 6.03 (SD 0.3) Gender/Sex: 54% boys
Interventions	Theory: Investigation, Vision, Action and Change (IVAC) Methodology Intervention type: dietary and activity Intervention group(s) participants: 156 (at baseline) Comparator type: non-active intervention Comparison group participants: 122 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (10 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01156805 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by Observatori de la Salut Carles Vallbona, Fundacio´ Hospital Asil de Granollers, Public Health Department, Granollers City Council, Primary Health Subdivision (PCS) Granollerse Mollet, Catalan Institute of Health and by Health Department, Generalitat de Catalunya, Spain." DOI: "The authors state that they have no conflicts of interest." General notes: NR

Lloyd 2018

Study characteristics	
Methods	Study name: HeLP (Healthy Lifestyles Programme) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 school terms (the spring and summer term of Year 5 and the autumn term of Year 6) Follow-up time(s): 18 months; 24 months
Participants	Participants: 1324 Setting: thirty-two state-run primary and junior schools in Devon and Plymouth Country: United Kingdom Country income: high income Recruitment: Quote: "All state-run primary and junior schools in Devon and Plymouth (UK) with enough pupils for at least one year-5 class (children aged 9–10 years) were eligible. Schools for children whose additional needs cannot be met in a mainstream setting were excluded because they were unlikely to be teaching the standard national curriculum, around which the intervention had been designed. Schools willing to participate and fulfilling the inclusion criteria were then purposefully sampled by JL and KW to represent a range of school sizes (one to three year-5 classes), locations (urban and rural), and socioeconomic status (<19% and ≥19% of children eligible for free school meals). We aimed to have half of the schools in the trial with at least the national average proportion of pupils eligible for free schools meals (19% at the time of recruitment of schools). Before randomisation, head teachers from all schools gave written informed consent. To accommodate the

	logistics and personnel required for delivering the week-long term drama component of the intervention to each year-5 class, the trial ran across two cohorts (cohort 1 commenced the trial in September, 2012, and cohort 2 in September, 2013). Schools that were eligible but not sampled for the trial were asked if they were prepared to go on a waiting list in case any of the schools allocated to participate in cohort 2 dropped out during the interim 1-year period before commencing participation. All children in all year-5 classes within each recruited school were invited to participate, and their parents or carers could choose to opt their child out before baseline measurements were taken (full details in protocol). All children who were on the registration list at one of the recruited schools at the start of the autumn term 2012 (for cohort 1) or 2013 (for cohort 2), and whose parents or carers did not complete an opt-out form, were classed as participants." % of eligible population enrolled: schools: 89% (32/36); children: 97% (1324/1371); Age (years): mean: 9.7 (SD 0.3) Gender/Sex: 48.7% boys
Interventions	Theory: Intervention Mapping Approach, Behaviour Change Theories, Health Promoting School Framework Intervention type: dietary and activity Intervention group(s) participants: 676 Comparator type: non-active intervention Comparison group participants: 648 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long term; BMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN15811706 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "UK National Institute for Health Research, Public Health Research Programme. The funders had no role in study design, data collection, data analysis, data interpretation, or writing of the report." DOI: "Authors report grants from the Peninsula College of Medicine and Dentistry and non-financial methodological support during the transition from the exploratory trial to the definitive evaluation from the NIHR Collaboration for Leadership in Applied Health, Research, and Care for the South West Peninsula. Others report grants from the CLAHRC for the South West Peninsula, NIHR, and personal fees from University College London and non-financial support from Knowledge Exchange Conferences." General notes: NR

Lynch 2016

Study characteristics	
Methods	Study name: Let's Go! 5-2-1-0 Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 4 months
Participants	Participants: 51 Setting: a local elementary school in Rochester, Minnesota Country: United States Country income: high income Recruitment: Quote: "All second- and third-grade students at a local elementary school (n = 183) in Rochester, Minnesota, were invited to participate in the study. children were included in the study if a caregiver signed the HIPAA (Health Insurance Portability and Accountability Act) form, completed the initial study surveys, and if the child gave assent. For families whose primary language was Spanish, documents were translated to Spanish by the Mayo Clinic Language Department. Second- and third-grade teachers sent home a packet of information, prepared by the study team, to each student's legal guardian caregiver, including a letter of invitation, which explained the study, a 5-2-1-0 Healthy Habits survey, a demographic survey, and a HIPAA form accompanied by a return envelope. The contact letter also stated that, by completing questionnaires, caregivers authorized the use of pedometers for their child both at the beginning and the end of the study. For families whose primary language was not English or Spanish, school interpreters were available to translate information via phone; all school interpreters satisfy the Minnesota Court Interpreter training requirements." % of eligible population enrolled: classroom: NR; children: 28% (51/183); Age (years): median: intervention: 8 (IQR 7-8), control: 8 (IQR 7-9) Gender/Sex: 51% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 29 Comparator type: non-active intervention Comparison group participants: 22 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as median (IQR) BMI
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was supported by a grant from the Ben and Zelma Dorson Family Charitable Foundation

	as well as funding through the Mayo Clinic Department of Family Medicine. This publication was made possible by the CTSA Grant UL1 TR000135 from the National Center for Advancing Translational Sciences (NCATS), a component of the National Institutes of Health (NIH).The contents of this study are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health."" DOI: "The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article." General notes: data reported as median (IQR) BMI

Macias-Cervantes 2009

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 76 Setting: public schools at León, Guanajuato Country: Mexico Country income: upper middle income Recruitment: Quote: "We carried out a randomized, controlled trial during 12 weeks in children from public schools at León, Guanajuato, Mexico. We invited to participated children who attended public schools in four neighborhoods. Only children considered as sedentary and moderate active were included in the study." % of eligible population enrolled: children: 90.5% (76/84); Age (years): median: intervention: 8 (IQR 6.1-9.1); control: 7.5 (IQR 6.9-8.4) Gender/Sex: 56.4% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 38 Comparator type: non-active intervention Comparison group participants: 38 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as median (IQR) BMI
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported in part by grant number FOMIX GTO-2006-C01-31929. The authors do not have financial interest with the organization that sponsored this work." DOI: "The authors do not have financial interest with the organization that sponsored this work." General notes: study targets children considered as sedentary and moderate active

Madsen 2013

Study characteristics	
Methods	Study name: Modified SCORES program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school terms (12 weeks in the fall sessions and 12 weeks in the spring sessions) Follow-up time(s): 12 weeks; 24 weeks
Participants	Participants: 156 Setting: seven schools in San Francisco, California Country: United States Country income: high income Recruitment: Quote: "This study took place in a large, diverse, urban school district, with an enrollment of 56,000 students. Of 72 schools with grade K-5 enrollment, 60 schools that had not offered SCORES in the year prior to the study were eligible to participate. The study was presented at a regularly scheduled principals' meeting, at which 14 eligible schools were represented, and 7 schools agreed to participate. At study schools, 61% of students were eligible for free or reduced-price (FRP) meals (range 44% to 89%). All fourth and fifth grade students enrolled in the after-school program at participating schools were eligible for the study. After-school programs can accommodate approximately 25% of the total student body and preferentially enroll students who qualify for FRP meals. Of 88 eligible students in the 3 intervention schools, 82 (93%) enrolled in the study, and 74 of 86 eligible students (86%) enrolled in the study in control schools" % of eligible population enrolled: schools: 12% (7/60); children: 90% (156/174); Age (years): mean: 9.8 (SD 0.6) Gender/Sex: 60% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 82

	Comparator type: non-active intervention Comparison group participants: 74 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narrativelly
Notes	Clinical Trial Registry: NCT01156103 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was by the following grants: NIH/ NICHDK23HD054470 and American Heart Association 0865005F." DOI: NR General notes: NR

Magnusson 2012

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 321 Setting: six schools in Reykjavik Country: Iceland Country income: high income Recruitment: Quote: "Three pairs of schools in the city of Reykjavik were selected and matched on size, i.e. number of students and total number of grades. All children attending second grade (born in 1999) were invited to participate and to hand in a written parental consent form (signed by either parent and the child) before the first measurement sessions in the fall of 2006." % of eligible population enrolled: schools: NR; children: NR; Age (years): mean: intervention: 7.3 (SD 0.3); control: 7.4 (SD 0.3) Gender/Sex: 44.3 boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 151 Comparator type: non-active intervention Comparison group participants: 170 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was primarily funded by the Icelandic Centre for Research (RANNIS), but also supported by the city of Reykjavik, the Ministry of Education, Science and Culture and BRIM Seafood" DOI: "The authors have no conflict of interest." General notes: NR

Marcus 2009

Study characteristics	
Methods	Study name: STOPP Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1-4 years Follow-up time(s): 4 years
Participants	Participants: 3135 Setting: ten primary schools in the Stockholm county area Country: Sweden Country income: high income Recruitment: Quote: "Ten primary schools including children between 6 and 10 years of age within the Stockholm county area were selected. Participating schools had a mixed pupil population with children from middle and working class families living both in blocks of flats and in detached houses. The proportion of children with an immigrant background, defined as children requiring native-language teaching did not exceed 15%. Five of the selected schools were thereafter randomized to intervention and five schools to control. All children participated in the study until the end of their fourth school year, that is,

	until the age of 9–10 years. Ninety-two to 100% of the children in the intervention schools and 90 to 100% in the control schools were entered into the study and participated in at least one occasion of weight and height assessment." % of eligible population enrolled: schools: 2.6% (10/387; selected/invited to participate); children: 90-100% (92 - 100% of the children in the intervention schools and 90 - 100% in the control schools were entered into the study and participated in at least one occasion of weight and height assessment). Age (years): mean: intervention: 7.4 (SD 1.3); control: 7.5 (SD 1.3) Gender/Sex: 50.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1670 Comparator type: non-active intervention Comparison group participants: 1465 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long term (4 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN96347873 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by grants from Stockholm County Council, Swedish Council for working life and social research, Swedish Research Council, Freemason's in Stockholm Foundation for Children's Welfare and Signhild Engkvist Foundation" DOI: NR General notes: children who entered the study during their first school year in August 2001 participated in the programme for four years, whereas children who started school at a later year, participated in the programme for short termer time periods. Schools with children from high socio-economic families were not included.

Marsigliante 2022

Study characteristics	
Methods	Study name: NR Study design: RCT (see notes) N of arms: 2 Unit of allocation: individual (see Notes) Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 398 Setting: secondary-level public schools located in two wo cities in Southern Italy Country: Italy Country income: high income Recruitment: a sample of 398 children was selected from different schools. These schools are located in two cities with similar socioeconomic status and have not previously participated in health promotion programs. % of eligible population enrolled: children: 100% (398/398) Age (years): mean: intervention girls: 9.4 (SD 0.7); intervention boys: (9.4 (SD 0.7); control girls: 9.5 (SD 0.7); control boys: 9.5 (SD 0.7) Gender/Sex: 48.7% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 198 Comparator type: non-active intervention Comparison group participants: 200 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: it is unclear whether the data repoted are from BMI or percentile measurements and whether they reported a standard deviatin or a standard error.
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: the authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: it is unclear if the study is a individual or cluster RCT, the methods (flowchart and text) suggests that participants were individually randomized but the authors stated " The control schools followed their regular curriculum" and "all teachers and parents in the intervention schools received on-site training". We have reported the study as RCT and analysed the data according to a RCt design.

Martinez-Vizcaino 2014

Study characteristics	
Methods	Study name: MOVI-2 Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 9 months
Participants	Participants: 1592 Setting: twenty schools in 20 towns in the Province of Cuenca Country: Spain Country income: high income Recruitment: Quote: "This trial included 20 schools in 20 towns in the Province of Cuenca, Spain. All but two were rural schools (located in towns less than 5,000 inhabitants). In towns with two or more schools, only one was chosen at random to avoid contamination of the intervention. All the schools invited agreed to participate. All the children in the fourth and fifth grades in the 20 selected schools were considered eligible for study inclusion if they met the eligibility criteria." % of eligible population enrolled: schools: 100% 920/20; included/invited); children: 67% (1070/1592; consented and measured/randomized); Age (years): mean: 9.5 (SD 0.5) Gender/Sex: 48.6 boys
Interventions	Theory: Social Ecological Model Intervention type: activity Intervention group(s) participants: 769 Comparator type: non-active intervention Comparison group participants: 823 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: BMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01277224 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the Ministry of Education and Science-Junta de Comunidades de Castilla-La Mancha (PII1I09-0259-9898 and POII10-0208- 5325), and Ministry of Health (FIS PI081297). Additional funding was obtained fro the Research Network on Preventative Activities and Health Promotion (Ref. - RD06/0018/0038). The authors declare no conflicts of interests. All authors declare that the following statements are true: they received no support from any organisation for the submitted work; they conducted no financial relationships with any organisations that might have an interest in the submitted work in the previous years; there were no other relationships or activities that could appear to have influenced the submitted work." DOI: "The authors declare no conflics of interest. All authors declare that the following statements are true: they received no support from any organisation for the submitted work; they conducted no financial relationships with any organisations that might have an interest in the submitted work in the previous years; there were no other relationships or activities that coudl appear to have influenced the submitted work." General notes: NR

Martinez-Vizcaino 2020

Study characteristics	
Methods	Study name: MOVI-KIDS Study design: cluster RCT (cross-over) N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 2407 Setting: twenty-one pre-school and primary schools in Cuenca and Ciudad Real provinces in the Castilla-La Mancha region Country: Spain Country income: high income Recruitment: Quote: "Approval from directors and boards of governors was obtained to enlist schools, and all parents of children who were in the third preschool grade (4–5 years) and the first grade of primary school (aged 6–7 years) were invited to participate. Parents were asked to give their written informed consent to allow their child to participate in the study; this consent could be revoked by the parents or children at any time." % of eligible population enrolled: schools: 95% (21/22); children: 67% (1604/2407; number of children excluded because not eligible is not reported) Age (years): mean: intervention boys: 5.32 (SD 0.620; intervention girls: 5.38 (SD 0.64); control boys: 5.31 (SD 0.59); control girls: 5.39 (SD 0.62) Gender/Sex: 50.1% boys
Interventions	Theory: Social Ecological Model Intervention type: activity Intervention group(s) participants: 1299 Comparator type: non-active intervention Comparison group participants: 1108 Comparison: activity vs control

	Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01971840 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Ministry of Economy and Competitiveness- Carlos III Health Institute and FEDER funds (FIS PI12/00761). Additional funding was obtained from the Research Network on Preventative Activities and Health Promotion (RD12/0005/0009). DPP-C (FPU14/01370) and MG-M (FPU15/03847) are recipients of a predoctoral fellowship by the Spanish Ministry of Education, Culture and Sport. IC-R is supported by a postdoctoral grant (FPU13/01582) from Universidad de Castilla-La Mancha, Spain." DOI: Competing interests: None General notes: this is a cross-over CRCT in which in the second year the control group became intervention group and the intervention group became the control group; outcome measured at the first year follow-up is reported in this article.

Martinez-Vizcaino 2022

Study characteristics	
Methods	Study name: MOVI-daFIT! Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8-9 months
Participants	Participants: 923 Setting: ten schools from ten towns in the Province of Cuenca Country: Spain Country income: high income Recruitment: Quote: "The Department of Education and Science of the Junta de Communities of Castilla- La Mancha (Spain) sent a letter informing each school that agreed to participate about the study. After that MOVI-daFIT! researchers provided information about the objectives and methods of the study to the head teacher, the school board, and the physical education teachers of the schools. The consent of the school Council, board of community participating in school management, was required to participate in MOVI-daFIT!. Finally, 10 schools from 10 towns in the province in Cuenca, Spain, agreed to participate. In all schools, all children belong terming to the fourth and fifth grades of primary school (9–11 years old) were invited to participate. Parents were invited to a meeting in which researchers provided complete information about the objectives and procedures of the study. Signed informed consent from parents was compulsory for the children whose parents decided that they will participate in MOVI-daFIT!. Parents were encouraged to take children's opinion into consideration for this decision." % of eligible population enrolled: schools: 100% (10/10); children: 61% (562/923) Age (years): mean: intervention boys: 9.89 (SD 0.71); intervention girls: 10.03 (SD 0.69); control boys: 10.12 (SD 0.69); control girls: 10.04 (SD 0.72) Gender/Sex: 47.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 518 Comparator type: non-active intervention Comparison group participants: 405 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (8-9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03236337 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Ministry of Economy and Competitiveness Carlos III Health Institute and FEDER funds (FIS PI19/01919). Additional funding was obtained from the Research Network on Preventative Activities and Health Promotion (RD12/0005/0009) to VM-V. The authors declare that they have no competing interests." DOI: "The authors declare that they have no competing interests." General notes: NR

Meng 2013 (Beijing)

Study characteristics	
Methods	Study name: NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China) Study design: cluster RCT

	N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 1776 Setting: nine schools in Beijing Country: China Country income: upper middle income Recruitment: Quote: "This study is a multi-center randomized controlled trial. Six centers included Beijing, Shanghai, Chongqing, Guangzhou, Jinan and Harbin were recruited. Two-step cluster sampling was used for subject selection. In the first step, 9 schools in Beijing were selected and assigned randomly to nutrition intervention (3 schools), physical activity (PA) intervention (3 schools) or control condition (3 schools). In the second step, 2 classes from each grade in each school were chosen randomly. The schools which meet the inclusion criteria (non boarding school; the students' overweight & obesity rate is over 10%; school feeding, and more than 50% of the student eat lunch at school. All of the students in the selected classes were enrolled in the trial, expect the students that were not eligible." % of eligible population enrolled: schools: NR; classes: NR; children: 96% (9327/9750) Age (years): 6-9.9: 69.7%; 10-13.9: 30.3% Gender/Sex: 52.1% boys
Interventions	Theory: NR Intervention type: dietary/activity (multi-arm) Intervention group(s) participants: nutrition education intervention: 656 Happy 10 intervention: 635 Comparator type: non-active intervention Comparison group participants: 485 Comparison: dietary vs control activity vs control activity vs dietary Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-PRC-09000402 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project has been funded by China Ministry of Science & Technology as “Key Projects in the National Science & Technology Pillar Program during the Eleventh Five-Year Plan Period”, grant number 2008BAI58B05. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." DOI: "The authors have declared that no competing interests exist." General notes: this is a two-steps clustered RCT: first randomization was at school level; second randomization was at classroom level. Participants were selected from Beijing and 5 other cities (2 cohorts); data are analysed separatelly for the Beijing cohort and the other 5 cities cohorts. Data from all 5 arms are reported in both Meng 2013 and Xu 2017. From this study we only extracted data from the Beijing cohort (3 arms). The data from the 5 other cities cohort (2 arms) are extracted from Xu 2017 study.

Morgan 2011

Study characteristics	
Methods	Study name: HDHK (Healthy Dads, Healthy Kids) Study design: cluster RCT N of arms: 2 Unit of allocation: father + ≥ 1 child Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 71 Setting: communies in Newcastle, New South Wales Country: Australia Country income: high income Recruitment: Quote: "Overweight or obese men with a primary school child aged between 5 and 12 years of age were recruited from the local community through media releases, school newsletters and paid advertisements in local newspapers in August/ September 2008. Men were screened for eligibility through telephone interviews. All fathers needed to have Internet access and were asked to not participate in other weight loss programs during the study. Fathers completed a pre exercise risk assessment screening questionnaire and provided written informed consent, as well as child assent." % of eligible population enrolled: fathers: 90% (70/78); children: NR; Age (years): mean: 8.2 (SD2.0) Gender/Sex: 53.5% boys
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 39 Comparator type: non-active intervention Comparison group participants: 32 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months)

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12609000855224 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Hunter Medical Research Institute and the Gastronomic Lunch." DOI: "The authors declare no conflict of interest." General notes: the study targets men that are overweight or obese with a primary school child aged between 5 and 12 years of age

Morgan 2014

Study characteristics	
Methods	Study name: HDHK (Healthy Dads, Healthy Kids) Study design: cluster RCT N of arms: 2 Unit of allocation: father + ≥ 1 child Unit of analysis: individual Intervention period: 7 weeks Follow-up time(s): 14 weeks
Participants	Participants: 132 Setting: communies in the Singleton and Maitland local government areas of the Hunter region Country: Australia Country income: high income Recruitment: Quote: "Overweight or obese (BMI between 25 and 40 kg/m2) fathers (aged 18– 65 years) with a child attending primary school (aged between 5 and 12 years) were recruited and assessed between 2010 and 2011 in two cohorts from two local government areas (LGAs) (Singleton and Maitland) in the Hunter Region of NSW, Australia with treatment and control groups at each LGA. Of note, these rural LGAs include high rates of mining and shift work-based employment (Australian Bureau of Statistics, 2009), which are linked to increased risks of obesity and associated health complications. Recruitment strategies included school newsletters, school presentations, interactions with parents waiting to pick their children up from school, local media, and fliers distributed through local communities. Fathers were screened for eligibility via telephone. Children of any weight status were able to participate in the trial and fathers were required to live with their children." % of eligible population enrolled: fathers: 98% (101/103); children: NR; Age (years): mean: 8.1 (SD 2.1) Gender/Sex: 55% boys
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 72 Comparator type: non-active intervention Comparison group participants: 60 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (14 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12610000608066 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The Healthy Dads, Healthy Kids community program is funded by a Coal and Allied Community Development Fund grant (2010–2012) and the Hunter Medical Research Institute. The funding bodies did not have any input into the design of the study, the collection or analysis of data, the preparation of this manuscript, or the decision to submit this manuscript for publication. C.E. Collins is supported by an Australian National Health and Medical Research Council Career Development Fellowship. R.C. Plotnikoff is funded by a Senior Research Fellowship from the National Health and Medical Research Council of Australia. Anthony Okely is supported by a National Heart Foundation of Australia Career Development Fellowship." DOI: "The authors declare that they have no competing interests. " General notes: the study targets men that are overweight or obese with a primary school child aged between 5 and 12 years of age. According to the study protocol outcome was planned to be measured at 3, 6 and 12 months follow-up, but only 3 months is reported here.

Morgan 2019

Study characteristics	
Methods	Study name: DADEE Study design: cluster RCT N of arms: 2 Unit of allocation: family (father + ≥ 1 daughter) Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 9 months
Participants	Participants: 153 Setting: communies in Newcastle, New South Wales Country: Australia Country income: high income Recruitment: Quote: "All families were recruited from Newcastle in New South Wales, Australia over 11 weeks in 2015. The

	primary recruitment strategy was a University media release that was featured in several local news outlets (television, radio, newspaper). Fathers (including stepfathers and male guardians) could enroll with one or more daughters if they were aged 18–65 and passed a pre-exercise screening questionnaire (or provided a doctor's clearance to participate)." % of eligible population enrolled: families: 83% (115/139); children: NR ; Age (years): mean: 7.7 (SD 1.8) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 74 Comparator type: non-active intervention Comparison group participants: 79 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12615000022561 2015 (ID8489); ACTRN12616001270404 2016 (ID8490); Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by project grants from Port Waratah Coal Services and the Hunter Children's Research Foundation to the Hunter Medical Research Institute. The funding bodies had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and de cisionto submit the manuscript for publication." DOI: "The authors declare no conflict of interest. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000" General notes: NR

Muller 2016

Study characteristics	
Methods	Study name: Leipzig School Project Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 4 years Follow-up time(s): 1 year; 2 years; 4 years
Participants	Participants: 366 Setting: ten schools in the area of Leipzig and Chemnitz, Saxony Country: Germany Country income: high income Recruitment: Quote: "In 10 schools in the area of Leipzig and Chemnitz, Saxony, Germany, 22 classes (10 intervention, eight control, four high level) with 491 students at grades 5 or 6 were invited for participation in this open end controlled, randomised school-based exercise programme. Sixteen classes (seven intervention, seven control, two high level) at the end of grades 8 or 9 fulfilled a study period of 4 years." From Walther 2009: "After the rationale, study protocol, and potential side effects were explained, parents of all study participants gave informed consent. Study selection was based on the willingness of parents to allow their children to participate in the study protocol for at least 1 year." % of eligible population enrolled: classrooms: NR; children: 74.5% (366/491); Age (years): mean: 11.5 (SD 0.61) Gender/Sex: 50.5% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 202 Comparator type: non-active intervention Comparison group participants: 164 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI percentile; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI medium term (1 year) BMI percentile long term (4 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00176371 Funder(s) type: industry Writing and/or research independent from funder(s): NR Funding details: the author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: an unrestricted grant from Novartis and Roland Ernst Stiftung. DOI: "The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article." General notes: data for the long term term follow-up (4 years) are reported as percentage of participants that are overweight or obese. We excluded these results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to mean.

Muller 2019

Study characteristics	
Methods	Study name: DASH (Disease, Activity and School children's Health) Study design: cluster RCT N of arms: 5 (see Notes) Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (10 months; 2 x 10 week intervention periods) Follow-up time(s): 10 months
Participants	Participants: 1009 Setting: eight primary schools in Port Elizabeth in the Eastern Cape province Country: South Africa Country income: upper middle income Recruitment: Quote: "Recruitment of schools commenced in September 2014 and two 10-week multidimensional physical activity interventions were implemented in July-September 2015 and February-April 2016. Overall, 103 quintile 3 primary schools were eligible for participation. From the 103 quintile 3 schools, 25 schools expressed an interest, as documented in a response letter. Those 25 schools were invited to an information sharing meeting that was attended by 15 schools. Among the 15 schools, seven did not satisfy the chief criterion of having at least 100 learners in grade 4, and hence, were excluded. Eight schools were selected based on (i) suffciently large grade 4 classes (n > 100 children); (ii) geographical location; (iii) representation of the various target communities and (iv) commitment to support the project activities." % of eligible population enrolled: schools: 100% (8/8); 84% (649/770); Age (years): mean: 10.0 (SD 0.9) Gender/Sex: 51.1% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: physical activity (PA) intervention: 119 physiscal activity + health and hygiene education (PA + HE) intervention: 181 physical activity + health and hygiene education + nutritional education intervention (PA + HE + NU): 99 health and hygiene education + nutritional education intervention (HE + NU): 140 Comparator type: non-active intervention Comparison group participants: no intervention: 470 (note: the analysis compared schools with physical activity intervention (n=337) vs schools without physical activity intervention (n=610)) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN68411960 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was financially supported by the Swiss National Science Foundation (Bern, Switzerland; project no. IZLSZ3 149015), the Swiss Government Excellence Scholarships for Foreign Scholars and Artists (Bern, Switzerland) and the National Research Foundation (Pretoria, South Africa; project no. 87397). The funders had no role in study design, data collection, data analysis, data interpretation or writing of the report." DOI: "All authors declare no competing interests." General notes: the randomized 5 harms are: 1 school assigned to a physical activity (PA) intervention, one school assigned to a PA + health education (HE) intervention, one school assigned to a PA with HE + nutritional intervention (NU); one school assigned to NU and HE and four schools are control with no intrevention; the author analysed the effect of PA and therefore the clustering for such analysis are 3 schools with PA and 5 schools without PA; the comparison is PA with or without NU and/or HE vs No PA (control with/without NU and HE).

Muzaffar 2019

Study characteristics	
Methods	Study name: PAWS (Peer-education About Weight Steadiness) Club Study design: cluster RCT N of arms: 2 Unit of allocation: after school program (see Notes) Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 9 months
Participants	Participants: 109 Setting: four middle schools in East-central Illinois Country: United States Country income: high income Recruitment: Quote: "The program was delivered as an afterschool club in 4 middle schools in east central Illinois in support of childhood obesity prevention. Early adolescents at each school enrolled in the program on the day of the week that was most convenient for their schedules. Each school had the day of the program randomized to either the adult-led or peer-led group. The intervention for both groups was identical in materials and content; the only difference was delivery mode (adult educators vs peer educators). Three of the 4 schools had both adult-led and peer-led programs. One of the 4 schools had only a peer-led program, as this school could only host the program one day per week due to logistics and staffing limitations./The project coordinator for the PAWS Club contacted the principals at each of the 4 participating schools and obtained approval to host the program in their respective schools. The first school adopted the PAWS Club in spring 2015, the second in fall 2015, the third in spring 2016, and the fourth school in fall 2016. Researchers participated in school orientation programs and club fairs, visited 6th and 7th grade classrooms, and organized meetings at each school to advertise the program and recruit participants."

	% of eligible population enrolled: children: 54% (109/201); Age (years): mean: intervention (peer-led) group: 11.6 (SD 0.7); control (adult-led) group: 11.6 (SD 0.7) Gender/Sex: 33% boys
Interventions	Theory: Social Cognitive Theory, Stages of Change model Intervention type: dietary and activity Intervention participants: 56 Comparator type: dietary and activity intervention Comparison participants: 53 Comparison: dietary and activity vs dietary and activity Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (dietary and activity interventions)
Notes	Clinical Trial Registry: NCT02365324 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This material is based upon work that is supported by the National Institute of Food and Agriculture, US Department of Agriculture, under award number 2012-68001-22032. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the US Department of Agriculture." DOI: "All authors declare no conflicts of interest. None of the authors have benefitted financially from this work." General notes: participants were randomly allocated to either the peer-led or the adult-led afterschool program. Three of the 4 schools had both adult-led and peer-led programs. Randomization unit was days within the same after school program. One of the 4 schools had only a peer-led program, as this school could only host the program one day per week due to logistics and staffing limitations.

NCT00224887 2005

Study characteristics	
Methods	Study name: FBC (Family Based Counseling) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 12 months
Participants	Participants: 307 Setting: San Jose area, California Country: United states Country income: high income Recruitment: NR % of eligible population enrolled: schools: NR; children: NR; Age (years): mean: 7.7 (SD 1.2) Gender/Sex: 28% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 154 (at baseline) Comparator type: non-active intervention Comparison group participants: 153 (at baseline) Comparison: dietary vs control Setting of the intervention: home/community (active intervention control group) Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00224887 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Current Study Sponsor: Stanford University" DOI: NR General notes: data extracted from the study Trial Registrartion, therefore there are limited information on baseline and PROGRESS characteristics

NCT02067728 2014

Study characteristics	
Methods	Study name: FNPA (Family Nutrition Physical Activity) Study design: cluster RCT N of arms: 2 Unit of allocation: primary care clinics Unit of analysis: individual Intervention period: 1 child-care visit (1 with potential follow-up call/appointment); the intervention was rulled out at the

	practice for 6 monthshowever it is not reported how many time families attended the practice within this time Follow-up time(s): 6 months
Participants	Participants: 232 Setting: primary care clinics in Peoria, Illinois region Country: United States Country income: high income Recruitment: Quote: "Practice Recruitment: Quote: "For 3 months, practice recruitment meetings will be held with offices from three healthcare networks during which the research protocol will be explained, roles and responsibilities of research staff and practices will be outlined, and written agreements signed." Subject Recruitment: "Subject recruitment will occur one month before implementation. Eligible subjects with scheduled well-child visits will receive a letter signed by their provider and the principal investigator. The letter will briefly describe the study and offer the opportunity to enroll. They will be given an opt-out phone number to call within one week of mailing this letter if they do not want to participate. If the research coordinator does not receive a call, he/she will contact the family by phone to answer questions and send a consent form to the family. The subject will be considered enrolled after obtaining a signed written consent from the family."" % of eligible population enrolled: practices: NR; children: NR; Age (years): mean: 10.6 (SD 4.1) (range 5-17 years) Gender/Sex: 46.5% boys (of total participants age group 4 -18)
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 210 (partecipants in age group 4-17 years) Comparator type: non-active intervention Comparison group participants: 220 (partecipants in age group 4-17 years) Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT0206772 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Sponsors and Collaborators: University of Illinois at Chicago; American Cancer Society, Inc.; Feinberg School of Medicine, Northwestern University; New York University; There is NOT an agreement between Principal Investigators and the Sponsor (or its agents) that restricts the PI's rights to discuss or publish trial results after the trial is completed." DOI: NR General notes: the trial was conducted on participants aged 4-17, results at follow-up are reported for all participants and for age grpup 4-10 and 11-17 separatelly; published data not found; baseline data and results extracted from Trial Registration; we have limited details on study characteristics and PROGRESS data.

Nemet 2011a

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 12 months
Participants	Participants: 795 Setting: schools in the Sharon area Country: Israel Country income: high income Recruitment: NR % of eligible population enrolled: NR Age (years): mean: 5.2 (SE 0.02) Gender/Sex: 53% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 417 Comparator type: non-active intervention Comparison group participants: 378 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; BMI percentile medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by a grant from The Rosalinde and Arthur Gilbert Foundation, and the Israel Heart Fund. The authors declare no conflicts of interest." DOI: "The authors declare no conflict of interest." General notes: NR

Nemet 2011b

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 12 months; 24 months
Participants	Participants: 342 Setting: schools in Central Israel Country: Israel Country income: high income Recruitment: NR % of eligible population enrolled: NR Age (years): mean: intervention: 5.36 (SE 0.03); control: 5.4 (SE 0.04) Gender/Sex: intervention: 58% boys; control: 55% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 154 Comparator type: non-active intervention Comparison group participants: 188 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium term; BMI percentile medium term (12 months) BMI long term; BMI percentile long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by a grant from The Rosalinde and Arthur Gilbert Foundation, and the Israel Heart Fund." DOI: NR General notes: NR

Newton 2014

Study characteristics	
Methods	Study name: Parent-Targeted Mobile Phone Intervention Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 27 Setting: communies in Baton Rouge, Louisiana. Country: United States Country income: high income Recruitment: Quote: "Potential participants were recruited through advertisements placed in the newspaper, posted in local hospitals and schools, and delivered through a Pennington Biomedical Research Center email listserv targeting registered individuals interested in participating in research. Once self-identified, one parent completed an initial telephone screen to determine eligibility for themselves and their child. If the parent-child dyad was eligible following the phone screen, they attended a clinic screening visit at the Pennington Biomedical Research Center (Louisiana). The dyad was oriented to the study and then written informed consent was obtained from the parent and written assent was obtained from the targeted child. The baseline assessment (see Measures below) was then conducted. At the end of the clinic visit, the targeted child was fitted with a pedometer (New Lifestyles 1000/NL-1000), the parent was required to use their mobile phone to respond to a text message sent from the study coordinator, and the parent had to access the study website. The dyad was sent home with the following instructions: the child was to engage in their normal level of activity and the parent was instructed to use their mobile phone to access the study website to record their child's step count each night after the child laid down to go to bed. This website was formatted for a mobile phone and contained a webpage to enter the date and the child's step count. Following the clinic visit, the dyad was sent home to begin the 7-day run-in period the following morning. The run-in period was designed to assess the targeted child's baseline physical activity levels and the parent's compliance with monitoring the child's step counts. The dyad was eligible for the study if girls averaged <9500 steps/day or boys averaged <12,500 steps/day (sex-specific cut points indicative of sedentary behavior in children) and parents entered at least 5 days of step counts into

	the study website across the 7-day run-in period (evidence of ability to comply with data recording requirements). The dyad was not made aware of these eligibility criteria so that they did not alter their behavior in order to qualify for the study." % of eligible population enrolled: dyads: 69% (27/39) Age (years): mean: 8.7 (SD 1.4) Gender/Sex: 44% boys
Interventions	Theory: Social Cognitive Theory Intervention type: activity Intervention participants: 13 Comparator type: attention control Comparison participants: 14 Comparison: activity vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; zBMI short term; BMI percentile short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01551108 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "RLNJr was supported by unrestricted funds from the Coca Cola Foundation. RM and WDJ were supported in part by 1 U54 GM104940 from the National Institute of General Medical Sciences of the National Institutes of Health, which funds the Louisiana Clinical and Translational Science Center." DOI: "An author developed the software that was used in the study." General notes: the study targets children with high sedentary levels.

Nicholl 2021

Study characteristics	
Methods	Study name: Milky Way Study Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12.3 (SD 0.9) weeks (range: 11.5- 15 weeks) Follow-up time(s): 3 months
Participants	Participants: 49 Setting: communies in Perth, Western Austraia Country: Australia Country income: high income Recruitment: Quote: "Participants were recruited from the coordinating university, community childcare centers, and parent social communities and organizations, and via socialmedia snowball recruitment, articles in local newspapers, and a current affairs segment on television. Parents were recruited by telephone and sent parent and child information leaflets by email." % of eligible population enrolled: children: 37.7% (49/130) Age (years): mean: intervention: 5.2 (SD 0.9); control: 5.2 (SD 0.9) Gender/Sex: 53.1% boys
Interventions	Theory: Gerber-Pikler RIE; Bronfenbrenner Ecological Model of Child Development Intervention type: dietary Intervention group(s) participants: 24 Comparator type: non-active intervention Comparison group participants: 25 Comparison: dietary vs control Setting of the intervention: home Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; zBMI short term; BMI percentile short term (3 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12616001642471 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The Milky Way Study received financial support from Telethon Kids Institute grant 12012 and from Telethon Perth Children's Hospital Research Fund, Department of Health, and Channel 7 Telethon Trust, WesternAustralia grant TPCHRF R4 2015. AN and KED were each supported in their PhD studies by an Australian Government HigherDegree by Research scholarship, and AN in addition received a PhD top-up scholarship from the Children's Diabetes Center, Telethon Kids Institute, University of Western Australia. No funding body played any role in the Milky Way Study design, implementation, analysis or interpretation of the data, or publication. The Milky Way Study received no funding from any dairy or food industry organization or affiliation toward study research, dairy product purchase or provision, child assessments, project personnel, or publication." DOI: "The PI was awarded funding in 2011 for a previous study from the Dairy Health and Nutritino Consortium. Another author received honoraria and reimbursements for travel as well as a research grant from several dairy-related organisations, including National Dairy Council/Dairy Management Inc., Dairy Farmers of Canada, the Dutch Dairy association, Dairy Australia, and the French Interbranch organisation. All other authors report no conflicts of interest." General notes: the study population were healthy children aged 4–6 y daily consumers of ≥1 serving of whole-fat dairy, with >70% of their dairy consumed or prepared at home

Nollen 2014

Study characteristics	
Methods	Study name: MT (Mobile-Technology) intervention Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 51 Setting: afterschool programs in Kansas Country: United States Country income: high income Recruitment: Quote: "Fifty-one girls were recruited through afterschool programs located in economically disadvantaged neighborhoods and were randomly assigned to a mobile technology (MT; n=26) or control (n=25) condition. Girls aged 9–14 years who were members of the after school program and able to speak/read English and comprehend the program were eligible. " % of eligible population enrolled: children: 46% (51/111) Age (years): mean: 11.3 (SD 1.6) Gender/Sex: 100% girls
Interventions	Theory: Behavioural Weight Control Principles Intervention type: dietary and activity Intervention participants: 26 Comparator type: attention control Comparison participants: 25 Comparison: dietary and activity vs control Setting of the intervention: telehealth/school (active intervention control group) Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: NR Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Dr. Nollen was supported by an award that was co-funded by the Office of Research on Women's Health (ORWH), the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institute of Allergy and Infectious Diseases (NIAID), and National Institutes of Mental Health (NIMH) (K12 HD052027) and the National Heart Lung and Blood Institute at the NIH (K23 HL090496). The views expressed in this paper do not reflect those of the NIH." DOI: "No financial disclosures were reported by the authors of this paper. " General notes: pilot trial to test the feasibility and potential efficacy of a 12-week standalone mobile technology intervention.

Nyberg 2015

Study characteristics	
Methods	Study name: Healthy School Start Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 8 months; 12 months
Participants	Participants: 243 Setting: eight schools in a municipality in Stockholm County Country: Sweden Country income: high income Recruitment: Quote: "Schools were chosen from a municipality in Stockholm County, Sweden, with a population of low to medium term socio-economic status (SES) and with mixed types of housing (blocks of flats, semi-detached houses and detached houses). The schools included were within the school physician's administrational area. All families who had children in these pre-school classes were invited to participate in the study, provided that at least one parent was able to communicate and understand the Swedish language." % of eligible population enrolled: schools: 53% (8/15); children: 40% (243/611); Age (years): mean: 6.2 (SD 0.3) Gender/Sex: 51% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 131 Comparator type: non-active intervention Comparison group participants: 112 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI short term (8 months) zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	

	Clinical Trial Registry: ISRCTN32750699 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "ES and LSE received funding for this study from the Public Health Fund, Stockholm County Council. GN received funding from the Signhild Engkvist Foundation, the Martin Rind Foundation and the Lars Hierta Memorial Foundation. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. The authors have declared that no competing interests exist." DOI: "The authors have declared that no competing interests exist." General notes: the outcome is proportion of children with weight sttaus classified as obesity; zBMI results reported narratively.

Nyberg 2016

Study characteristics	
Methods	Study name: Healthy School Start Study II Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 8 months; 11 months
Participants	Participants: 378 Setting: thirteen schools in a municipality in Stockholm County Country: Sweden Country income: high income Recruitment: Quote: "Schools were chosen from low income areas in a municipality in Stockholm County, Sweden, with the highest prevalence of overweight and obesity among children in the county. These areas are characterised by a high proportion of foreign-born citizens. Of the 15 eligible schools in three low income areas, 13 schools and 31 pre-school classes participated. All families who had children in these classes were invited to participate in the study. The children were recruited in August to September 2012, the intervention started in October and lasted for six months (2012–2013). Pre-school class is not compulsory in Sweden but 90–95 % of all six-year-old children attend. " % of eligible population enrolled: schools: 87% (13/15); pre-school classes: 82% (31/38); children: 47% (378/801); Age (years): mean: 6.3 (SD 0.3) Gender/Sex: 49.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 185 Comparator type: non-active intervention Comparison group participants: 193 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (8 months) zBMI medium term (11 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN39690370 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by Stockholm County Council Public Health Fund, the Martin Rind Foundation and the Sven Jerring Foundation" DOI: "The authors declare that they have no competing interests." General notes: NR

O'Connor 2020

Study characteristics	
Methods	Study name: PSNS (Papa´s Saludables Nin˜os Saludables(Study design: cluster RCT N of arms: 2 Unit of allocation: father + ≤ 3 children Unit of analysis: individual Intervention period: 10 weeks Follow-up time(s): 14.8 (SD 1.64) weeks (range 11.9-17.1 weeks)
Participants	Participants: 64 Setting: one of the Texas Children's Health Plan (TCHP) Center for Children and Women clinics in Houston, Texas Country: United States Country income: high income Recruitment: Quote: "Families were recruited from the clinic and then screened by research staff for enrollment. Presentations about the study and program were made to the providers and staff at the clinic, who were asked to refer eligible patients to the study. Fliers were posted in the clinic and study staff spent time in the waiting room talking to interested families about the study and inviting them to be screened. The main messages promoted during recruitment were the focus on health promotion for the family, teaching fathers and children how to be healthier and more active, and providing an opportunity for fathers to spend time with his children. families could express interest in the study by calling the study staff, leaving their contact information with study staff, or completing contact forms and leaving it with the clinic receptionist for study staff to followup. Initial screening of the father and family took place by phone and then confirmed after consent was

	signed and initial data collected." % of eligible population enrolled: families: 100% (36/36); children: NR Age (years): mean: 8.5 (SD 2.12) Gender/Sex: 43.8% boys
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 31 (at baseline) Comparator type: non-active intervention Comparison group participants: 33 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (15 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03532048 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health (grant number R34HL131726). This work also is a publication of the United States Department of Agriculture (USDA/ARS) Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX, and has been funded in part with federal funds from the USDA/ARS (cooperative agreement number 58-3092-5-001)." DOI: "No competing financial interests exist." General notes: the follow-up time confirmed by email from authors: "We ran the numbers of the time span between baseline and follow up assessments for the father-child dyads in the feasibility study. Number of weeks from baseline to post-1: Mean 14.8 (SD 1.64) weeks, range 11.9-17.1 weeks"

Paineau 2008

Study characteristics	
Methods	Study name: ELPAS Study design: cluster RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 1013 Setting: fifty-four elementary schools in Paris Country: France Country income: high income Recruitment: Quote: "One thousand thirteen families were included in this 10-month, parallel, randomized intervention trial. In each family, one second- or third-grade pupil (aged 7-9 years) and one of his or her parents participated. Volunteers were recruited from 54 elementary schools in Paris, France, from March 2005 through June 2005. A mailing was performed in July 2005 to complete the recruitment with families from non-participating schools. All families were informed of the general nature of the intervention but were unaware of the primary hypothesis, eg, that nutritional changes would affect body mass index." % of eligible population enrolled: schools: NR; families: 96% (1013/1059); Age (years): mean: intervention A: 7.7 (SD 0.6); intervention B: 7.8 (SD 0.6); control 7.6 (SD 0.6) Gender/Sex: 47.5% boys
Interventions	Theory: NR Intervention type: dietary Intervention participants: group A: 297 group B: 298 Comparator type: attention control Comparison participants: 418 Comparison: dietary vs control Setting of the intervention: school + home + community Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00456911 Funder(s) type: mixed Writing and/or research independent from funder(s): no Funding details: Quote: "Funding was provided by the French Ministry of Research (2002 Re´seau Alimentation Re´fe´rence Europe 31), and by the ELPAS study's private partners (Avenance Enseignement, the Centre d'Etudes et de Documentation du Sucre, and the Louis Bonduelle Foundation). The private partners did not participate in conduct of the study; collection, management, analysis, or interpretation of the data; or preparation, review, or approval of the manuscript. The Centre d'Etudes et de Documentation du Sucre participated in the study design." DOI: NR General notes: NR

Pena 2021

Study characteristics	
Methods	Study name: Juntos Santiago trial Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 4 months; 7 months
Participants	Participants: 2022 Setting: twenty-four public, private-subsidized, and private schools in the municipalities of Santiago and Estación Central in Santiago Country: Chile Country income: high income Recruitment: Quote: "All types of schools (i.e., public, private-subsidized, and private schools) in Santiago were eligible for inclusion in the intervention and control arm (71 schools), whereas all types of schools in Estación Central were eligible for inclusion only in the control arm (27 schools). Within each arm, we invited schools sequentially to participate using a random sequence propor tional to the total number of students, resulting in schools with more students being more likely to be invited. Recruitment took place between March and early May 2018." % of eligible population enrolled: schools: 27% (24/88); children 64% (2466/3872) Age (years): mean: intervention: 11.1 (SD 0.8); control: 11.2 (SD 0.8) Gender/Sex: 66.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1611 Comparator type: non-active intervention Comparison group participants: 411 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03459742 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by the Mayors Challenge 2016, Bloomberg Philanthropies. The funder had no role in the study design, data collection, data analysis, data interpretation, or writing of the report. During the application phase of the Mayors Challenge 2016, the funder provided training in Design Thinking and behavioral economics and appointed a coach to support the planning team at the Municipality of Santiago. After awarding the grant, the funder appointed Delivery Associates to support the delivery of the implementation." DOI: "The authors declared no conflict of interest." General notes: the study included schools from two municipalities, but only schools in the Santiago municipality were randomized to intervention or control; schools from the other municipality were only assigned to control. In this review we only inlcuded data from the ranodmized school as reported in the sensitivity analysis in supplementary table.

Pindus 2015

Study characteristics	
Methods	Study name: FITKids2 (Fitness improves thinking in kids 2) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months
Participants	Participants: 44 Setting: seven schools in the East-central Illinois Country: United States Country income: high income Recruitment: Quote: "Eight to nine year-olds (grades 2 to 4) from seven schools in the east-central Illinois, USA were targeted for recruitment. Those who expressed interest were further screened for eligibility criteria." % of eligible population enrolled: children: 54% (44/82) Age (years): mean: intervention: 8.73 (SD 0.64); control: 8.55 (SD 0.52) Gender/Sex: 38.9 boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 22 Comparator type: non-active intervention Comparison group participants: 22 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no

	Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as median (IQR) BMI and BMI percentile
Notes	Clinical Trial Registry: NCT01619826 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The trial was supported by the NIH grant no. HD069381 awarded to Drs. Charles Hillman and Arthur Kramer." DOI: NR General notes: the FITKids2 trial followed from FITKids trial initiated in 2009

Puder 2011

Study characteristics	
Methods	Study name: Ballabeina study Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 652 Setting: forthy public preschool classes in the German (city of St Gallen) and the French (urban surroundings of Lausanne, canton Vaud speaking regions of Switzerland Country: Switzerland Country income: high income Recruitment: Quote: "Classes from the German and French areas were separately selected after agreement of the school directors and the school health services. All children in Switzerland attend preschool." % of eligible population enrolled: classes: 56% (40/71); children: 90% (655/727); Age (years): mean: 5.1 (SD 0.7) Gender/Sex: 50% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 342 (at baseline) Comparator type: non-active intervention Comparison group participants: 310 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00674544 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was mainly supported by the Swiss National Science Foundation (grant No 3200B0-116837) and Health Promotion Switzerland (project No 2104). Additional funding was obtained from aresearch award for interdisciplinary research from the University of Lausanne, a Takeda research award, the Wyeth Foundation for the Health of Children and Adolescents, the Freie Akademische Gesellschaft, and an unrestricted educational grant from Nestléé. The funding sources had no role in the study design,data collection, analysis, interpretation of data, in the writing of the report, and in the decision to submitthe article for publication." DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work." General notes: the Ballabeina study is a cluster randomised controlled trial conducted in 40 randomly selected public preschool classes in areas with a high migrant population from two different sociocultural and linguistic regions in Switzerland

Ramirez-Rivera 2021

Study characteristics	
Methods	Study name: Planet Nutrition Program Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 9 weeks Follow-up time(s): 6 months
Participants	Participants: 41 Setting: one public elementary school in Hermosillo, Sonora Country: Mexico Country income: upper middle income Recruitment: Quote: "Fifth grade students from one public elementary school in Hermosillo, Sonora, Mexico were invited to participate in the program. This school operated extended hours and the study was supported by the school authorities. The study nutrition team invited the children face to face in the classrooms to participate in March 2019. A printed invitation was delivered to the children to give to their parents, in addition to the informed consent and assent. A questionnaire was also distributed to collect personal data, including age, date of birth, history of disease, other interventions, and parents' level of

	schooling. / All 5th grade students from the chosen school (80 students) were invited to participate in the study." % of eligible population enrolled: children: 51% (41/80); Age (years): mean: 10.2 (SD 0.46) Gender/Sex: 51.2% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 21 Comparator type: attention control Comparison participants: 20 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT04095910 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The expenses incurred by this research study were covered by the University of Sonora (12613 Fund)." DOI: "The authors declare that they have no competing interests." General notes: NR

Razani 2018

Study characteristics	
Methods	Study name: SHINE (Stay Healthy In Nature Everyday) Study design: RCT N of arms: 2 Unit of allocation: parent (or carer)/child dyad Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months (outcome measurement was planned but it is not reported if it was measured)
Participants	Participants: 128 Setting: pediatric primary care clinic in Oakland, California Country: United States Country income: high income Recruitment: Quote: "In 2012 the study pediatric primary care clinic (PCC) partnered with the local park agency to design a park prescription program. The PCC is a Federally Qualified Health Center (FQHC) that serves a linguistically, racially and culturally diverse group of pediatric patients living near the federal poverty level. This population has higher rates of chronic illness than the national pediatric population" From study protocol: "Eligible dyads will be recruited by providers during patient visits or through self-referral. The principal investigator will train clinic physicians, nurse practitioners, socialworkers, casemanagers, and therapists by giving presentations at staff meetings on the health benefits of nature, the locations of local parks, and patient eligibility. The training is based on a curriculum previously developed by the research team. Training consistency will be ensured by using the same presenting materials, and by having presenters review with the principal investigator. Large posters of local nature sites posted in the clinic waiting area and exam rooms and a prompt for health care providers will be integrated into participants' electronic medical records for use during well-child visits. SHINE staff will determine eligibility and consent and obtain baseline measures." % of eligible population enrolled: dyads: 58% (78/134); Age (years): mean: 4-18 (children eligible age) Gender/Sex: NR
Interventions	Theory: None Intervention type: activity Intervention participants: 50 Comparator type: activity intervention Comparison participants: 78 Comparison: activity vs activity Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI (planned) Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: measurement of the outcome at follow-up(s) was planned but results are not reported (there is no evidence that it was measured).
Notes	Clinical Trial Registry: NCT02623855 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was supported by grants from East Bay Regional Parks District, East Bay Regional Parks District Foundation, and National Recreation and Parks Administration and REI Foundation, all to NR. The funders had no role in writing this report or the decision to submit this article for publication." DOI: "The authors report that they have no conflicts of interest." General notes: BMI measurements were planned but data are not reported. Based on the study protocol: "Body mass index (BMI)will be measured in clinic at baseline, one month, and three months out by using weight and an average of three measurements of height."

Rerksuppaphol 2017

Study characteristics	
Methods	Study name: Internet Based Obesity Prevention Program for Thai School Children Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 3 moths; 4 moths
Participants	Participants: 218 Setting: two public elemental schools in Portan township of Ongkharak district, Central Thailand Country: Thailand Country income: upper middle income Recruitment: Quote: "Two public elemental schools in Portan. All healthy children who were studying in Grade 1 to 6 of these schools were eligible for the study. The study purpose was explained to children verbally and a study information sheet was sent to their parents or guardians. Written informed consent and assent were obtained from children's parent or guardians and participating children, respectively, before they were recruited. From study protocol: In order to ensure diversity in the study population, recruitment is performed by stratifying the city into regions. Within each region, a complete list of schools, recreation centres, health care centres, children's recreation classes, outdoor markets and shopping malls are obtained and the same number of each type of facility in each region is randomly selected and contacted for recruitment. The authors recruited approximately 5–10 families per week with this strategy. Additionally they incorporated a participant in centive program for snowball recruitment. Any family who refers another family and they enroll in the study is eligible for a $25 grocery store gift card." % of eligible population enrolled: children: 83% (285/342); Age (years): mean: 10.7 (SD 3.1) Gender/Sex: 49% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 111 Comparator type: non-active intervention Comparison group participants: 107 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: TCTR20140926002 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by grants from Srinakharinwirot University, Thailand. The study sponsor had no role in the planning, execution or analysis of the study." DOI: "Financial or other competing interests: None" General notes: NR

Rhodes 2019

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: parent(s) + 1 child Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 102 Setting: communies in Victoria, British Columbia Country: Canada Country income: high income Recruitment: Quote: "Rolling recruitment began in June 2012 and was completed in April 2017. Participants were recruited through advertisements and booths at local markets and recreation centers, materials passed out at local schools, and referrals. Though all children aged 6–12 years in a family were invited to participate in the intervention, only one child was designated as the target child for measurement a priori (chosen at random in cases in which multiple children met inclusion criteria)." % of eligible population enrolled: children: 66% (102/154) Age (years): mean: 8.93 (SD 2.08) Gender/Sex: 48% boys
Interventions	Theory: Health Action Process Approach and the Multi-Process Action Control Approach Intervention type: activity Intervention group(s) participants: 52 Comparator type: non-active intervention Comparison group participants: 50 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months)

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01882192 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study received funding from the Canadian Institute of Health Research. The funding ID is CIHR113798. The authors declare that they have no competing interests" DOI: "No financial disclosures were reported by the authors of this paper. " General notes: NR

Riiser 2020

Study characteristics	
Methods	Study name: Active Play in APS (After School Programs) Study design: cluster RCT N of arms: 2 Unit of allocation: after school program Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 7 months; 19 months
Participants	Participants: 456 Setting: fourteen school health services in municipalities of three counties in Eastern Norway Country: Norway Country income: high income Recruitment: Quote: "The first step of the study recruitment process was to engage school physiotherapists (PTs) because the study relied on their assistance in the implementation of the intervention as well as in the data collection process. School health services in municipalities of three counties in Eastern Norway were approached and, within the time limit defined for this first phase of recruitment (August 2016), PTs from 14 municipalities volunteered to participate. They assisted in recruiting the ASPs in schools within their area of responsibility. All schools were eligible. School administrators, who accepted the invitation, provided written consent. Following the allocation, all parents of first graders (5–6 years of age) in the participating ASPs were asked to provide written consent on behalf of their child. There were no exclusion criteria." % of eligible population enrolled: schools: 31% (14/45); children: 71% (456/643); Age (years): range 5-6 Gender/Sex: 52.2% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 229 Comparator type: non-active intervention Comparison group participants: 227 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): proportion of of children with BMI ≥25 Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data are reported as proportion of children with BMI ≥25
Notes	Clinical Trial Registry: NCT02954614 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was funded by the Norwegian Fund for Postgraduate Training in Physiotherapy and OsloMet - Oslo Metropolitan University as part of the first author's postdoctoral fellowship. The funding body had no impact on the design of the study, nor the data collection, analysis, interpretation or in writing of the manuscript. Open access was funded by OsloMet." DOI: "The authors declare that they have no conflict of interest." General notes: data are reportedas % of participants with BMI ≥25 and BMI <25

Robinson 2003

Study characteristics	
Methods	Study name: Stanford GEMS Phase 1 Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 61 Setting: communies in Stanford, California Country: United States Country income: high income Recruitment: Quote: "Girls were recruited for the study through community centers and afterschool programs; by community youth leaders; through presentations at schools; at community events and churches; and by posting fliers. To recruit low-income families, recruitment activities and intervention sites focused on low-income neighborhoods of Oakland, and East Palo Alto, California, with high proportions of African American." Further details regarding our recruitment strategies are described in Story et al. 2003b." % of eligible population enrolled: children: NR;

	Age (years): mean: 9 (SD 1) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: activity Intervention participants: 28 Comparator type: dietary and activity intervention Comparison participants: 33 Comparison: activity vs dietary and activity Setting of the intervention: home + community/community (active intervention control group) Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by grant numbers UO1-HL62662, UO1-HL62663, UO1- HL62668, UO1-HL62732, and UO1- HL65160, from the National Heart, Lung, and Blood Institute. (Rochon 2003)" DOI: NR General notes: NR

Robinson 2010

Study characteristics	
Methods	Study name: Stanford GEMS Phase 2 Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 6 months; 12 months; 18 months; 24 months
Participants	Participants: 261 Setting: communies in Oakland, California Country: United States Country income: high income Recruitment: Quote: "To enroll a representative sample of lower socioeconomic status African-American girls, we recruited from schools, community centers, churches and community events in low- income, predominantly African-American neighborhoods in Oakland, CA." From study protocol: "To enroll African-American families with lower socioeconomic status, we focused recruitment in neighborhoods in Oakland, CA, around elementary schools most likely to be disproportionately serving this population; ie.,those with high African-American enrollments, high rates of free or reduced price meals and poor standardized test score performance. We performed all assessments in participants' homes, eliminating the need for families to come to a clinical research center. Recruitment strategies were based on the most successful methods from Phase 1,15, 18 making presentations and distributing fliers to girls and parents at existing after-school programs, schools, churches, and neighborhood and community events (e.g., street fairs, Juneteenth celebrations, African-American cultural events), and making individual presentations to parents and girls in commercial locations (e.g., food stores, new store openings). We also presented the project to school parent groups, church groups, and Parks and Recreation Department staff, to enhance the visibility of Stanford GEMS, especially among community opinion leaders, building upon relationships established during Phase 1. Interested families were given a description of the study and screened by telephone for inclusion and exclusion criteria. Potentially eligible families were scheduled for a home data collection visit to confirm eligibility, complete informed consent and assent, and conduct baseline assessments." % of eligible population enrolled: families: 83% (261/316); Age (years): mean: 9.4 (SD 0.9) Gender/Sex: 100% girls
Interventions	Theory: Bandura's Social Cognitive Model Intervention type: activity Intervention participants: 134 Comparator type: dietary and activity intervention Comparison participants: 127 Comparison: activity vs dietary and activity Setting of the intervention: home + community/community (active intervention control group) Setting of the intervention in sub-group analyses: home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long term; BMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NCT00000615 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was funded by a cooperative agreement UO1 HL62663 from the National Heart, Lung, and Blood Institute, National Institutes of Health. An NHLBI Program Officer (EO) was a member of the cooperative agreement Steering Committee and as a co-author on the manuscript, participated in interpretation of the data and preparation of the manuscript. The NHLBI Program Officer and other NHLBI scientific staff provided input on design and conduct of the study, but were not involved in collection, management or analysis of the data. The manuscript was reviewed and approved by NHLBI prior to submission. Dr. Robinson (Principal Investigator) had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis." DOI: NR General notes: effect reported as mean BMI changes per year

Rosario 2012

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 464 Setting: seven Santos Simões public elementary public schools in Guimarães, Braga Country: Portugal Country income: high income Recruitment: Quote: "During 2007/2008, seven out of eighty public elementary public schools from a city from the north of Portugal were selected by a simple randomsample and invited to participate in this study. The number of schools involved was according to constraints of personnel for assessment and intervention." % of eligible population enrolled: schools: 9% (7/80); children: 93% (464/574); Age (years): mean: 8.3 (SD 1.2) Gender/Sex: 48.5% boys
Interventions	Theory: Health Promotion Model, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 233 Comparator type: non-active intervention Comparison group participants: 231 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01397123 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by the Fundação para a Ciência e Tecnologia (FCT), Projeto PEst-OE/SAU/UI0617/2011." DOI: "The authors declare no conflict of interest." General notes: NR

Rosenkranz 2010

Study characteristics	
Methods	Study name: Sn/aP (Scouting Nutrition & Activity Program) Study design: cluster RCT (nested cohort design) N of arms: 2 Unit of allocation: girl scout troops Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 6 months
Participants	Participants: 76 Setting: communies in three Midwestern towns, Kansas Country: United States Country income: high income Recruitment: Quote: "Seven troops agreeing to participate completed a pretest time 1 assessment within a two-week period in October before randomization. To meet study inclusion criteria at the individual level, girls had to be attending members of Girl Scouts in one of our included troops. All girls of participating troops were included for direct observation variables, and those with parental consent were included for the individual variables under study." % of eligible population enrolled: troups: 64% (7/11); children: 75% (76/101); Age (years): mean: intervention: 10.5 (SD 1.1); control: 10.5 (SD 1.3) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 34

	Comparator type: non-active intervention Comparison group participants: 42 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; zBMI short term; BMI percentile short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00949637 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding for this project was provided, in part, by the Sunflower Foundation: Health Care for Kansans, a Topeka-based philanthropic organization with the mission to serve as a catalyst for improving the health of Kansans. The authors declare that they have no competing interests." DOI: "The authors declare that they have no competing interests." General notes: NR

Rush 2012

Study characteristics	
Methods	Study name: Project Energize Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 6456 Setting: one-hundred four primary schools in the Waikato district Country: New Zealand Country income: high income Recruitment: Quote: "A list of all primary schools in the Waitematā District Health Board (WDHB) catchment was provided by the Ministry of Education, characterised by location and size of school, ethnicity of students, and school decile. After randomisation, schools were approached for inclusion in the study without knowledge of whether they would be programme or control schools. Where a school declined involvement, the next randomised school was approached." % of eligible population enrolled: schools: 44% (124/279); children: 47% (3034/6456) Age (years): 5 and 10 Gender/Sex: 50.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 3263 Comparator type: non-active intervention Comparison group participants: 3193 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12610000132044 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The Waikato District Health Board funds the Project Energize programme and its evaluation. The Ministry of Health, New Zealand has contributed to evaluation funding. The authors report no conflicts of interest. " DOI: NR General notes: NR

Sacchetti 2013

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 497 Setting: twenty-six 3rd-grade classes of primary schools in a province of the Emilia Romagna region Country: Italy Country income: high income Recruitment: Quote: "Twenty-six 3rd-grade classes of primary schools in a province of the Emilia Romagna region (Italy) were randomly selected stratifying by geographic location (city, plain, hills). To recruit a sample in which the various geographic locations were equally represented in both control and intervention groups, the enrolled classes were randomly assigned to either treated and untreated group, separately per geographic area.Both the principal and the teachers of the enrolled

	schools were asked to sign a written consent and to complete a questionnaire for their classes." % of eligible population enrolled: classes: NR; children: 95% (497/521); Age (years): range 8-9 Gender/Sex: 51.5% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 247 (at baseline) Comparator type: non-active intervention Comparison group participants: 250 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by funds provided by the Italian Ministry of University and Scientific Research-Local projects" DOI: NR General notes: NR

Safdie 2013

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 7 months; 11 months; 18 months
Participants	Participants: 886 Setting: twenty-seven public elementary schools schools in Xochimilco, Tlalpan, Magdalena Contreras and Coyoacán administrative zones in a urban area in the south of Mexico City Country: Mexico Country income: upper middle income Recruitment: Quote: "Of a preliminary list of 1 283 schools located in the urban area of Mexico City, provided by the Federal Administration of Educational Services (Administración Federal de Servicios Educativos del Distrito Federal, AF SEDF), 274 schools located in the four “delegaciones” (administrative zones that comprise Mexico City) of interest (Xochimilco, Tlalpan, Magdalena Contreras and Coyoacán) were identified. From the 40 eligible schools that met the inclusion criteria and agreed to participate in the study by committing to accomplish the study needs (i.e. change food and PA school environment, permit evaluation and implementation activities during school day), 27 schools were randomly selected and assigned to one of three conditions. A total of 886 students from 4th and 5th grades (approximately 32 students per school) from these 27 schools were randomly selected for outcome evaluation from 1712 students who agreed to participate and whose parents had provided informed consent." % of eligible population enrolled: schools: 67.5% (27/40); children: 51% (886/1712); Age (years): mean: intervention plus: 9.7 (SD 0.7); intervention basic: 9.7 (SD 0.7); control: 9.8 (SD 0.8) Gender/Sex: 50% boys
Interventions	Theory: Ecological Principles, Theory of Planned Behaviour, Social Cognitive Theory, Health Belief Model Intervention type: dietary and activity Intervention group(s) participants: Basic program: 262 Plus program: 264 Comparator type: non-active intervention Comparison group participants: 360 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (7 months) BMI medium term (11 months) BMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The project was supported by the Pan American Health Organization (PAHO), the HLHP program of the International Life Science Institute (ILSI), the Mexican Council for Science and Technology (Conacyt), and the Mexican Ministry of Health (SSa). This work was carried out with support from the Global Health Research Initiative (GHRI), a collaborative research funding partnership of the Canadian Institute of Health Research, the Canadian International Development Agency, Health Canada, the International Development Research Centre, and the Public Health Agency of Canada. The authors declare not to have conflict of interests." DOI: "The authors declare not to have conflict of interests." General notes: NR

Sahota 2001

Study characteristics	
Methods	Study name: APPLES (Active Programme Promoting Lifestyle in Schools) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (11 months) Follow-up time(s): 12 months
Participants	Participants: 636 Setting: ten primary schools sited outside the inner city area of Leeds Country: United Kingdom Country income: high income Recruitment: Quote: "Ten primary schools in Leeds were recruited and paired them according to size, ethnicity, and level of social dis advantage (as reflected by numbers of free school meals). All the participating schools were state primary schools sited outside the inner city area." % of eligible population enrolled: schools: NR; children: 96% (613/636; baseline/included); Age (years): mean: intervention: 8.36 (SD 0.63); control: 8.42 (SD 0.63) Gender/Sex: 55% boys
Interventions	Theory: Health Promoting Schools Concept Intervention type: dietary and activity Intervention group(s) participants: 314 Comparator type: non-active intervention Comparison group participants: 322 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN61188203 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The research was funded by a grant from the Northern and Yorkshire Region Research and Development Unit." DOI: Competing interests: None General notes: NR

Sahota 2019

Study characteristics	
Methods	Study name: PhunkyFoods Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 17 months Follow-up time(s): 18 months
Participants	Participants: 358 Setting: eight schools in a town in North of England Country: United Kingdom Country income: high income Recruitment: Quote: "A sample size of eight schools were recruited over a 3- month period from a town in the north of England. Schools were approached from September to October 2012 and eight schools that showed interest in participating were successfully recruited. A low number of schools overall showed interest in participating due to the timing of recruitment." % of eligible population enrolled: schools: 13% (8/63); children: 11% (358/3150); Age (years): mean: intervention: 7.2 (1.1 SD); control: 7.2 (1.1 SD) Gender/Sex: 51.1% boys
Interventions	Theory: Behaviour Theory, Behaviour Change Wheel Intervention type: dietary and activity Intervention group(s) participants: 188 Comparator type: non-active intervention Comparison group participants: 170 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN15641330 Funder(s) type: industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by Purely Nutrition who delivered the intervention and Nestlé UK Healthy

	Kids Programme for funding the research project. The authors declare that they have no competing interests." DOI: "The authors declare that they have no competing interests." General notes: the authors stated that the study was not powered to detect changes in outcome measures

Salmon 2008

Study characteristics	
Methods	Study name: Switch - play Study design: cluster RCT N of arms: 4 Unit of allocation: classroom Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months; 15 months; 21 months
Participants	Participants: 295 Setting: three government primary schools located on four campuses in low socioeconomic status suburbs in metropolitan Melbourne Country: Australia Country income: high income Recruitment: Quote: "A convenience sample of three government primary schools located on four campuses in low socioeconomic status (SES) areas (based on socioeconomic index for areas scores) in metropolitan Melbourne was recruited to the study. Children attending schools in low SES areas were selected because of previously shown inverse associations between SES and TV viewing and between SES and adiposity among children. All grade 5 (approximately 10–11 years old) students (n=397) in the selected schools were eligible to participate and were invited to take part in the study." % of eligible population enrolled: schools: NR; classess: NR; children: 78% (311/397) Age (years): mean: 10.1 (SD 0.4) Gender/Sex: 51% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory Intervention type: activity Intervention group(s) participants: Behavioural modification (BM) intervention: 66 Fundamental movement skills (FMS) intervention: 74 Behavioural modification (BM) + Fundamental movement skills (FMS): 93 (at baseline) Comparator type: non-active intervention Comparison group participants: 62 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: the definition of zBMI reported in the article is unclear
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Victorian Health Promotion Foundation. Jo Salmon is supported by a National Heart Foundation of Australia and Sanofi-Aventis Career Development Award. Kylie Ball is supported by a National Health and Medical Research Council/National Heart Foundation of Australia Career Development Award. David Crawford is supported by a Victorian Health Promotion Foundation Senior Research Fellowship." DOI: NR General notes: ineligible data, method of derivation of zBMI is unclear and we are unsure how to interpret the effect estimate. Quote: "BMI was calculated and converted as recommended for analysis of long termitudinal adiposity data. This involves subtracting the sex–age population median (based on US data) from the child's raw BMI score. For convenience, these BMI units of difference from the sex–age population median will hereafter be referred to simply as BMI."

Salmon 2022

Study characteristics	
Methods	Study name: Transform-Us! Study design: cluster RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 30 months Follow-up time(s): 18 months; 30 months
Participants	Participants: 593 Setting: twenty government, catholic and independent co-educational primary schools within 50 km of the Melbourne Central Business District Country: Australia Country income: high income Recruitment: Quote: "Government, Catholic and Independent co-educational primary schools within 50 km of the Melbourne Central Business District in the first (low), third (mid) and fifth (high) quintiles of socioeconomic status (SES) areas according to the Australian Bureau of Statistics' Socio-Economic Index for Areas (suburb disadvantage score), with an enrolment exceeding 300 students and at least two Year 3 classes were eligible to be selected for the study (n=219 schools). All children in Year 3 at baseline (aged 8–9 years), apart from children in the control schools, received the programme." % of eligible population enrolled: schools: 15.7% (20 enrolled/127 attempted contacts); children: 37% (591/1606);

	Age (years): range 8-9 Gender/Sex: 44.2% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory, Ecological Systems Theory Intervention type: activity Intervention group(s) participants: physical activity intervention (PA-I): 161 sedentary behaviour intervention (SB-I): 124 physical activity + sedentary behaviour intervention (PA-I + SB-I): 159 (at baseline) Comparator type: non-active intervention Comparison group participants: 149 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (30 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN83725066; ACTRN12609000715279 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "National Health and Medical Research Council (NHMRC) of Australia Project Grant (ID: 533815); Diabetes Australia Research Trust. The funders played no role in the design of the study, the collection, analysis or interpretation of the data, in the writing of the paper or the decision to submit for publication." DOI: Competing interests: None General notes: BMI was measured at T2 (5-9 months), T3 (18 months) and T4 (30 months) but T2 data are not reported. Quote: "Children's height (cm) and weight (kg) were measured twice at each time point with a portable stadiometer."

Santos 2014

Study characteristics	
Methods	Study name: Healthy Buddies Manitoba Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (10 months) Follow-up time(s): 10 momths
Participants	Participants: 687 Setting: twenty elementary schools in Manitoba Country: Canada Country income: high income Recruitment: Quote: "In the spring of 2009, 60 elementary schools in Manitoba indicated an interest in piloting Healthy Buddies lesson plans in the 2009-2010 academic calendar year. Among these schools, 20 were randomly selected to participate and randomly assigned to receive the Healthy Buddies curriculum or to serve as a waiting list control group receiving a regular curriculum. Within the intervention schools, administrators assigned 2 teachers, 1 froma grade 4 to 6 classroom and 1 from a kindergarten to grade 3 classroom, to deliver the lesson plans to their classrooms. " % of eligible population enrolled: schools: 2.4% (20/833); children: intervention: 95%; control: 79%; Age (years): mean: intervention: 9.3 (95% CI 9.1-9.5); control: 8.8 (95% CI 8.6-9.0) (mean age is of the whole cohort of younger and older children) Gender/Sex: 52% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 340 Comparator type: non-active intervention Comparison group participants: 347 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term (10 momths) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01979978 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The Government of Manitoba provided funding and support for the pilot intervention (Manitoba Healthy Living) and its randomized evaluation (Healthy Child Manitoba Office). The funding agency, the Province of Manitoba, helped in the design of the study, enrolling schools to participate and training teachers, but it had no role in the collection of data, statistical analyses, or interpretation of findings or in the preparation, review, or approval of the manuscript. The results and conclusions are those of the authors, and no official endorsement by the Government of Manitoba is intended or should be inferred." DOI: "One author reports having received operating grants and/or salary awards from the Canadian Diabetes Association, the Canadian Institute of Health Research, the Cosmopoiltan Foundation of Canada, and the Lawson Foundation and currently holding the Robert Wallace Cameron Chair in evidence based child health. No other disclosures were reported." General notes: zBMI data reported for the whole group (old and young) and in young and old groups separately.

Seguin-Fawler 2021

Study characteristics	
Methods	Study name: F3HK (Farm Fresh Foods for Healthy Kids) Study design: RCT N of arms: 2 Unit of allocation: caregiver/child dyad Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 5 months
Participants	Participants: 305 Setting: farm communities in New York, North Carolina, Vermont, Washington Country: United states Country income: high income Recruitment: Quote: "Flyers, newspapers, and social media were used to advertise the study opportunity, and study staff directly recruited at schools, churches, libraries, community service organizations, and at local events from January through June 2016 and 2017. Participants were also identified via “word of mouth.” Caregivers completed a brief electronic screening tool on a tablet or were later screened over the telephone." % of eligible population enrolled: caregiver-child dyads: 56% (305/542) Age (years): mean: intervention: 6.1 (SD 3); control: 6.2 (SD 3) Gender/Sex: intervention: 43.9% boys; control: 51.6% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 148 Comparator type: non-active intervention Comparison group participants: 157 Comparison: dietary vs control Setting of the intervention: community + home Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile short term (5 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02770196 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture (USDA), under award number 2015–68001- 23,230. USDA had no role in the design, analysis, or writing of this article." DOI: "The authors declare that they have no competing interests." General notes: cross-over trial here reporting only the outcome at 5 months before the intervention was assigned to the control group in year 2.

Sekhavat 2014

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 5-10 minute counseling session during initial dental visit Follow-up time(s): 6-12 months after the initial baseline visit
Participants	Participants: 168 Setting: undergraduate pediatric dentistry clinic at the University of Toronto’s Faculty of Dentistry, Toronto Country: Canada Country income: high income Recruitment: Quote: "The study population was taken from the 168 children 6 to11 years of age, who were the first to attend the undergraduate pediatric dentistry clinic for their routine dental care at the University of Toronto’s Faculty of Dentistry during the recruitment period. Information regarding the study was provided to all and they were given an opportunity to ask questions regarding the study. Informed consent was obtained by the student research investigator from the parent/caregiver for study participation and the patient identifier form was then completed. Although patients were encouraged to complete the study, any participant could withdraw from the study at any time for any reason with no effect on the their future care at the Faculty of Dentistry of the University of Toronto. Participants were assured that the information obtained from this study would be strictly confidential and secured." % of eligible population enrolled: children: 100% (168/168); Age (years): mean: 8.97 (SD 1.52) Gender/Sex: 52.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 87 Comparator type: non-active intervention Comparison group participants: 81 Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (6-12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NCT02637752 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: student project sponsored by the University of Toronto DOI: NR General notes: NR

Sgambato 2019

Study characteristics	
Methods	Study name: PAAPPAS (Parents, students, community health agents and teachers for healthy eating) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 8-9 months
Participants	Participants: 2743 Setting: eighten public schools in the municipality of Duque de Caxias, State of Rio de Janeiro Country: Brazil Country income: upper middle income Recruitment: Quote: "In Duque de Caxias, twenty-seven out of the forty-two municipal public schools were in areas with FHS coverage. These schools were firstly stratified by size as small, medium term and large, based on the number of fifth- and sixth-grade classes. Six schools in each stratum were randomly selected, resulting in eighteen schools to reach the calculated sample size, which were allocated randomly to the control or intervention group (nine schools in each group). All students from fifth- and sixth-grade classes in the selected schools were eligible to participate, except disabled and pregnant adolescents." % of eligible population enrolled: schools: 67% (18/27); children: 100% (2743/2743); Age (years): mean: intervention: 11.5 (SD 1.43); control: 11.5 (SD 1.46) Gender/Sex: intervention 51.9% boys; control 52.1% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1406 Comparator type: non-active intervention Comparison group participants: 1337 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (8-9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02711488 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by Conselho Nacional de Desenvolvimento Científico e Tecnol´ogico and Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro." DOI: "None of the authors have conflicts of interest." General notes: NR

Sherwood 2019

Study characteristics	
Methods	Study name: Healthy Homes/Healthy Kids 5-10 Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months, 24 months
Participants	Participants: 421 Setting: communy in the Greater Minneapolis-St. Paul area Country: United States Country income: high income Recruitment: Quote: "Electronic medical record was queried to identify age and BMI-eligible children with upcoming well-child visits. After review by study staff and the primary care provider, an invitation letter was sent to the parents of the child. Study staff conducted follow-up phone calls to assess interest and conduct a brief screening with parents/primary caregivers who were interested in participating." % of eligible population enrolled: children: 24% (421/1777); Age (years): mean: 6.6 (SD 1.7) Gender/Sex: 50.6% boys
Interventions	Theory: Social Cognitive Theory, Motivational Interviewing principles Intervention type: dietary and activity Intervention participants: 212 Comparator type: attention control Comparison participants: 209 Comparison: dietary and activity vs control

	Setting of the intervention: clinical setting + telehealth Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI medium term; BMI percentile medium term (12 months) zBMI long term; BMI percentile long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01084590 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work is supported by grants from the National Institute of Diabetes and Digestive and Kidney Diseases including 1R01DK084475, as well as P30DK050456 and P30DK092924. The funders had no role in the design, conduct, or reporting of this work." DOI: "No conflict of interest was declared" General notes: NR

Sichieri 2008

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (7 months) Follow-up time(s): 7 months
Participants	Participants: 1134 Setting: twenty-two public schools in the metropolitan city of Nitero´i, Rio de Janeiro of Nitero´ i, Rio de Janeiro Country: Brazil Country income: upper middle income Recruitment: Quote: "A cluster randomised controlled trial of fourth graders from twenty-two public schools in the metropolitan city of Nitero´i, Rio de Janeiro, Brazil, was conducted from March to December 2005. Most students in the public schools are from families of low socio-economic level. Children go to school either in the morning (08.00–12.00 hours) or in the afternoon (13.00–17.00 hours). Only morning classes were included in the study. Families of fourth grade children (most of them 10 and 11 years old) were informed of the study and only those children with informed consent given by the parents were included in the study." % of eligible population enrolled: schools: 10% (47/47); children: 97% (1134/1166) Age (years): mean: intervention: 10.9 (SD 0.81); control: 10.9 (SD 0.75) Gender/Sex: intervention: 46.9% boys; control: 47.4% boys
Interventions	Theory: NR Intervention type: dietary Intervention participants: 526 Comparator type: attention control Comparison participants: 608 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02653352 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by the Brazilian National Research Council – CNPq. Grant number: 500404/2003-8 – CNPq." DOI: Conflict of interest: none declared General notes: NR

Siegrist 2013

Study characteristics	
Methods	Study name: JuvenTUM Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 826 Setting: eight primary schools from four regions of Bavaria Country: Germany Country income: high income Recruitment: Quote: "Sixty primary schools throughout Bavaria, Germany were invited by mail or telephone to take part in this project. Eight primary schools agreed to participate. In each of the four regions, one school was randomized to participate in the intervention, and another school served as a control. Intervention and control schools were comparable with regard to socioeconomic status of the population and the recreational environments."

	% of eligible population enrolled: schools: 13% (8/60); children: 92% (826/902); Age (years): mean: 8.4 (SD 0.7) Gender/Sex: 51.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 486 Comparator type: non-active intervention Comparison group participants: 340 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study received a research grant by the Bavarian State Ministry of the Environment and Public Health (Gesund. Leben. Bayern.) (321g-G8203.1-2005/68-36)." DOI: NR General notes: NR

Siegrist 2018

Study characteristics	
Methods	Study name: JuvenTUM 3 Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 18 months Follow-up time(s): 18 months
Participants	Participants: 792 Setting: fifteen school in the greater Munich area Country: Germany Country income: high income Recruitment: recruitment of participating schools was based on the willingness of schools to take part in the study prior to being randomized into either an intervention or control school. In total, 15 schools with 32 classes agreed to take part in the study. % of eligible population enrolled: schools: 22% (15/68); children: 74.2% (588/792; examined at baseline/randomized); Age (years): mean: 11.1 (SD 0.6) Gender/Sex: 57% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 426 Comparator type: non-active intervention Comparison group participants: 366 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: BMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00988754 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work has been funded by a grant from the Bavarian State Ministry of Public Health and Care Services (Gesund.Leben.Bayern.) (LP 00001-FA 08)." DOI: "The authors declared they do not have anything to disclose regarding conflict of interest with respect to this manuscript." General notes: subjects selected were these with a zBMI between the 70th and the 95th percentile

Simon 2008

Study characteristics	
Methods	Study name: ICAPS (Intervention Centered on Adolescents' Physical activity and Sedentary behavior) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 4 years Follow-up time(s): 1 year; 2 years; 3 years; 4 years; 6.5 years
Participants	Participants: 954 Setting: eight public middle schools of the Department of Bas-Rhin Country: France

	Country income: high income Recruitment: Quote: "Eight schools out of the 77 public middle-schools of the department of the Bas-Rhin (Eastern France) were randomly selected. In order to have a broad socioeconomic context, randomisation was carried out after stratification on sociogeographical criteria: communes of less than 50 000 inhabitants in the north or the south of the department (one pair of schools in each) and greater Strasbourg, a city of 450 000 inhabitants (two pairs, with one pair located in a low economic environment). All initially first-level students (corresponding to US sixth-graders) of these schools were eligible to participate." % of eligible population enrolled: schools: 10% (8/77); children: 91% (954/1048); Age (years): mean: 11.6 (SD 0.6) Gender/Sex: intervention: 46.3% boys; control: 51.8% boys
Interventions	Theory: Behaviour Change, Social Ecological Model Intervention type: activity Intervention group(s) participants: 479 Comparator type: non-active intervention Comparison group participants: 475 Comparison: activity vs control Setting of the intervention: school + community Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term (1 year) BMI long term; zBMI long term (6.5 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00498459 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by grants from The Regional Health Insurance of Alsace-Moselle; National Program of Research in Human Nutrition (INSERM and INRA); French Public Authorities within the National Nutritional Health Program and through the Youth and Sports Department; Conseil General du Bas-Rhin; Municipalities of Drusenheim, Illkirch-Graffenstaden, Obernai and Schiltigheim and The International Longevity Centre. The funding sponsors had no role in the design and protocol development of the study, in data collection analysis and interpretation or in manuscript preparation." DOI: NR General notes: the outcome data are reported for the whole population (4 years follow-up) and stratified by being non overweight or overweight at baseline (all follow-up times); from the stratified analysis we have extracted only data from the non overweight group.

Spiegel 2006

Study characteristics	
Methods	Study name: WAY (Wellness, Academics & You) Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 1191 Setting: schools in Delaware, Florida, Kansas, and North Carolina Country: United States Country income: high income Recruitment: Quote: "Teachers were recruited through coordination with local and state education officials. The four states were selected based on existing networks and infrastructure to recruit schools and collect and report data. In each of the four states, school administrators and teachers were sent information about the program. Teachers completed an application form to participate in the study. The model for sampling was stratified at the district level to ensure a diverse and representative sample of a national population." % of eligible population enrolled: classess: 75% (70/93); children: NR Age (years): mean: 9-10 (4th and 5th school graders) Gender/Sex: NR
Interventions	Theory: Theory of Reasoned Action, Constructivism Intervention type: dietary and activity Intervention group(s) participants: 572 Comparator type: non-active intervention Comparison group participants: 619 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was commissioned by the Institute for America's Health, a not-for-profit 501(c)3 organization striving to enhance the health of all Americans through research and education (www.healthy-america.org)." DOI: NR General notes: NR

Stettler 2015

Study characteristics	
Methods	Study name: Smart Steps Study design: cluster RCT N of arms: 3 Unit of allocation: clinical practice Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 173 Setting: clinical practices in Philadelphia Country: United States Country income: high income Recruitment: eligible subjects identified from medical records. Letter co-signed by the research team and the primary care clinician was sent to families and followed by up to three phone calls. % of eligible population enrolled: clinical practices: NR; children: 48% (173/359) Age (years): mean (SD): Beverage-only intervention: 10.8 (SD 1.4); multiple behaviour intervention: 10.7 (SD 1.3); control: 10.8 (SD 1.4) Gender/Sex: beverage-only intervention: 46% boys; multiple behaviour intervention: 43% boys; control: 55% boys
Interventions	Theory: Behavioral Economics Intervention type: dietary/dietary and activity (multi-arm) Intervention participants: Smart Steps - beverage-only: 77 Smart Steps - multiple behavior: 63 Comparator type: attention control Comparison participants: 33 Comparison: dietary vs control dietary and activity vs control dietary and activity vs dietary Setting of the intervention: clinical setting Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00241891 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The study were funded by an National Institutes of Health (NIH) grant, 5R01HL084056. Dr. Stettler joined after the end of the study Exponent, Inc., a for-profit company that provides consulting services to several food and beverages companies. He also received travel support, but no compensation, from PepsiCo, Nestlé, and Danone while visiting these companies as part of a sabbatical. The remaining authors have no financial relationships relevant to this article to disclose." DOI: "One author joined after the end of the study Exponent Inc., a for-profit company that provides consulting services to several food and beverages companies. He also received travel support, but no compensation from PepsiCo, Nestle, and Danone while visiting these companies as part of a sabbatical. The remaining authors have no financial relationships relevant to this article to disclose. " General notes: subjects selected were these with a BMI between 75th and 95th percentile (at risk of obesity/overweight) and consuming an average of at least 4 oz. of sugar sweetened beverages per day.

Stolley 1997

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: mother/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 12 months
Participants	Participants: 65 Setting: local tutoring program in inner city Chicago, Illinois Country: United States Country income: high income Recruitment: Quote: "Subjects were 65 African American girls and their mothers who live in Chicago's inner city and attend a local tutoring program. Subjects were recruited in three ways: (1) an advertisement published in the tutoring newsletter requested the participation of 7- to 12-year-old girls and their mothers in one of two preventive health programs, (2) letters

	were sent to all mothers of children registered in the tutoring program, and (3) the first author made a short term presentation about the research and health programs to parents at the orientation for the tutoring program. As potential subjects signed up or called to be involved in the study, they were screened for appropriate age of daughter and informed of the details of the project." % of eligible population enrolled: dyads: NR Age (years): mean: intervention: 9.9 (SD 1.3); control: 10 (SD 1.5) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 32 Comparator type: attention control Comparison participants: 33 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by a grant from the American Heart Association of Metropolitan Chicago" DOI: NR General notes: NR

Story 2003

Study characteristics	
Methods	Study name: Minnesota GEMS pilot study Study design: RCT N of arms: 2 Unit of allocation: parent/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 54 Setting: three schools in Minnesota Country: United States Country income: high income Recruitment: Quote: "Participants were recruited from 3 schools that also served as intervention sites for the program. Further details regarding our recruitment strategies are described in Story et al. 2003b: "A multi-pronged staged recruitment approach was used, targeting both girls and their parents. / The first step in recruitment was to have GEMS staff arrange with the schools to meet with groups of 8- to 10-year-old African- American girls during the school day, to generate interest in the program. At these meetings, girls were told about the program, and were given flyers to take home to their parents, inviting them to attend an informational meeting held at the school. At the same time, a letter describing the GEMS project, and a flyer with the dates of the information meetings, were mailed directly to parents, using mailing lists obtained from the schools. To recruit girls at high risk of obesity, recruitment materials for parents were framed around the concept of chronic disease risk, asking, ‘‘Is there a family history of heart disease, diabetes, high blood pressure, or overweight?’’ The materials also announced that a fun program, just for African-American girls aged 8–10, would be offered. Parents were asked to call if they were interested, and could attend any of the meeting dates, or if they were interested but unable." % of eligible population enrolled: dyads: NR Age (years): mean: 9.3 (SD 0.9) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory, youth development, resiliency-based approach Intervention type: dietary and activity Intervention participants: 26 Comparator type: attention control Comparison participants: 28 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by the National Heart, Lung, and Blood Institute, National Institutes of Health Cooperative agreement UO1 HL62668-02." DOI: NR General notes: NR

Story 2012

Study characteristics	
Methods	Study name: Bright Start Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 46 weeks (14 weeks in kindergarten, 31 weeks in first grade) Follow-up time(s): 20 months
Participants	Participants: 454 Setting: fourteen schools in the Pine Ridge Reservation in South Dakota Country: United states Country income: high income Recruitment: all 14 schools on the reservation were recruited into the study in one of two cohorts of 6 and 8 schools, respectively. Families of children attending kindergarten were recruited and enrolled in the study. % of eligible population enrolled: schools: 100% (14/14); children: 96% (454/472) Age (years): mean: 5.8 (SD 0.5) Gender/Sex: 51% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 267 Comparator type: non-active intervention Comparison group participants: 187 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long term; BMI long term (20 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00123032 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was supported by Grant # 1 R01 HL078846 from the National Institutes of Health, Bethesda, MD, USA. The authors have indicated they have no financial relationships relevant to this article to disclose." DOI: "The authors report no conflict of interest." General notes: NR

Tanskey 2017

Study characteristics	
Methods	Study name: FLEX (Fueling Learning through Exercise) Study Study design: cluster RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 12 months (data analysed by linear regression to give 12 months data only)
Participants	Participants: 769 Setting: sixteen schools in Massachusetts Country: United states Country income: high income Recruitment: Quote: "The FLEX team recruited school districts where more than 40% of students were eligible for free or reduced-price lunch and more than 40% of students were non-Caucasian. Third and fourth grade students in participating schools were invited to enroll in the FLEX Study. Recruitment packets were sent from home to school with students. The packets included an informational flyer describing the study, plain language parent consent and child assent forms, and a demographic survey to be completed by the child's parent or guardian. Recruitment materials were provided in the following languages, as requested by participating schools: English, Spanish, Portuguese, Hatian Creole, Arabic, Vietnamese, and Mandarin. Students were given at least one week to return their completed recruitment materials to school. In May–June 2015, children participating in Wave 1 of the FLEX Study were invited to participate in a separate pilot project on summer weight gain. Parents were asked to give permission for their child to participate in a post-summer height and weight measurement. To facilitate the largest possible sample for this aim, recruitment ran in conjunction with the main FLEX Study. Students in participating FLEX schools were invited to enroll during Fall 2015. Research staff worked with school liaisons to coordinate recruitment efforts in each school." % of eligible population enrolled: schools: 5.6% (16/286); children: NR for this sub-group Age (years): mean: 8.7 (SD 0.7) Gender/Sex: 44% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 100 Miles club: 261 Just Move: 249 (at baseline) Comparator type: non-active intervention Comparison group participants: 259 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months)

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02810834 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: ""I would like to express my sincere gratitude to the donors who funded the Bacow Fellowship that made my doctoral studies possible. Finally, I would like to thank the Vela Foundation, the American College of Sports Medicine Foundation, and The Boston Foundation for funding my doctoral research, and the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health, for funding Dr. Sacheck's FLEX Study (Award Number R01HD080180)."" DOI: NR General notes: NR

Telford 2012

Study characteristics	
Methods	Study name: LOOK (Lifestyle Of our kids) Study Study design: cluster RCT (nested cohort design) N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 620 Setting: twenty-nine primary schools in Canberra Country: Australia Country income: high income Recruitment: Quote: "We recruited schools from an Australian education jurisdiction (Canberra) through invitations to the principals in 2005. Of 30 schools invited, 29 schools accepted. We randomly assigned 13 schools (32 classes) to the specialist-taught PE group and 16 schools (36 classes) to the common-practice PE group after ensuring that the following conditions were satisfied. First, to match schools as well as possible in terms of the socioeconomic statuses of their suburbs, facilities, general administration, and teaching methods, we chose government-funded schools in outer-city suburbs of similar average family income as indicated by data supplied by the Australian Government Bureau of Statistics. Second, we ensured that specialist-taught and common-practice schools were geographically far enough apart to minimize any chance of a specialist-taught PE influence on commonpractice PE programs. " % of eligible population enrolled: schools: 97% (29/30); children: 75% (620/830; inlcuded in this study/included in the long termitudinal LOOk study); Age (years): range 8-9 (grade 3) Gender/Sex: 51.3% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 312 (at baseline) Comparator type: non-active intervention Comparison group participants: 308 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research received financial support from the Commonwealth Education Trust (London, UK)." DOI: NR General notes: the 620 participants were part of the Lifestyle of Our Kids study (nested design study)

Tessier 2008

Study characteristics	
Methods	Study name: REGU'LAPS Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 31 weeks Follow-up time(s): 31 weeks
Participants	Participants: 1150 Setting: schools in Meurthe-et-Moselle and Vosges (District of Golbey) in the Lorraine region Country: France Country income: high income Recruitment: Quote: "All principals and teachers in charge of classes from grade 2 to 5 in two counties (Meurthe-et-Moselle and Vosges [District of Golbey]) in the Lorraine region of France were contacted (i.e., 508 schools). Among these, 58 were interested (i.e., 88 classrooms). However, to be eligible, principals or teachers had to accept to modify the organisation of physical education sessions, and 52 teachers agreed to do so. " % of eligible population enrolled: schools: NR; children: 82% (939/1150)

	Age (years): mean: 9.1 (SD 1.2) Gender/Sex: 51% boys
Interventions	Theory: NR Intervention type: activity Intervention participants: 578 Comparator type: activity intervention Comparison participants: 572 Comparison: activity vs activity Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (activity interventions)
Notes	Clinical Trial Registry: NCT01161212 (from Speyer 2010) Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Thivel 2011

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 355 Setting: nineteen public primary schools in Auvergne Country: France Country income: high income Recruitment: four hundred fifty-seven primary school children (6 to 10 years old) were recruited from the local public schools that agreed to participate in the study. % of eligible population enrolled: schools: 59% (19/32); children: NR; Age (years): range 6-10 Gender/Sex: 49.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 229 (168 in the non-obese weight classification) Comparator type: non-active intervention Comparison group participants: 228 (187 in the non-obese weight classification) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by grants from the French National Plan for Nutrition and Health (PNNS), the Comite Regional Executif des Actions de Sante d'Auvergne (CREAS), the Caisse Régionale d'Assurance Maladie d'Auvergne (CRAMA), the Appert Institutes, the town of Clermont-Ferrand, and the governing bodies of the Clermont-Ferrand school system." DOI: NR General notes: NR

Topham 2021

Study characteristics	
Methods	Study name: FISH (The Families and Schools for Health) Study design: cluster RCT N of arms: 5 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 4 months; 16 months; 28 months; 40 months
Participants	Participants: 538 Setting: twenty-nine chools were within 90 miles from Oklahoma State University, Stillwater, OK Country: United states Country income: high income

	Recruitment: Quote: "Thirty-seven rural schools within a 90-mile radius of the researchers' university were approached. All schools where both superintendents and principals agreed to participate were included in the study. All families with a 1st grade child (ages 6–7) in consented schools were invited to participate. Parents were recruited at kindergarten graduations, 1st-grade registration, and back-to-school events, as well as via letters in children's backpacks. Families were recruited into a "healthy lifestyles" program and children were told the researchers wanted "to learn more about their eating habits"." % of eligible population enrolled: schools: 78% (29/37); children: 29% (538/1854; assessed for eligibility for subsample inclusion/eligible within the assessed for eligibility for sample inclusion). Age (years): range 6-7 (1st grader children) Gender/Sex: 51.7% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: Family Lifestyle (FL) intervention: 117 Family Lifestle (FL) + Family Dynamics (FD) intervention: 87 Family Dynamic (FD) + Peer Group (PG) intervention: 124 Family Lifestyle (FL) + Family Dynamic (FD) + Peer Group (PG) intervention: 129 Comparator type: non-active intervention Comparison group participants: 81 Comparison: dietary and activity vs control Setting of the intervention: school + community/community (multi-arm study) Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (40 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02659319 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: ""This research was funded by the National Institute of Food and Agriculture, U. S. Department of Agriculture, under Agreement No. 05545; Oklahoma Center for the Advancement of Science & Technology, Grant #HR07-044, AH; Oklahoma Agricultural Experiment Station, Grant #2744. T. Swindle is supported by the NIH NIDDK (K01 DK110141), the NIH NCATS (UL1 TR003107), and NIH NCI (R21 CA237985). T. Swindle and J.M. Rutledge are supported by NIH NIDDK (R03 DK117197) and NIH NIGMS (P20 GM109096) The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH."" DOI: "The authors declare no conflict of interest." General notes: the study included children with BMI>75th percentile but we only exracted outcome data for the at risk group (75th<BMI <85th percentile)

Treviño 2004

Study characteristics	
Methods	Study name: Beinestar Health Program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 8 months (outcome measurement was planned but it is not reported if it was measured)
Participants	Participants: 1993 Setting: twenty-seven schools in San Antonio, Texas Country: United States Country income: high income Recruitment: Quote: "After the 27 schools were identified, Bienestar staff sent parents a letter and a consent/assent form. These documents explained to parents that their children's schools could be assigned to receive either a health examination alone or a health examination and a school health program. The documents also explained to parents that students would receive $5 at baseline and $5 at follow-up for participating in the health examination. Only children who returned written informed consent forms signed by their parent or guardian and who assented to the study participated in program evaluation, and all children participated in program implementation." % of eligible population enrolled: schools: 61% (27/44); children: 64% (1993/3096) Age (years): mean: intervention: 9.79 (SD 0.53); control 9.77 (SD 0.49) Gender/Sex: intervention 50% boys; control 51% boys
Interventions	Theory: Social Cognitive Theory, Socio-Ecological Framework Intervention type: dietary and activity Intervention group(s) participants: 969 Comparator type: non-active intervention Comparison group participants: 1024 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI (planned) Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: teasurement of the outcome at follow-up was planned but results are not reported (there is no evidence that it was measured)
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "National Institutes of Health-National Institute of Diabetes and Digestive and Kidney Disease" DOI: NR

	General notes: BMI was measured and used to derive body fat measure but BMI data are not reported at follow-up. Quote: "Body fat was measured using bioelectric impedance analysis (Tanita Corporation of America Inc, Arlington Heights, Ill) and body mass index. Bioelectric impedance analysis was used for body fat measurement because body fatness has been shown to relate closely to atherogenic and diabetogenic risk factors in children and because body mass index may not represent true body fatness in prepubertal children. The children, in indoor clothing, were asked to remove their shoes and socks and step on the metal box. Within 30 seconds, the instrument prints out percentage of body fat and weight. Students, in indoor clothing and barefooted, also had their height measured using a wall stop measuring tape (stadiometer) (Seca Bodymeter 206; Seca Corp, Hanover, Md). Body mass index was calculated as weight in kilograms divided by the square of height in meters using the Quetelet Index measure."

van de Berg 2020

Study characteristics	
Methods	Study name: Texas, Grow! Eat! Go! Study design: cluster RCT N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 1 school year
Participants	Participants: 1326 Setting: south and central Texas Country: United States Country income: high income Recruitment: Quote: "All third grade students at the 28 study schools received the respective interventions. However, only the students recruited into the study participated in the data collections. Students and their parents were recruited by sending Texas, Grow! Eat! Go! (TGEG) study packets home to parents." % of eligible population enrolled: NR Age (years): children aged 7-8: 70.6%; children aged 9-11: 29.4% Gender/Sex: 49.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention group(s) participants: Walk Across Texas (WAT!) intervention: 336 Learn!Grow! Eat!Go! (LGEG!) intervention: 347 Walk Across Texas (WAT!) + Learn!Grow! Eat!Go! (LGEG!) intervention: 358 (at baseline) Comparator type: non-active intervention Comparison group participants: 285 (at baseline) Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school + home Setting of the intervention in sub-group analyses: school + home
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile medium term (1 school year) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: Texas, Grow! Eat! Go! (TGEG) Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This material is based on work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2011-68001- 30138. This study was partially funded by the Michael & Susan Dell Foundation through resources provided by the Michael & Susan Dell Center for Healthy Living, The University of Texas (UTHealth) School of Public Health at Austin Campus." DOI: "No competing financial interests exist." General notes: NR

Viggiano 2018

Study characteristics	
Methods	Study name: Kaledo Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 8 months; 18 months
Participants	Participants: 1313 Setting: classes III, IV, and V from ten primary schools in Campania Country: Italy Country income: high income Recruitment: Quote: "We enrolled 1313 children (aged 7–11 years) from classes III, IV, and V from ten primary schools in Campania, Italy." % of eligible population enrolled: schools: NR; children: NR;

	Age (years): range 7-11 Gender/Sex: 52% boys (measured at 8 months folow-up)
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 837 Comparator type: non-active intervention Comparison group participants: 476 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (8 months) zBMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Second University of Naples, Associazione Culturale Kaledo, Regione Campania, Provincia di Napoli, and Provincia di Salerno" DOI: "The authors declare that they have no conflict of interest." General notes: NR

Vizcaino 2008

Study characteristics	
Methods	Study name: MOVI Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 24 weeks Follow-up time(s): 9 months
Participants	Participants: 1409 Setting: twenty schools in 20 towns in the Province of Cuenca Country: Spain Country income: high income Recruitment: Quote: "We selected 20 schools in 20 towns in the Province of Cuenca, Spain. In towns with two or more schools, only one was chosen at random to avoid contamination of the intervention. The Boards of Governors (community participatory organ in each school) and the children's parents were informed of the study's aims and methods, and consented to their children's participation in writing. Similarly, the study was presented classroom-by-classroom to the children and their oral consent was obtained. Participation in the Movi program was promoted by presenting it separately to physical education teachers, the children's parents and the Board of Governors of each intervention school. Good adherence to the Movi program was encouraged with a system of rewards (T-shirts, caps, board games, and so on, with the program logo) for the children and their parents." % of eligible population enrolled: schools: 100% (20/20); children: 79% (1119/1409); Age (years): mean: intervention boys: 9.4 (SD 0.7); intervention girls: 9.4 (SD 0.7); control boys : 9.5 (SD 0.7); control girls: 9.4 (SD 0.6) Gender/Sex: 50.6% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 691 Comparator type: non-active intervention Comparison group participants: 718 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded mainly by La Consejerı´a de Sanidad de Castilla-La Mancha (grant GC03060-00). Additional funding was obtained from the Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III, Red de Investigacio´n en Actividades Preventivas y de Promocio´n de Salud (grant RD06/0018/ 0038)." DOI: NR General notes: NR

Wang 2012

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: school

	Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 1003 Setting: six primary schools from Jinan City, Shandong Province Country: China Country income: upper middle income Recruitment: Quote: "Six primary schools were chosen from Jinan City, Shandong Province, China. Each two were selected from schools with large (>1000 students), middle (500-1000 students), and small (<500) population. In each study school, two classes were randomly chosen from each grade of grades 2-5. All students in the selected classes were invited into the study." % of eligible population enrolled: schools: NR; children: NR; Age (years): range 7-11 (grades 2-5) Gender/Sex: NR
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 476 Comparator type: NR Comparison participants: 527 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI medium term (12 months) Outcome self-reported: NR Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was funded by Key Projects in the National Science & Technology Pillar Program during the Twelfth Five-year Plan Period (project number: 2008BAI58B05)" DOI: NR General notes: article published in Chinese

Wang 2018

Study characteristics	
Methods	Study name: HLP-YOG (Health Legacy Project of the 2nd Summer Youth Olympic Games) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 10091 Setting: thirty-two primary and 16 junior high schools in eight urban districts of Nanjing, China Country: China Country income: upper middle income Recruitment: Quote: "Thirty-two primary and 16 junior high schools were selected in total, and all of the 4th and 7th graders in the selected participating schools were eligible study subjects, resulting in 10 447 students in the baseline survey." % of eligible population enrolled: schools: NR; children: 97% (10091/10447) Age (years): mean: 10.5 (SE 0.02) Gender/Sex: intervention: 53.2% boys; control: 52.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 5400 Comparator type: non-active intervention Comparison group participants: 4691 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTRERC-11001819 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study (both the research project and intervention) was supported by Nanjing Medical Science and Technique Foundation (ZDX12019), China. Zhengqi Tan, Drs Youfa Wang and Hong Xue's efforts were partially supported by the National Institute of Health (NIH, U54 HD070725). Professor Neville Owen was supported by NHMRC Centre of Research Excellence Grant #1057608, NHMRC Senior Principal Research Fellowship #1003960 and by the Victorian Government's Operational Infrastructure Support Program. From xu 2016: The content of this abstract is solely the responsibility of the authors and does not necessarily represent the offi cial views of the funders." DOI: "The authors declare no conflict of interest." General notes: NR

Warren 2003

Study characteristics	
Methods	Study name: Be Smart! Study design: RCT N of arms: 4 Unit of allocation: individual Unit of analysis: individual Intervention period: 4 school terms (20 weeks) Follow-up time(s): 14-16 months
Participants	Participants: 218 Setting: three primary schools in Headington, Oxford Country: United Kingdom Country income: high income Recruitment: Quote: "All children in years 1 and 2 (aged 5–7 years) from three primary schools in Oxford were targeted in January 2000. The primary schools were selected on the basis of previous links to the Nutrition and Food Science Department at Oxford Brookes University and their close proximity to the University. Parents/carers were given a slip and a fact sheet. Canvassing in the school playground during mornings and afternoons was a successful means of enhancing recruitment, along term with parent meetings held in the schools. Children were recruted in three phases." % of eligible population enrolled: children: NR Age (years): mean: 6.1 (SD 0.6) Gender/Sex: 50.9% boys
Interventions	Theory: Social Learning Theory Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention participants: Eat Smart intervention : 56 Play Smart intervention: 54 Eat and Play Smart intervention: 54 Comparator type: attention control Comparison participants: Be Smart intervention: 54 Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported as percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means.
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by the UK Food Standards Agency" DOI: NR General notes: data are reported as percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means.

Wendel 2016

Study characteristics	
Methods	Study name: NR Study design: cluster RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 173 Setting: twenty-four schools in Texas Country: United States Country income: high income Recruitment: the autors approached 24 teachers in 3 Texas schools (8 in each school), informed them the study's purpose and protocol, and offered them a financial incentive for their participation. All 24 teachers consented to take in the study. In August 2011 research staff members attended the parent orientation events held at each of the schools and presented study information to parents. % of eligible population enrolled: teachers; 100% (24/24); childen: 79% (380/480); Age (years): mean: 8.8 Gender/Sex: 49.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 101 (at baseline) Comparator type: non-active intervention

	Comparison group participants: 72 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI long term; BMI percentile long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Devel- opment (grant 5R21HD068841). M. E. Benden declares a financial conflict of interest associated with this research since his US patented designsfor standing height school desks have been licensed by Texas A&M University to Stand2Learn LLC, a faculty led startup company, of which he owns stock and whose desks were included in the treatment groups used in this study. M. E. Benden's COI is managed by a TAMU approved plan and his involvement was at the experimental design stage and not the data collection or analysis phases. The conclusions presented are those of the authors and do not necessarily represent the official position of the National Institutes of Health." DOI: "One author declares a financial conflict of interest associated with this research since his US patented designs for standing height school desks have been licensed by Texas A&M University to Stand2Learn LLC, a faculty led startup compnay, of which he owns stock and whose desks were included in the treatment group used in this study. His COI is managed by a TAMU approved plan and his involvement was at the experimental design stage and not the data collection or analysis phases. " General notes: data were analysed according to an intention to treat plan; data from the TT and TC groups were merged and analysed as intervention group; data from the CC and CT groups were merged and analysed as control group

White 2019

Study characteristics	
Methods	Study name: iCook 4-H Study Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 24 months Follow-up time(s): 4 months; 12 months; 24 months
Participants	Participants: 228 Setting: communies in six counties in Maine, Nebraska, South Dakota, Tennessee, and West Virginia Country: United States Country income: high income Recruitment: Quote: "Recruitment occurred at youth-oriented organizations and clubs, schools and home schools, town halls, churches, pediatrician offices, grocery stores, 4-H and other Extension e-mail listservs, demonstrations at fairs and day camps, and news releases and other media outlets. Model flyers, media scripts, and letters to community organizations were used across states. Recruited adults received phone calls from researchers to confirm study eligibility, review the consent form, and set appointment times for assessments." % of eligible population enrolled: dyads: NR Age (years): mean: 9.35 (SD 0.67) Gender/Sex: 45% boys
Interventions	Theory: Social Cognitive Theory, Experiential 4-H Learning Model Intervention type: dietary and activity Intervention group(s) participants: 151 Comparator type: non-active intervention Comparison group participants: 77 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in sub-group analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (4 months); zBMI medium term (12 months); zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Other funding for this material is from US Department of Agriculture Experiment Stations in Maine, Nebraska, South Dakota, and West Virginia. The funding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results." DOI: "The authors have not stated any conflicts of interest." General notes: NR

Williamson 2012

Study characteristics	
Methods	Study name: Louisiana (LA) Health Study design: cluster RCT N of arms: 3 Unit of allocation: school

	Unit of analysis: individual Intervention period: 28 months Follow-up time(s): 18 months; 28 months
Participants	Participants: 1473 Setting: twenty three school systems in Louisiana Country: United States Country income: high income Recruitment: Quote: "Twenty three school systems were invited to participate in LA Health. The research team then contacted superintendents of school systems that had been invited to participate, gained their support, and progressed to obtaining the support of principals, teachers, staff, and parents. Students were recruited in the school environment by a variety of methods, including presentations to students and parents, fliers, and word of mouth." % of eligible population enrolled: schools: 74% (17/23); children: 42% (2060/4857); Age (years): mean: 10.5 (SD 1.2) Gender/Sex: 41.5% boys
Interventions	Theory: Social Learning theory Intervention type: dietary and activity Intervention participants: primary prevention intervention: 713 primary + secondary prevention intervention: 760 Comparator type: attention control Comparison participants: 587 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term (28 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00289315 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This project was supported by the National Institute for Child Health and Human Development of the National Institutes of Health (R01 HD048483) and the U.S. Department of Agriculture (58-6435-4-90). In addition, this work was partially supported by the NORC Center Grant #1P30 DK072476 entitled “Nutritional Programming: Environmental and Molecular Interactions” sponsored by NIDDK, and C. Martin was supported by NIH grant K23 DK068052The authors disclose no conflicts of interest." DOI: NR General notes: NR

Xu 2015

Study characteristics	
Methods	Study name: CLICK-Obesity Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 1182 Setting: eight schools in the Jianye urban district of Nanjing Country: China Country income: upper middle income Recruitment: Quote: "Eight schools were randomly selected from thirteen primary schools within Jianye district based on estimates of sample size required and the average class size for primary schools. All the fourth graders within the eight chosen schools were eligible to participate. Written informed consent regarding baseline and follow-up surveys as well as participation in the lifestyle intervention were obtained from parents/guardians and the schools prior to the baseline survey." % of eligible population enrolled: schools: 61.5% (8/13); children: 86.5% (1182/1225); Age (years): mean: intervention: 10.2 (SD 0.51); control: 10.2 (SD 0.52) Gender/Sex: intervention: 53.9% boys; control: 59.2% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 638 Comparator type: non-active intervention Comparison group participants: 544 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-ERC-11001819 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research work was funded by the Nanjing Municipal Science and Technique Foundation (200901088), Medical Science and Technique Development Foundation (2009-ZKX09034) The Young Medical Experts Project of Nanjing Medical Science and technique Development Foundation (QRX11038) and Nanjing Municipal Center for Disease Control and Prevention (Nanjing CDC), China. The research (Dr. Youfa Wang) was also supported in part by U.S.

	National Institutes of Health (NIH,U54HD070725). The funder had no role in the decision to collect data, data analysis, or reporting of the results." DOI: NR General notes: NR

Xu 2017 (5 other cities)

Study characteristics	
Methods	Study name: NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China) Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 7717 Setting: thirty schools from Shanghai, Chongqing, Guangzhou, Jinan and Harbin Country: China Country income: upper middle income Recruitment: Quote: "This study was a multi-center cluster randomized control trial. Six centers, including Shanghai, Chongqing, Guangzhou, Jinan, Harbin and Beijing, were recruited (note: we are including data from all the cities but Beijing, as data from the Beijing schools are reported in Meng 2013); Two-step cluster sampling method was used for subjects' selection. Firstly, 8 schools from Beijing and 6 schools from each other city were randomly chosen into the trial. The selected schools were randomly divided into two groups in each other city (3 schools for comprehensive intervention and 3 schools for control). In total, there were 15 comprehensive intervention schools, 15 control schools. Secondly, 2 classes from each grade (1st to 5th) were selected randomly in every school. " % of eligible population enrolled: schools: NR; children: 92% (7077/7717); Age (years): mean: 9 (SD 1.4) Gender/Sex: intervention: 50.9% boys; control: 50.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 3773 Comparator type: non-active intervention Comparison group participants: 3944 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium term; zBMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-PRC-09000402 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: ""This project has been funded by China Ministry of Science & Technology as "Key Projects in the National Science & Technology Pillar Program during the Eleventh Five-Year Plan Period", grant number 2008BAI58B05. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." From Meng 2013" DOI: "We declare that the authors have no competing interests. " General notes: this is a two-steps clustered RCT: first randomization was at school level; second randomization was at classroom level. Participants were selected from Beijing and 5 other cities (2 cohorts); data are analysed separatelly for the Beijing cohort and the other 5 cities cohorts. Data from all 5 arms are reported in both Meng 2013 and Xu 2017. From this study we only extracted data from the 5 other cities (Shanghai, Chongqing, Guangzhou, Jinan, Harbin). The data from the Beijing cohort (3 arms) are extracted from Meng 2013 (Beijing).

Yin 2012

Study characteristics	
Methods	Study name: Fitkid - Georgia Fitkid Project Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 9 months; 13 months; 20 months; 24 months; 33 months
Participants	Participants: 1187 Setting: eighteen schools in Augusta, Richmond County, Georgia Country: United States Country income: high income Recruitment: Quote: "Participant recruitment took place from late spring in 2nd grade students to early fall in 3rd grade students in 2003. Additional recruitment occurred at the beginning of years 2 and 3 in schools with low enrollment. In early spring 2003, the FitKid research team identified 18 schools from 22 interested schools that met the selection criteria. To assure that similar types of schools were present in both the intervention and control arms, we first stratified schools on the basis of geographic location (urban, suburban, and rural). In May 2003, our research staff visited all second-grade students in the 18 selected schools during PE periods and explained the project to them. Students who expressed interest in the study were asked to take a packet, including a letter describing the study, consent and assent forms, and a prepaid envelope to

	their parentsAll third graders who attended intervention schools were invited to enroll in the 3-year FitKid program. " % of eligible population enrolled: schools: 69% (18/29); children: 52% (614/1187); Age (years): mean: 8.7 (SD 0.5) Gender/Sex: 47% boys
Interventions	Theory: Environmental Change Intervention type: activity Intervention group(s) participants: 603 Comparator type: non-active intervention Comparison group participants: 584 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term(13 months) zBMI long term (33 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02793024 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "None of the authors has a known conflict of interest, financial or otherwise that would affect the analysis or interpretation of the data presented within this manuscript. This study was funded by the National Institutes of Health (DK063391)." DOI: "No financial disclosures are reported by the authors of this paper. None of the authors has a known conflict of interest, financial or otherwise that would affect the analysis or interpretation of the data presented within this manuscript." General notes: NR

Zota 2016

Study characteristics	
Methods	Study name: DIATROFI Program Study design: cluster RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months
Participants	Participants: 21261 Setting: one hundred fourty-six schools in Attica, Thessaloniki and the rest of Greece Country: Greece Country income: high income Recruitment: Quote: "After establishing initial contacts with all schools in low socioeconimic status areas, a total of 1053 schools' principals, corresponding to 140,468 students, declared their willingness to participate for the 2013–2014 school year and completed the relevant application form. Depending on funding availability, a set of criteria was used to prioritize the schools that applied. All students of participating schools were offered the opportunity to receive the free meal, irrespective of their socioeconomic status, so as to avoid stigmatization. Parents who did not wish their child to participate provided a signed statement." % of eligible population enrolled: schools: 36% (146/406); children: 35% (21261/61506); Age (years): range 4-18 years Gender/Sex: multicomponent intervention: 50.7 % boys; environmental intervention: 48.8%
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 10561 (participants in age group 5-18 years) Comparator type: non-active intervention Comparison group participants: 10700 (participants in age group 5-18 years) Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in sub-group analyses: school
Outcomes	Measured outcome(s): odds ratio of changing from a weight status of overweight or obesity to a normal weight status Outcome(s) included in the meta-analysis: n/a Outcome self-reported: yes Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as odd ratios of changing the weight status from overweight or obese classification to normal weight
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The DIATROFI Program was funded by the Stavros Niarchos Foundation and has been approved and runs under the auspices of the Greek Ministry of Education and Religious Affairs" DOI: Conflict of interest: none declared General notes: participants were children (4-11 years old) and adolescents (12-18 years old); only data from the children group are included in this review; narrative only in previous review. Data reported as probability of improving the weight status of adolescents.

Abbreviations: NR: not reported; n/a: not applicable; RCT: randomised controlled trial; SD: standard deviation; SE: standard error.

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
Allender 2021	Ineligible study design (cross-sectional study)
Beets 2014	Ineligible study dsign (repeated cross-sectional group randomized controlled trial)
Braun 2016	Outcome of interest was not measured
Braun 2019	Outcome of interest was not measured (follow-up time < 12 weeks)
Christiansen 2013	Outcome of interest was not measured
Coleman 2005	Outcome of interest was not measured
De Oliveira 2015	Ineligible study design (not a RCT)
Dominguez-Munoz 2021	Ineligible aim of the intervention
Dong 2021	Ineligible study design (non-randomized study)
Fernald 2009	Ineligible population (children age was < 5 years at baseline)
Gruber 2015	Ineligible study design (non-randomized study)
Herscovici 2013	Ineligible study design (<3 clusters/group)
Jones 2020	Ineligible study design (cross-sectional study)
Lubans 2011	Ineligible study design (<3 clusters/group)
Madsen 2015	Ineligible study design (<3 clusters/group)
Madsen 2021	Ineligible aim of the intervention
Mattos 2018	Ineligible study design (non-randomized study)
Meng 2020	Ineligible study design (the control groups is non-randomized)
Muckelbauer 2010	Ineligible study design (non-randomized study)
NCT00061165 2003	Outcome of interest was not measured
NCT01845480 2013	Ineligible population (target population were children with obesity or overweight)
NCT03069274 2017	Ineligible study design (<3 clusters/group)
NCT03422926 2018	Outcome of interest was not measured
NCT03469752 2018	Outcome of interest was not measured
NCT03479658 2018	Outcome of interest was not measured
NCT03885115 2019	Outcome of interest was not measured
NCT04863040 2021	Outcome of interest was not measured
NCT04864574 2021	Outcome of interest was not measured
NCT05358444 2022	Ineligible study design (non-randomized)
NCT05417347 2022	Outcome of interest was not measured
NCT05468216 2022	Outcome of interest was not measured
Nezami 2020	Outcome of interest was not measured
Parkinson 2015	Ineligible aim of the intervention
Perry 2021	Ineligible study design (<3 clusters/group)
Polonsky 2019	Ineligible aim of the intervention
Prina 2014	ineligible aim of the intervention
Reed 2008	Ineligible study design (<3 clusters/group)
Robbins 2006	Ineligible study design (<3 clusters/group)
Sallis 1993	Ineligible study design (<3 clusters/group)
Sevinc 2011	Ineligible study design (<3 clusters/group)
Waters 2017	Ineligible study design (repeated cross-sectional design with nested longitudinal subsample)
Zafiropulos 2015	Outcome of interest was not measured

RCT: randomized controlled trial

Characteristics of studies awaiting classification [ordered by study ID]

Larruy-Garcia 2022

Methods	Study name: MELIPOP (MEditerranean LIfestyle in Pediatric Obesity Prevention) Study dates: March 2018 (starting date) Study design: Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Primary Health centres in Córdoba, Santiagode Compostela and Zaragoza Country: Spain Age (years): 3-6
Interventions	Intervention type: dietary and activity Setting of the intervention: community (primary care) Brief description: education on Mediterranean lifestyle (Mediterranean diet and physical activitypromotion), combined with the provision of extra-virgin olive oil and fish, in order to be consumed at least 3 timesper week. Physical activity sessions with a physical activity monitor will also be offered for free to the children (2sessions of 60 minutes of moderate-vigorous physical activity, per week). The participants' degree of compliancewith the intervention will be periodically monitored
Outcomes	Measured outcome(s): BMI
Notes	Trial registration: NCT04597281 Funding: NR DOI: NR General notes: eligible participants were children > 3 years and < 7 years, with at least one parent having a BMI ≥ 25 kg/m^2, with no disease responsible for the high BMI. Children from families having dietary habits not fitting with the characteristics of

	the dietary intervention were not eligible. It is unclear whether the mean age of the participants is > 5 years, and thus whether the study is eligible for inclusion in our review and we were unable to obtain such information from the authors (the authors were contacted on 13 February 2023 but they were unable to clarify the age of the participants)

Widhalm 2022

Methods	Study name: EDDY Young Study Study dates: September 2016 (baseline measurements) Study design: NR in the abstract Unit of allocation: NR in the abstract Unit of analysis: individual
Participants	Setting: elementary schools in Vienna Country: Austria Age (years): 8-11
Interventions	Intervention type: dietary and activity Setting of the intervention: school Brief description: eight units nutrition teaching and 16 units special physical activity training
Outcomes	Measured outcome(s): BMI
Notes	Trial registration: NR Funding: The project was carried out by a scientific Grant made possible by Hofer/Sattledt (Die Durchführung des Projektes wurde durch einen wissenschaftlichen Grant der Fa. Hofer/Sattledt ermöglicht) DOI: The authors declare that no conflict of interest consists (Die Autorinnen/Autoren geben an, dass kein Interessenkonflikt besteht) General notes: the article is writen in German and needs translation (data extracted from the translated abstract reported in the main article)

BMI: body mass index; DOI: declaration of interests; NR: not reported

Characteristics of ongoing studies [ordered by study ID]

ACTRN12620001101976 2020

Study name	PPDP (Pasifika Preventing Diabetes Programme)
Methods	Study design: cluster RCT (stepped wedge) Unit of allocation: church Unit of analysis: individual
Participants	Setting: churches in Greater Western and South Eastern Sydney Country: Australia Country income: high income Age (years): 4-17
Interventions	Intervention type: dietary and activity Intervention setting: community (church) Brief description: the intervention was aimed at changing lifestyle delivered by community activators
Outcomes	Measured (or planned) outcome(s): zBMI; BMI
Starting date	26 October 2020 (date of first enrolment)
Contact information	Prof David Simmons (da.simmons@westernsydney.edu.au)
Notes	Trial registration: ACTRN12620001101976 Funding: South Western Sydney Primary Health Network (SWSPHN); South Eastern Sydney Local Health District (SESLHD); NSW Ministry of Health; EIS Health Ltd ;Sanofi-Aventis Australia Pty Ltd; NHMRC Partnership Project Grant; Western Sydney Local Health District (WSLHD); Nepean Blue Mountains Local Health District (NBMLHD); WentWest Limited; Wentworth Healthcare; Diabetes NSW and ACT; NSW Health Pathology; South Western Sydney; Local Health District (SWSLHD); Sydney Partnership for Health, Education, Research and; Enterprise (SPHERE) DOI: NR General notes: recruited churches are required to have at least 70% of their congregation from a Pasifika background

ACTRN12622000906752 2022

Study name	HRWP (He Rourou Whai Painga)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: communities (four research centers across New Zealand) Country: New Zealand Country income: high income Age (years): 11 and older
Interventions	Intervention type: dietary Intervention setting: community Brief description: this is a randomised controlled trial of food provision and dietary change support (Group A) compared with a self-selected habitual dietary intake (Group B) for 12 weeks
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	20 June 2022 (recruitment start date)

Contact information	Dr Martin Gagnon (martin.gagnon@otago.ac.nz)
Notes	Trial registration: ACTRN12622000906752 Funding: High Value Nutrition National Science Challenge (New Zealand) DOI: NR General notes: index participants will be adults at risk of metabolic and cardiovascular disease and up to five members of their household/whanau will be invited to also take part in the study

Andino 2022

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households recruited from the community (unemployment seminars, food pantries, community and school events, the local community health center, and at other community partner locations and events) Country: USA Country income: high income Age (years): 6-12
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: a community-based obesity intervention utilizing motivational interviewing, health coaching, and community resource mobilization
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	NR
Contact information	H.H. Laroche (hhlaroche@cmh.edu)
Notes	Trial registration: NR Funding: "This work is supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health [R01HL119882]" DOI: "The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper." General notes: height and weight measurements were collected for all participants in the intervention group but only from 'willing' children in the contorl group. Eligible participants had one parent with obesity

Barragan 2022

Study name	Abriendo Caminos
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households from four sites (Illinois, California, Texas, and Iowa) Country: USA Country income: high income Age (years): 6-18
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: family-based approach to deliver culturally-tailored nutrition education, family wellness, and physical activity workshops
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	Fall of 2015 (start of recruitment)
Contact information	Margarita Teran-Garcia (teranmd@illinois.edu)
Notes	Trial registration: NCT03505658 Funding: "This research was funded by the U.S Department of Agriculture—National Institute of Food and Agriculture, 2015-68001-23248. This research project is supported by the Agriculture and Food Initiative Competitive grant (No. 2015-68001-23248) from the U.S. Department of Agriculture." DOI: "The authors declare no conflict of interest." General notes: the interventin was designed for Mexican and Puerto Rican families

Brooks 2022

Study name	Strong Families
Methods	Study design: cluster RCT Unit of allocation: postcode Unit of analysis: individual
Participants	Setting: families in the Greater Western Suburbs of Sydney Country: Australia Country income: high income Age (years): 5-11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: "The face-to-face behavioural parenting and lifestyle (BPL) intervention will comprise of 6 x 90 min weekly

	group sessions (plus 2 x 45 min boosters at 3 months follow-up), incorporating the parenting and healthy lifestyle components trialled. The 2 booster sessions will occur 3 months after completing the 6 intervention sessions."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	23 February 2022 (date of first enrollment)
Contact information	Prof Andre M.N. Renzaho (andre.renzaho@westernsydney.edu.au)
Notes	Trial registration: NR Funding: National Health and Medical Research Council DOI: NR General notes: eligible participants are either Australian born or migrants (predominantly speaking Arabic, Hindi and Punjabi) that live in socio-economically disadvantaged areas (< 1000 index of socio-economic disadvantage). For households with two or more eligible children, the child who had the most recent birthday will be included. Randomization conducted by postcode (as a cluster)

Bustos 2016

Study name	KIND
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 12 primary public schools in three regions Country: Chile Country income: high income Age (years): 6-10
Interventions	Intervention type: dietary; activity; dietary and activity (multi-arm study) Intervention setting: school Brief description: "Intervention 1: Healthy Kiosk and nutritional education (KSEAN). Intervention 2: Optimized physical activity (AFSO), where the physical education classes will be taken by a specialized physical education teacher or a primary teacher with a specialization in physical education. The effective class time will be a minimum of 70 min, during which half of the time should involve undertaking activities of moderate to vigorous intensity. Intervention 3: Healthy kiosk and nutritional education (KSEAN) + Optimized physical activity (AFSO)."
Outcomes	Measured (or planned) outcome(s): zBMI; BMI
Starting date	March 2014 (recruitment start date)
Contact information	Nelly Bustos (nbustos@inta.uchile.cl)
Notes	Trial registration: ISRCTN32136790 Funding: "Funding for the project was provided by the Fund for Solidarity and Social Investment (FOSIS), from the Chilean government, and by the Corporate Social Responsibility funds (RSE), from the Tresmontes Lucchetti food company." DOI: "The authors declare that they have no competing interests." General notes: NR

Byrd-Bredbenner 2022

Study name	HomeStyles-2
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households Country: USA Country income: high income Age (years): 6-11
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: "the intervention has 8 brief instructional electronic guides for parents, with a different guide provided each week of the intervention. Each guide focuses on strategies parents can use in partnership with their middle childhood-age kids to re-shape one aspect of the home environment and lifestyle (i.e., overview of parenting school-age kids for good health, 5 guides addressed to diet (fruits/vegetables, sugarsweetened beverages, portion size control, family meals, breakfast) and 1 guide each on physical activity. and sleep). A second component of the intervention is a 1-page online tracker that encourages parents to set goals for re-shaping their home environment and lifestyles, monitor their progress, and reward themselves and their family for progress toward the goal. A third intervention component is a 1-page guide designed especially for kids that coordinates and supports the messaging in the parent guides."
Outcomes	Measured (or planned) outcome(s): zBMI; BMI percentile
Starting date	2022 (recruitment year)
Contact information	Carol Byrd-Bredbenner (bredbenner@sebs.rutgers.edu)
Notes	Trial registration: NCT04802291 Funding: "This work was supported by the National Institute of Food and Agriculture, United States Department of Agriculture award number 2017–680001-26351." DOI: "The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper." General notes: eligible participants were parentsthat are the primary food gatekeeper in the household (i.e., makes all or most decisions related to family food choices), have regular Internet access, read English and/or Spanish, and reside in the United States

Cespedes 2021

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 16 public and private schools in the urban and rural area of the Department of Caaguazú Country: Paraguay Country income: upper-middle income Age (years): 9-12 (school grade 4th to 6th)
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: a nutritional education and physical activity program in the school environment
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	NR
Contact information	Laura González Céspedes (lgonzalez@qui.una.py)
Notes	Trial registration: NR Funding: El proyecto es financiado por el Programa Paraguayo para l Desarrollo de la Ciencia y Tecnología (PROCIENCIA) con el apoyo del Fondo para la Excelencia de la Educación y la Investigación (FEEI). Proyecto PINV15-426. DOI: no conflicts of interest declared General notes: the article needs translation

ChiCTR-IOR-16009997 2016

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Shanghai Children Hospital Country: China Country income: upper-middle income Age (years): NR (see General notes)
Interventions	Intervention type: dietary Intervention setting: community (primary care) Brief description: technique on early diagnosis and comprehensive prevention for children nutritious risk based on mobile platform; control: face to face advisement traditionally
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	1 November 2017 (date of first enrollment)
Contact information	Shi Huiqing (rukawayouko@163.com)
Notes	Trial registration: ChiCTR-IOR-16009997 Funding: Shanghai Shen Kang Hospital Development Cente DOI: NR General notes: inclusion criteria: preschool children, with the household registration in Shanghai and Shanghai for more than two years or more or non Shanghai residence in Shanghai for more than a year of permanent residents, voluntary

ChiCTR-PRC-08000053 2008

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in Urban Beijing Country: China Country income: upper-middle income Age (years): 7-12
Interventions	Intervention type: activity Intervention setting: school Brief description: 20 minutes of physical activity per school day
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	1 January 2005 (date of first enrollement)
Contact information	Guansheng Ma (mags@chinacdc.net.cn)
Notes	Trial registration: ChiCTR-PRC-08000053 Funding: Nutricia Research Foundation DOI: NR General notes: NR

ChiCTR-TRC-12001880 2012

Study name	NR
Methods	Study design: RCT Unit of allocation: individual

	Unit of analysis: individual
Participants	Setting: kindergartens Country: China Country income: upper-middle income Age (years): 3-6
Interventions	Intervention type: dietary Intervention setting: school Brief description: family leaflets, behavior cards
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	23 February 2010 (date of first enrollement)
Contact information	Lin Ming (linming12@yeah.net)
Notes	Trial registration: ChiCTR-TRC-12001880 Funding: Union Hospital, Tongji Medical College, Huazhong University of Science and Technology DOI: NR General notes: NR

ChiCTR2000033945 2020

Study name	NR
Methods	Study design: clustered RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools, Nanjing, Jiangsu Country: China Country income: upper-middle income Age (years): 7-10
Interventions	Intervention type: dietary Intervention setting: school Brief description: class-based comprehensive intervention (school + family) method with the aim of reducing children's sugary beverage intake, improving the knowledge and behavior of sugary beverages and decreasing the incidence of caries, of overweight and obesity,and of exceeding blood pressure
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	January to September 2019 (recruiting time)
Contact information	Wang Chenchen (isisccwang@163.com)
Notes	Trial registration: ChiCTR2000033945 Funding: Jiangsu Provincial Center for Disease Control and Prevention, Jiangsu Preventive Medicine Association DOI: NR General notes: NR

CTRI/2020/10/028700 2020

Study name	V-CaN (Vitalizing Community against Non-communicable diseases)
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools Country: India Country income: lower-middle income Age (years): 10-30
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the three interventions are with school students as change agents, with Village Health Nutrition and Sanitation Committees (VHNSC) members as change agents and with Women's Self-help group (SHG) members as change agents in addition to the existing government programs for non-communicable diseases (NCDs). The population in control arm will continue to receive the routine care through the existing government programs and no additional activities would be conducted in control arm. If proven effective, the health promotion strategy will also be implemented in the control PHC at the end of project. Intervention 1: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of school students will be done through monthly contact sessions for developing NCD specific health action plan for their area/school, formation of V-CaN clubs and conduction of community-based events. Intervention 2: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of VHNSC members will be done through monthly contact sessions for developing NCD specific health action plan for their village, formation of V-CaN clubs and conduction of community-based events. Intervention 3: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of Women's SHG members will be done through monthly contact sessions for developing NCD specific health action plan for their village, formation of V-CaN clubs and conduction of community-based events.
Outcomes	Measured (or planned) outcome(s): proportion of children classified as with pre-obesity and obesity
Starting date	1 January 2021 (date of first enrolment)
Contact information	Dr. Sushila Nayar (abhishekvraut@gmail.com)

Notes	Trial registration: CTRI/2020/10/028700 Funding: Indian Council of Medical Research DOI: NR General notes: NR

Cunha 2017

Study name	PAAPAS Nudge
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 18 public schools in the municipality of Duque de Caxias, metropolitan area of Rio de Janeiro Country: Brazil Country income: upper-middle income Age (years): 9-10
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: educational activities in the classroom; changes in the school environment (nudge strategies); educational activities and changes in the school environment
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	Activities will occur during the 2018 school-year
Contact information	Diana Barbosa Cunha (dianabcunha@gmail.com)
Notes	Trial registration: NR Funding: "This work was supported by Foundation of Support of Research of the State of Rio de Janeiro (FAPERJ), E-26/010.001656/2016." DOI: the authors report no conflicts of interest. General notes: eligible participants were adolescents (students from the fifth and sixth grade)

DRKS00023824 2020

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: primary schools in Klagenfurt Country: Austria Country income: high income Age (years): 6-10
Interventions	Intervention type: activity Intervention setting: school Brief description: the intervention group is accompanied throughout the school year by an external "coach" in addition to the specialist teacher in the subject of movement and sport. All movement units are planned in a practical methodological way, structured and curriculum-oriented. The intervention starts with the start of school in October 2019 and ends at the end of school in June 2020. In the 2nd classes, 3x 1 movement unit is performed during the regular lessons, over 30 weeks in the period described above. In the 3rd grades, 2x 1 unit of movement is performed during the regular lessons, over 30 weeks in the period described above.
Outcomes	Measured (or planned) outcome(s): anthropometric measures
Starting date	October 2019 (start of the intervention)
Contact information	Gerald Jarnig (gerald.jarnig@gmx.at)
Notes	Trial registration: DRKS00023824 2020 Funding: österreichischem Bundesministerium für Kunst, Kultur, öffentlicher Dienst und Sport DOI: NR General notes: NR

DRKS00025515 2021

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: primary schools in Klagenfurt Country: Austria Country income: high income Age (years): 8-12
Interventions	Intervention type: activity Intervention setting: school Brief description: in the intervention classes, all physical activity and sports lessons are led by external trainers, and the planning of the lesson designs is carried out uniformly by the project management. In an innovative concept, movement elements are additionally implemented into the classroom and the school's daily routine on every day. The planning, design and formulation of these focal points is taken over by an primary school teacher and passed on to all primary school teachers involved.
Outcomes	Measured (or planned) outcome(s): body weight and height

Starting date	10 June 2021 (date of first enrollement)
Contact information	Mireille van Poppel (mireille.van-poppel@uni-graz.at)
Notes	Trial registration: DRKS00025515 2021 Funding: österreichischem Bundesministerium für Kunst, Kultur, öffentlicher Dienst und Sport DOI: NR General notes: NR

Dukhi 2020

Study name	i-SPAN
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 16 government-funded primary schools in the iLembe district of KwaZulu-Natal Country: South Africa Country income: upper-middle income Age (years): 9-15
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: school-based diet and physical activity classroom and outdoor activities and Health Promotion Toolkit that consists of the learner pamphlet, the educator manual, and sports box
Outcomes	Measured (or planned) outcome(s): zBMI; Proportion of children and adolescents classified as overweight and with obesity
Starting date	August 2018 (school randomization)
Contact information	Natisha Dukhi (Dukhin@ukzn.ac.za)
Notes	Trial registration: PACTR201711002699153 Funding: "This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors." DOI: "The authors declare that they have no competing interests." General notes: NR

Elinder 2018

Study name	Healthy School Start Plus
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in Stockholm Country: Sweden Country income: high income Age (years): 6
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the intervention consists of four components: 1) health information to parents regarding the child; 2) motivational Interviewing with the parents by the school nurse concerning the child; 3) classroom activities for the children by teachers; and 4) a web-based self-test of type-2 diabetes risk by parents
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September-October 2017 (baseline data collection)
Contact information	Liselotte Schäfer Elinder 9liselotte.schafer-elinder@ki.se)
Notes	Trial registration: NCT03390725 Funding: "This project has received funding from the Swedish Research Council Forte No. 2016–00775, Box 894, SE 101 37 Stockholm, Sweden; the Kamprad Family Foundation for Entrepreneurship, Research and Charity No. 2170238; and the Sigurd and Elsa Golje's Foundation. The funders had no role in the design of this study and will not have any role during its execution, analyses, interpretation of the data, or decision to submit results." DOI: "The authors declare that they have no competing interests." General notes: the study targets disadvantaged areas with increased health needs

Elinder 2021

Study name	IMPROVE
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 30 schools in two municipalities in the greater Stockholm area Country: Sweden Country income: high income Age (years): 5-7
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: head to head comparison between two dietary and activity interventions including Healthy School Start

	(see Elinder 2018); schools randomly assigned to group 1 will receive bundle 1 (Basic) and group 2 will receive bundle 1 + 2 (Enhanced). Bundle 2 consists of external facilitation, fidelity monitoring and feedback strategies.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	Two cohorts starting in 2021 and 2022, respectivelly
Contact information	Liselotte Schäfer Elinder 9liselotte.schafer-elinder@ki.se)
Notes	Trial registration: NCT04984421 Funding: Funding for this study has been received from the Swedish Research Council for Health, Working Life and Welfare (FORTE) grant number 2020–01198. DOI: The authors declare that they have no competing interests. General notes: NR

Friedrich 2015

Study name	TriAtiva
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 12 primary municipal schools in the city of Porto Alegre Country: Brazil Country income: upper-middle income Age (years): 5-8 (1st to 4th grade)
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: educational activities of healthy eating and physical activity, creating an environment which promoted student health while involving the school community and student families.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February-March 2013
Contact information	Roberta R Friedrich (robertafriedrich@hotmail.com)
Notes	Trial registration: RBR2xx2z4 Funding: "This study was funded by a PROEXT SESU/MEC 2013 grant." DOI: "The authors declare that they have no competing interests." General notes: NR

Gerber 2020

Study name	KaziAfya
Methods	Study design: cluster RCT (2x2 factorial) Unit of allocation: school Unit of analysis: individual
Participants	Setting: public primary schools in the area of Taabo in south-central Côte d'Ivoire, in Port Elizabeth in the Eastern Cape Province of South Africa, and in Ifakara in the Kilombero district of Tanzania Country: Côte d'Ivoire, South Africa and Tanzania Country income: lower-middle income (Côte d'Ivoire and Tanzania); upper-middle income (South Africa) Age (years): 6-12
Interventions	Intervention type: dietary; activity; dietary and activity (multi-arm study) Intervention setting: school Brief description: the four intervention arms are (i) physical activity: physical activity opportunities are incorporated into the main school curriculum, including daily in-class activity breaks as well as one weekly 40-min playful physical education lesson and one 40-min moving-to-music lesson.; (ii) multimicronutrient supplementation: a daily chewable tablet containing vitamins and trace elements; (iii) physical activity plus multi-micronutrient supplementation; and (iv) no specific interventions, which will serve as the control
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2018
Contact information	Marcus Gerber (markus.gerber@unibas.ch)
Notes	Trial registration: ISRCTN29534081 Funding: "The study is funded by the Fondation Botnar (Basel, Switzerland; project number 6071 'Physical activity and multi-micronutrient supplementation'), covering research expenses, staff salaries, study equipment and laboratory analyses. In-kind contributions are provided by all involved parties. The multi-micronutrient supplementation and the placebo products are sponsored by DSM Nutritional Products Ltd. (Basel, Switzerland). The KaziAfya teaching material is based on (or an extension of) the development of the KaziKidz teaching material, an initiative financially and technically supported by the Novartis Foundation since 2017. The funding sources had no further role in the study design, collection, analysis, interpretation of data, writing of this report, and in the decision to submit this paper for publication. The authors alone are responsible for the content and writing of the paper." DOI: "The authors declare that they have no competing interests." General notes: NR

Gittelsohn 2017

Study name	OPREVENT2
Methods	Study design: cluster RCT Unit of allocation: household

	Unit of analysis: individual
Participants	Setting: households from six Native American communities in the Southwest and Midwest Country: USA Country income: high income Age (years): 6-13 (school grades 2-6)
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: OPREVENT2 worked with worksites, food stores, schools (grades 2–6), through social media and mailings, and with a local community action committee, in each of the three intervention communities, and was implemented in six phases
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	June 2017
Contact information	J Gittelsohn (jgittel1@jhu.edu)
Notes	Trial registration: NCT02803853 Funding: "This work was supported by the National Heart, Lung, and Blood Institute (R01HL122150 to J.G.)." DOI: none declared General notes: NR

Glazebrook 2012

Study name	STAK (Steps To Active Kids)
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools in Nottinghamshire and Derbyshire Country: UK Country income: high income Age (years): 9-11
Interventions	Intervention type: activity Intervention setting: school Brief description: activity programme including activity diary, street dance DVD, circuit training and, for children at or above the 91st centile weight for height, motivational interviewing and goal setting
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	April 2010
Contact information	Chris Glazebrook (cris.glazebrook@nottingham.ac.uk)
Notes	Trial registration: ISRCTN12650001 Funding: "The study is funded as part of the NIHR Collaborations in Leadership in Applied Health Research and Care (CLAHRC) Nottinghamshire, Derbyshire and Lincolnshire, funded by a central grant from the National Institute of Health Research and Nottinghamshire Healthcare Trust, University of Nottingham and other Trusts in CLAHRC." DOI: "The authors declare that they have no competing interests." General notes: Oucome data only available for the children that were classifed as overweight at baseline; it is unclear if the intervention only targeted children that were overwieght or with obesity or all children in the schools; the intervention is described as targetting only children at risk of obesity: "This study aims to evaluate the efficacy and feasibility of a schools-based activity programme suitable for children with risk factors for adult obesity, including asthma, overweight and low exercise self-efficacy."

IRCT2014042315797N3 2014

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Hamadan city Country: Iran Country income: lower-middle income Age (years): 7 and older (fifth grade student)
Interventions	Intervention type: dietary Intervention setting: school + home Brief description: interventions will be performed using "Train to trainer" strategy to promote nutritional behaviors of mothers and students. In this method, teachers and school health educators will be trained, to teach the students about healthy eating behaviors. Finally, mothers will be trained by students. Interventions for 3 months included: education about food groups and nutritional behaviors; providing educational aids including pamphlet, booklet, display video and banner installation; holding painting competitions and providing wallpaper to promote nutritional behaviors. To assess the rate of learning, mothers and students will write their homework in the logbook.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	22 June 2014 (recruitement start date)
Contact information	Seyedeh Zeinab Hashemi (hashemi_boshra@yahoo.com; z.hashemi@umsha.ac.ir)
Notes	Trial registration: IRCT2014042315797N3 2014 Funding: Vice chancellor for Education of Tehran University of Medical Sciences DOI: NR General notes: NR

IRCT2016012626078N2 2016

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: kindergarten dependent on the well-being organization of Behbahan city Country: Iran Country income: lower-middle income Age (years): 4-6
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: in the intervention group (mothers), educational intervention (training classes) will be received. Educational intervention will be based on social cognitive theory and the theory of family systems (parenting skills and practices). Content, methods and number of training sessions will be according to the analysis of the results of pre - test measure on mothers preventive behaviors of obesity in children (daily: 2 hours of physical activity, eating five portions of fruit and vegetables, eating sugar-free drinks and watching less than two hours of TV).
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	20 Janaury 2016 (recruitement start date)
Contact information	Elham Nejadsadeghi (nejadsadeghi_e@razi.tums.ac.ir)
Notes	Trial registration: IRCT2016012626078N2 2016 Funding: Vice chancellor for Education of Tehran University of Medical Sciences DOI: NR General notes: NR

ISRCTN06248443 2014

Study name	Obesity Prevention Tailored (OPT) for Health II
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: patients of the Kaiser Permanente Southern California Medical Care Program Country: USA Country income: high income Age (years): 10-12
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: one in-person meeting with a health coach, four newsletters for the parent, four newsletters for the child, five telephone calls to the parent, and two collaborative family activities. All program activities were designed to encourage and/or produce diet and physical activity change
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	recruitment between June 2010 and November 2011
Contact information	Dr Kim Reynolds
Notes	Trial registration: ISRCTN06248443 2014 Funding: National Cancer Institute (USA); National Institute of Diabetes and Digestive and Kidney Diseases (USA); National Institutes of Health (USA) DOI: NR General notes: eligible participants are patients from the Kaiser Permanente Southern California Medical Care Program with a 10-12-year-old child living in the home

ISRCTN11371954 2020

Study name	VisezEauÂ® (ReachforWater)
Methods	Study design: cluster RCT (stepped wedge) Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools Country: Canada Country income: high income Age (years): 6-10
Interventions	Intervention type: dietary Intervention setting: school + home Brief description: the intervention is a multi-level (school and home) theory-based intervention to be deployed according to the randomized trial design. The intervention is designed to improve the beverage consumption profile of participating children as a means of improving their body composition.
Outcomes	Measured (or planned) outcome(s): BMI; prevalence of overweight and obesity
Starting date	school year 2019
Contact information	Michel Lucas (michel.lucas.1@ulaval.ca)
Notes	Trial registration: ISRCTN11371954 2020 Funding: Ministère de la Santé et des Services Sociaux du Québec [Ministry of Health and Social Services of Québec]; Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec [Ministry of Sustainable

	Development, Environment, and Fight Against Climate Change of Quebec] DOI: NR General notes: NR

ISRCTN12378125 2021

Study name	MapMe
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools in England Country: UK Country income: high income Age (years): reception and Year 6 pupils (usual age 4 - 5 years and 10 - 11 years)
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the MapMe intervention includes body image scales (BIS) of known weight status for 4-5 and 10-11-year-old children based on the same British growth reference clinical thresholds that are used by the National Child Measurement Programme (NCMP) to inform parents of their child's weight status. The BIS are designed to tap into the visual methods by which parents determine OW in children, to help them understand what a child with OW/OB looks like. The web-based format of MapMe shows parents the BIS and asks them to choose the image most resembling their child. Parents then enter their child's height and weight (both provided in the NCMP letter), sex and date of birth (DOB); they are then shown the 3D image and weight status that matches that data, thus facilitating parental acknowledgment of weight status. Parents are also shown a 3D image of an adult in the same weight category as their child's current category and given information about health risks of childhood OW, tapping into parental concerns of future OW in their child and raising awareness of potential health consequences. Information is included to support parents to prevent or address unhealthy weight gain in their child including brief advice on healthy eating, physical activity and signposts to sources of information and professional support, which include motivational and volitional materials for goal setting, practice, action and coping planning in family-based dietary and physical activity changes, positive family approaches focused on lifestyle rather than weight and positive family discussions focused on lifestyle rather than weight.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	March 2020 (overall study start date)
Contact information	Dr Laura Basterfield (Laura.Basterfield@newcastle.ac.uk)
Notes	Trial registration: ISRCTN12378125 2021 Funding: NIHR Evaluation, Trials and Studies Co-ordinating Centre (NETSCC); National Institute for Health Research (NIHR) (UK) DOI: NR General notes: participants are registered with a school in a Local Authority carrying out the National Child Measurement Programme (NCMP), and part of the MapMe trial and not opted out of the NCMP by parent or carer

ISRCTN52180050 2022

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: gorvernment primary schools in Badulla District Country: Sri Lanka Country income: lower-middle income Age (years): 9-10 (grade 5)
Interventions	Intervention type: activity Intervention setting: school Brief description: classroom-based physical activity breaks program. Intervention schools will receive five-minute physical activity breaks at least three times per day by the classroom teachers for 12 weeks. This is a pre-post-test intervention only. There will be no treatment during the follow-up period.Control schools will not receive any treatments.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2022 (start of the study)
Contact information	Ms Hashi Peiris (hashi_peiris@life.hkbu.edu.hk)
Notes	Trial registration: ISRCTN52180050 2022 Funding: Hong Kong Baptist University (Hong Kong Ph.D. Fellowship Scheme) DOI: NR General notes: NR

ISRCTN76013675 2014

Study name	PESSOA
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 14 high schools in the Oeiras Municipality Country: Portugal Country income: high income Age (years): 10-12

Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the intervention group was provided with 90 min additional weekly sessions with health and weight educational program and physical activities in addition to the standard general information regarding eating and physiscal activity behaviors provided to the control group
Outcomes	Measured (or planned) outcome(s): body composition assessed by dual-energy X-ray absorptiometry (DXA) and by standard anthropometric procedures
Starting date	1 September 2010 (date of first enrolment)
Contact information	Luis Sardinha
Notes	Trial registration: ISRCTN76013675 Funding: Portuguese Foundation for Science and Technology (Portugal) DOI: NR General notes: eligible participants were boys and girls without contraindications for physical activity enrolled in the 5th, 6th, and 7th grades

JPRN-UMIN000014896 2014

Study name	STOP Obesity Project for Elementary School Children
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: elementary schools Country: Japan Country income: high income Age (years): 6-12
Interventions	Intervention type: activity Intervention setting: school Brief description: intervention group 1: walking more than 10,000 steps with pedometer on holidays; intervention group 2: limit screen time; control: record pedometer count and screentime without intervention
Outcomes	Measured (or planned) outcome(s): Changes in the values of cardiovascular risk factors
Starting date	18 August 2014 (date of first enrolment)
Contact information	Masao Yoshinaga (m-yoshi@biscuit.ocn.ne.jp)
Notes	Trial registration: JPRN-UMIN000014896 2014 Funding: Ministry of Health, Labour and Welfare (Japan) DOI: NR General notes: eligible participants had a percent relative body weight of equal to or more than 20%

JPRN-UMIN000014992 2014

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: secondary schools in Hanoi Country: Japan Country income: high income Age (years): 10-12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: physical activity and lifestyle interventions: decrease sedentary activity time and increase physical activity time. "The project will provide a pedometer and a scale for each student in intervention schools. Results of steps record in the day, the students will write in the notebook. Each week, research team send staffs to schools to review the result of steps of each student on the machine and record the number of steps." Nutrition education: training for students, parents, teachers, school health staff, kitchen staff, canteen staff. "Emphasize the importance of implementing reasonable diet, healthy lifestyle, intergrated exercise and physical activities. Media, tools and wide communication schedule; communication activities, messages, and support materials promote the benefits of and attempt to lower some key barriers to targeted physical activity and dietary changes."
Outcomes	Measured (or planned) outcome(s): prevalence and incident of overweight or obesity
Starting date	4 December 2013 (date of first enrolment)
Contact information	Hiroshi Kajio (hkajio@hosp.ncgm.go.jp)
Notes	Trial registration: JPRN-UMIN000014992 2014 Funding: National Center for Global Health and Medicine; Manpei Suzuki Diabetes Foundation Minister of Health, labour and Welfare DOI: NR General notes: NR

JPRN-UMIN000036544 2019

Study name	Yui Kenko Project 2
Methods	Study design: RCT (cross-over) Unit of allocation: individual

	Unit of analysis: individual
Participants	Setting: elementary school children in Okinawa prefecture Country: Japan Country income: high income Age (years): 6 and older
Interventions	Intervention type: dietary Intervention setting: school Brief description: nutrition survey and information intervention of dietary habit
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	19 June 2013 (date of first enrolment)
Contact information	nknkyu@to.jim.u-ryukyu.ac.jp
Notes	Trial registration: JPRN-UMIN000036544 Funding: Okinawa Prefecture DOI: NR General notes: NR

JPRN-UMIN000039773 2020

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools Country: Malaysia Country income: upper-middle income Age (years): 7-12
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: community-based program educating nutrition and football technique
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2020
Contact information	Yit Siew Chin (chinys@upm.edu.my)
Notes	Trial registration: JPRN-UMIN000039773 2020 Funding: West Valley-Mission (WVM) Foundation DOI: NR General notes: NR

Lane 2018

Study name	Wellness Champions for Change
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 30 low- or middle-income schools (15 elementary and 15 middle) in five Maryland school districts Country: USA Country income: high income Age (years): 8-11 (3rd or 6th grade)
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: multi-arm study: Wellness Champions for Change (WCC), a training and technical assistance curriculum to support teacher wellness teams and (2) Wellness Champions for Change-Student (WCC-S), a yearlong curriculum to support Student Leaders on wellness teams.
Outcomes	Measured (or planned) outcome(s): zBMI; BMI percentile
Starting date	Fall 2016 (recruitement start date of Cohort 1)
Contact information	Hannah G. Lane (hlane@som.umaryland.edu)
Notes	Trial registration: NR Funding: "This study is funded primarily by a United States Department of Agriculture AFRI Childhood Obesity grant (ID: 2016-68001-24927), with additional funding from a National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health post-doctoral training grant (ID: F32DK115146), and Seed grant research funding from the Program in Health Disparities and Population Health, University of Maryland School of Medicine Department of Epidemiology and Public Health and from the Mid-Atlantic Nutrition Obesity Research Center (NIH NIDDK ID: 30DK072488)." DOI: NR General notes: economic evaluation reported in Lane 2022

Laroche 2020

Study name	NR
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: parent/child dyads in Iowa Country: USA

	Country income: high income Age (years): 6-12 (mean 8.6)
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: "Participants in the education only group receive educational materials on healthy family diet and activity and quarterly newsletters. In addition, they receive basic resource screenings at baseline and 6 months, follow-up phone calls, and referrals to appropriate basic-needs resources. Those in the health coach group receive guidance from a health coach, with up to 5 in-person visits and 4 phone visits within a 12-month period. Motivational interviewing is used during these sessions to help families set goals based on their health needs and priorities. Health coach group participants receive the same basic resource screening and newsletters as the education only group, as well as additional resources based on their goals chosen with the health coach."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	NR
Contact information	Linda Snetselaar
Notes	Trial registration: NCT02425046 Funding: "This work is supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health [R01HL119882]. Office space and the Research Electric Data Capture (REDCap) data management tool utilized by the Living Well Together team was provided by the Institute for Clinical and Translational Science at the University of Iowa. The ICTS at the University of Iowa is supported through the NIH CTSA program grant [UL1TR002537]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funding agencies were not involved in the study design, collection, analysis and interpretation of data, or in writing the manuscript. Community team staff space is supported by Primary Health Care and the Evelyn K. Davis Center for Working Families." DOI: NR General notes: the study targeted low-income families where one parent has a BMI ≥ 30 and a child aged 6-12 years

Leung 2018

Study name	INC (Interactive Nutrition Comics)
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: parent/child dyad in the New York area Country: USA Country income: high income Age (years): 9-12
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: head to head comparison using a Web-Based Interactive Comic Tool. "In the intervention group the child received a Web-based comic with health messages primarily promoting either fruit/vegetable (F/V) or water consumption or the comparison group, in which the child received Web-based newsletters with health information similarly promoting primarily F/V or water consumption. Parents of both groups received Web-based health newsletters; however, parents in the experimental group were also given access to the child comic."
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	August 2017 (recruitment start date)
Contact information	May May Leung (maymay.leung@hunter.cuny.edu)
Notes	Trial registration: NCT03165474 Funding: "This project was supported by grant number R21H5024117 from the Agency for Healthcare Research and Quality (AHRQ)." DOI: none declared General notes: NR

Magalhaes 2020

Study name	HEP-S (Healthy Eating Promotion through Self-regulation)
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: school Country: Portugal Country income: high income Age (years): 10-12 (children from the 5th and 6th grades)
Interventions	Intervention type: dietary Intervention setting: school Brief description: online preventive intervention program. This program is designed to promote and develop a set of transversal skills and strategies, related to self-regulation, on the healthy eating domain among school-aged children
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	January 2020 (planned start of recruitment)
Contact information	Paula Magalhães (pcsmagalhaes@gmail.com)
Notes	Trial registration: NCT04099498 Funding: "This study was conducted at the Psychology Research Centre (PSI/01662), School of Psychology, University of Minho, sponsored by University of Minho, and supported by the Portuguese Foundation for Science and

	Technology and the Portuguese Ministry of Science, Technology and Higher Education (UID/PSI/01662/2019), through the national funds (PIDDAC). Additionally, this study was supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education through national funds (PTDC/PSI-GER/28302/2017), and co-financed by FEDER through COMPETE2020 under the PT2020 Partnership Agreement (POCI-01-0145-FEDER-028302). This study was also supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education, through the national funds, within the scope of the Transitory Disposition of the Decree No. 57/2016, of 29th of August, amended by Law No. 57/2017 of 19 July. Lastly, BP and GF were supported by research scholarships and CS was supported by a Post-Doctoral research grant the three awarded by the project “In-person and Online Healthy Eating Promotion through Self-regulation: Assessing the Efficacy of a Narrative-based Intervention” (POCI-01-0145-FEDE R-028302)." DOI: "All authors declare that they have no competing interests." General notes: NR

Marcos-Pasero 2022

Study name	GENYAL
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: six schools in Madrid Country: Spain Country income: high income Age (years): 6-8
Interventions	Intervention type: dietary Intervention setting: school Brief description: "For the implementation of the nutritional education programme in the “intervention schools”, three different kinds of guides were designed aimed at parents, children and teachers. All this information was developed and adapted to the participants’ age by the nutritionists from the IMDEA Food Foundation. This material is sent to parents and educational centers in different modules adapted to parents, students, and teachers. The same modules include different activities and topics each year according to the children’s growth."
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	2017 (baseline data collection)
Contact information	Viviana Loria-Kohen (vloria@ucm.es)
Notes	Trial registration: NCT03419520 Funding: "This study was supported by Conserjería de Educación, Universidades y Ciencia de la Comunidad de Madrid, Dirección General de Educación Infantil, Primaria y Secundaria." DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: "The GENYAL study (is) aiming to design and validate a predictive model, considering both environmental and genetic factors, that identifies children who would benefit most from actions aimed at reducing the risk of obesity and its complications."

Marrero 2021

Study name	EPIC El Rio Families
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households served by El Rio Community Health Center (hereafter, El Rio), a Federally Qualified Health Center in the Southwestern United States Country: USA Country income: high income Age (years): 8-12
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: 13-week face-to-face group program adaptation of the DPP (Diabetes Prevention Programme) for delivery to at-risk mothers and children
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	July 2019
Contact information	Melanie D. Hingle (hinglem@email.arizona.edu)
Notes	Trial registration: NCT03781102 Funding: "Research reported in this publication was supported by the National Institute Of Diabetes And Digestive And Kidney Diseases of the National Institutes of Health under Award Number R34DK118486." DOI: "The authors (DGM, KP, KJ, DJR, RMB, MDH) declare that they have no competing interests." General notes: inclusion criteria: mothers with a history of gestational diabetes and their children

McWhannell 2018

Study name	A-CLASS (Active City of Liverpool Active Schools and SportsLinx
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual

Participants	Setting: eight schools in Liverpool Country: UK Country income: high income Age (years): 9-10
Interventions	Intervention type: activity Intervention setting: school Brief description: the “Switch-Play” project was used to guide the design of the PA signposting scheme (PASS). The high intensity group followed a programme where the instructor focus was on maintaining a high heart rate during multi-games activity, whereas the instructors of the fundamental movement skill (FMS) group led similar multi-games activities but focused their instruction on skill development as opposed to high levels of movement.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2016
Contact information	Nicola McWhannell (n.mcwhannell@chester.ac.uk)
Notes	Trial registration: NCT02963805 Funding: "This work was supported by the Neighborhood Renewal Fund and Liverpool City Council." DOI: The authors declare no conflict of interest General notes: "Self-reported stature and body mass were used in order to calculate BMI (kg/m^2). BMI was used as guide to target the children who were overweight or at risk of being overweight according to UK age- and sex-specific cut-off thresholds. Generally, 20–25 children with the highest BMI within each school."

Mehdizadeh 2018

Study name	IHS Iran Healthy Start Study/Aghazi Salem, Koodake Irani
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: preschools in Mashhad Country: Iran Country income: lower-middle income Age (years): 4-6
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the customized Iranian version of Canadian Healthy Start/Départ Santé health promotion program. The components of intervention include customized Decoda Web-based resources for children, an implementation guide for educators and managers, training and monitoring, communication and knowledge exchange, building partnership, and parent engagement
Outcomes	Measured (or planned) outcome(s): zBMI; BMI; BMI precentile
Starting date	March 2018 (completion of the intervention)
Contact information	Hassan Vatanparast (vatan.h@usask)
Notes	Trial registration: IRCT2016041927475N1 Funding: "Authors appreciate the Chancellor for Research, MUMS, for their financial support" DOI: None declared General notes: Although the authors state that the background to the intervention is prevention of obesity, the conclusions talk about the general issue of the double burden of malnutrition

Metayer 2018

Study name	The Live Well Experience
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: household from the community in Somerville, MA Country: USA Country income: high income Age (years): 3-12
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: education curriculum on nutrition and physical activity and phone-based motivational interviews and a 1-year civic-engagement program. Community-based participatory research principles to develop and implement five culturally-adapted recruitment activities (posters and flyers, media announcements, church outreach, participant referrals, and community organization partnerships)
Outcomes	Measured (or planned) outcome(s): NR (see General notes)
Starting date	September 2009 (recruitment start date)
Contact information	Christina D. Economos (Christina.Economos@tufts.edu)
Notes	Trial registration: NR Funding: "Funding for this research was provided by Grant 5R01HD057841 from the National Institutes of Health, Bethesda MD and spanned from 9/30/2008 to 6/30/2012. Postdoctoral research funds for Alison Tovar were provided by a supplement from this grant. We would also like to acknowledge funds from the Boston Obesity Nutrition Research Center, DK46200." DOI: "All authors declare that they have no conflicts of interest, financial or otherwise." General notes: eligible participants were new immigrant mothers and children from Brazil, Latin America, and Haiti; unclear

	if BMI measures are planned outcomes (this paper was primarily reporting on the results of the recruitment methods and the challenges of the study).

Moreno 2021

Study name	Water First
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 26 public elementary schools staggered across different school districts in the San Francisco Bay Area of California Country: USA Country income: high income Age (years): 9-10 (4th grade students)
Interventions	Intervention type: dietary Intervention setting: school Brief description: school environment changes that increase the accessibility of safe and appealing drinking water to promote consumption
Outcomes	Measured (or planned) outcome(s): zBMI; BMI precentile
Starting date	Fall 2016
Contact information	Anisha Patel (anipatel@stanford.edu)
Notes	Trial registration: NCT03181971 Funding: "The National Heart, Lung, and Blood Institute of the National Institutes of Health under award number R01HL129288 supported this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. We would like to thank the Water First Community Advisory Board for their input on the study, research associates that have assisted with intervention implementation and evaluation, and the schools, students, and families that participated in this study." DOI: NR General notes: NR

Moreno 2022

Study name	i Heart Rhythm Project
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in the greater Houston area Country: USA Country income: high income Age (years): 5-8
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: "Behavioral mobile health intervention, targeting parents of 5-8 year olds, designed to promote consistent behavioral rhythms in children through consistent bedtimes, light exposure, meal timing, and physical activity."
Outcomes	Measured (or planned) outcome(s): BMI; zBMI
Starting date	March 2021
Contact information	Hafza Dadabhoy
Notes	Trial registration: NR Funding: This study was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) of the National Institutes of Health under award number R00HD091396. DOI: NR General notes: eligible participants were enrolled in kindergarten and had BMI >50th percentile

NCT00005750 2000

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 14 ethnically diverse elementary schools Country: USA Country income: high income Age (years): 8-12
Interventions	Intervention type: dietary and activity Intervention setting: school + home Brief description: the intervention included activities in the school, and the home, and a clinically oriented component for high-risk children. The school component included: a computer-based classroom curriculum; a physical education curriculum; and a school lunch intervention. The home component included correspondence materials and a videotape for parents. Children identified as "high risk" were eligible to enroll in an intensive intervention. In addition, several innovative approaches were included: interventions to influence food preferences and television viewing, interventions promoting health advocacy, and computer-assisted instruction."
Outcomes	Measured (or planned) outcome(s): anthropometric measures
Starting date	April 1996

Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00005750 Funding: National Institute of Health DOI: NR General notes: NR

NCT00185770 2005

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 12 ethnically- and socioeconomically-diverse elementary schools Country: USA Country income: high income Age (years): 8-9 (3rd grade students)
Interventions	Intervention type: activity Intervention setting: school Brief description: intervention to reduce television, videotape and video game use
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	April 1999
Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00185770 Funding: National Institute of Health DOI: NR General notes: NR

NCT00185978 2005

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: elementary schools in California Country: USA Country income: high income Age (years): 8-9 (3rd grade students)
Interventions	Intervention type: dietary and activity Intervention setting: school + home Brief description: integrated, multiple-component, school and family-based, primary and secondary prevention program targeting third, fourth and fifth graders.
Outcomes	Measured (or planned) outcome(s): BMI; prevalence/incidence of obesity
Starting date	April 1998
Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00185978 Funding: National Institute of Health DOI: NR General notes: NR

NCT00476775 2007

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: six public elementary schools serving low-income Latino communities in northern California Country: USA Country income: high income Age (years): 7-9
Interventions	Intervention type: activity Intervention setting: school (ASP) Brief description: after school ethnic dance program plus a culturally-tailored, home-based screen time reduction intervention to reduce weight gain (body mass index) among lower socioeconomic status, pre-adolescent Latina girls. The control group will receive an "active-placebo" information-based health education intervention
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	May 2007
Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00476775 Funding: National Institute of Health

	DOI: NR General notes: NR

NCT00747513 2008

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 22 kindergartens and elementary schools Country: Israel Country income: high income Age (years): 5-13
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: teachers and students will be provided with materials in order to perform activities on healthy food and drink choices and habits during the school day. Schools will offer increased physical activity opportunities to children, as will afternoon community centers. Children will be given personal exercise items. Parents will be offered lectures on topics of diet and activity. Diet and activity habits will be assessed by a questionnaire, and height, weight and body fat percentage will be measured before and after the program.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2009
Contact information	Liat Lerner-geva
Notes	Trial registration: NCT00747513 Funding: NR DOI: NR General notes: NR

NCT00787709 2008

Study name	Pathways obesity prevention program
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 24 elementary schools from two of the largest districts in Orange County, CA Country: USA Country income: high income Age (years): 9-10 (4th grade students)
Interventions	Intervention type: unclear (see intervention brief description) Intervention setting: school Brief description: revised version of two nationally recognized programs for drug prevention for use with children in grades 4-6 with the express purpose of obesity prevention. The current study will attempt to promote emotion regulation, neuro-cognitive function, and social competence in order to prevent obesity.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	May 2007
Contact information	Mary Ann Pentz
Notes	Trial registration: NCT00787709 Funding: National Institute of Health DOI: NR General notes: NR

NCT00797615 2008

Study name	GEMAS
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: girl-parent dyads in Nashville, TN Country: USA Country income: high income Age (years): 8-10
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: 12-week family-based weight gain intervention program focused on dietary intake and physical activity for 8-10 year old Hispanic girls and their parents (girl-parent dyads)
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	November 2008
Contact information	Bettina M. Beech
Notes	Trial registration: NCT00797615 Funding: NR DOI: NR

	General notes: the parent or guardian must identify that the girl be at or above the 25th percentile of age- and sex-specific BMI based on the 2000 CDC growth charts or one parent/caregiver must have BMI>25 kg/m^2

NCT00944164 2009

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: primary care setting in Minneapolis and Seattle Country: USA Country income: high income Age (years): 5-9
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: parent counseling and coaching regarding healthy eating and physical activity habits for their child
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2016
Contact information	Rona Levy
Notes	Trial registration: NCT00944164 Funding: NR DOI: NR General notes: eligble participants were children with BMI ≥ 70th BMI percentile for age and sex according to CDC Growth Tables scheduled for an upcoming well child visit

NCT01373307 2011

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: church Unit of analysis: individual
Participants	Setting: churches in six Appalachian counties Country: USA Country income: high income Age (years): 9 and older
Interventions	Intervention type: dietary and activity Intervention setting: community (church) Brief description: faith-placed lay health advisor intervention aimed at increasing fruit and vegetable intake and physical activity among intergenerational Appalachian individuals and families. Based on We Can! and Media Smart Youth curricula
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2010 (date of first enrolment)
Contact information	Nancy Schoenberg
Notes	Trial registration: NCT01373307 Funding: National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) DOI: NR General notes: NR

NCT01513343 2012

Study name	SEEDs
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Houston, TX and Pasco, WA Country: USA Country income: high income Age (years): 3-6
Interventions	Intervention type: dietary Intervention setting: home Brief description: parent and child groups focused on self-regulation of eating
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	August 2014 (date of first enrolment)
Contact information	Sheryl O Hughes
Notes	Trial registration: NCT01513343 Funding: NR DOI: NR General notes: eligible participants were parents whose children attend Head Start with the sample of children equally split on gender and ethnicity

NCT01626807 2012

Study name	WSB (Walking School Bus) program
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 22 elementary schools Country: USA Country income: high income Age (years): 7-14
Interventions	Intervention type: activity Intervention setting: school Brief description: children will have the option of walking to and/or from school with study staff who are trained in Safe Routes to School methods
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	December 2012
Contact information	Jason A Mendoza
Notes	Trial registration: NCT01626807 Funding: NR DOI: NR General notes: NR

NCT02104973 2014

Study name	CRECES
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in Mexico City Country: Mexico Country income: upper-middle income Age (years): 8-12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the intervention is designed to promote the increase the intake of fruits and vegetables and to reduce the high density foods consumption. The advice is aimed at training users on healthy diet and constant physical activity. Workshops with children, in which selected topics will be discussed based on the analysis of depth interviews with children, parents and teachers, and information on habits and resources gathered through questionnaires will be conducted. The intervention included the provision of information and feedback with the population through a website. The work will include participation in the selection of foods sold in schools
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2012
Contact information	Marco A González
Notes	Trial registration: NCT02104973 Funding: Coordinación de Investigación en Salud, Mexico DOI: NR General notes: NR

NCT02161809 2014

Study name	Turn up the HEAT (Healthy Eating and Activity Time)
Methods	Study design: cluster RCT Unit of allocation: sumer camp Unit of analysis: individual
Participants	Setting: summer Day camps Country: USA Country income: high income Age (years): 6-14
Interventions	Intervention type: dietary; activity (multi-arm study) Intervention setting: community (summer camp) Brief description: the Healthy Eating and Physical Activity (HEPA) intervention aims to increase the quality of foods and beverages and physical activity opportunities in summer day camps. Physical Activity Intervention: "This arm (10 summer day camps) will receive the Physical Activity intervention the first year and both healthy eating and physical activity the second and thrid years." Healthy EAting Intervention: " This arm (10 summer day camps) will receive the Healthy Eating intervention the first year and both healthy eating and physical activity the second and thrid years."
Outcomes	Measured (or planned) outcome(s): BMI; cost effectiveness
Starting date	January 2015
Contact information	Michael W Beets
Notes	Trial registration: NCT02161809 Funding: NR DOI: NR

	General notes: summer camps were eligible if they operated for at least 10 weeks during the summer, did not have any primary focus such as sports, art, or tutoring (must be a general camp, enrollment was at least 40 campers, operation hours were at least 8 hours

NCT02197390 2014

Study name	Our Choice
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in three designated cities Country: USA Country income: high income Age (years): 2-11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: the Health Care intervention involves the implementation of an obesity care model within a Federally Qualified Health Center (FQHC) and includes a Family Wellness Program delivered by Community Health Workers (CHWs). The Public Health intervention involves working with early care and education centers, schools, community recreation organizations, and restaurants to promote four health behaviors: fruit and vegetable consumption, physical activity, water consumption, and quality sleep.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	May 2012
Contact information	Guadalupe X. Ayala
Notes	Trial registration: NCT02197390 Funding: National Institutes of Health DOI: NR General notes: study partners included a federally qualified health center (including three clinics), 26 early care and education centers, two elementary school districts (and 20 elementary schools), three community recreation centers, and three restaurants

NCT02425046 2014

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Iowa Country: USA Country income: high income Age (years): 6-12
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: health coaching using motivational interviewing focus on family diet and exercise change and connection with community resources specific to goals set. Screening for community resources that families may be eligible for to receive help with basic needs including shelter, food, health insurance etc
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	March 2015
Contact information	Helena Laroche
Notes	Trial registration: NCT02425046 Funding: NR DOI: NR General notes: eligible participants were children in low-income families that lived with at least one parent with a BMI of 30 or above for at least 80% of the time

NCT02721602 2016

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Health Service's clinics in the Fairview North metropolitan area Country: USA Country income: high income Age (years): 7-12
Interventions	Intervention type: dietary Intervention setting: community (primary care) Brief description: family-based, in-person program that focuses on nutrition education, the development of meal planning and cooking skills and promotion of healthful eating for families; the program will augment usual care and diabetes education received from Fairview Health Services for the parent with diabetes (control)
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February 2016

Contact information	NR
Notes	Trial registration: NCT02721602 Funding: NR DOI: NR General notes: eligible participants were parents with Type 2 diabetes that had completed at least some Diabetes Education through Fairview Health System

NCT03186508 2018

Study name	Optimize Sleep (OS)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Philadelphia Country: USA Country income: high income Age (years): 6-11
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: "Optimize Sleep-Plus (OS-Plus) will focus on enhancing sleep and targeted eating (decreasing sugar-sweetened beverages and sweet and salty snack foods) and activity (increasing physical activity and decreasing TV viewing) behaviors. Specific strategies to be used include: goal setting and self-monitoring, positive bedtime routines, stimulus control/sleep hygiene strategies, problem-solving regarding challenges, and review of effective strategies for relapse prevention."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	March 2018
Contact information	Chantelle N Hart
Notes	Trial registration: NCT03186508 Funding: National Institutes of Health (NIH) DOI: NR General notes: eligible participants were children with less than 9.5 hours time-in-bed for sleep most days/week

NCT03524183 2018

Study name	Virtual Fitness Buddy Ecosystem
Methods	Study design: cluster RCT Unit of allocation: YMCA Unit of analysis: individual
Participants	Setting: YMCA of Metropolitan Atlanta Country: USA Country income: high income Age (years): 6-10
Interventions	Intervention type: activity Intervention setting: community (YMCA) Brief description: virtual pet that function as a personalized fitness buddy to encourage children to set and meet physical activity goals, promote physical activity self-efficacy, and foster mutually supportive relationships among children, parents, and the virtual pet. Concurrently, the kiosk sends a text message to parents on the child's physical activity progress. Parents are then able to send words of encouragement and communicate with their children via the kiosk, using the text messaging feature of their mobile phones. Parents will also receive text messages from the kiosk with a security code to access a website that provides detailed records of the child's physical activity over time.
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	August 2018
Contact information	Sun Joo (Grace) Ahn
Notes	Trial registration: NCT03524183 Funding: NR DOI: NR General notes: NR

NCT03766191 2018

Study name	
Methods	Study design: RCT (cross-over) Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Dartmouth-Hitchcock Medical Center Country: USA Country income: high income Age (years): 8-12
Interventions	Intervention type: dietary Intervention setting: home Brief description: exposure to foods ads embedded in an age-appropriate TV program

Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2019
Contact information	Reina K Lansigan (reina.k.lansigan@dartmouth.edu)
Notes	Trial registration: NCT03766191 Funding: National Institutes of Health (NIH) DOI: NR General notes: NR

NCT03805295 2019

Study name	BOKS (Build Our Kids' Success)
Methods	Study design: RCT (cross-over) Unit of allocation: individual Unit of analysis: individual
Participants	Setting: three schools (K-8) in Revere, MA Country: USA Country income: high income Age (years): 5-14
Interventions	Intervention type: activity Intervention setting: school Brief description: 12-week physical activity program, occurring 3 times/week, lasting 30-60 minutes per session
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	February 2018
Contact information	Elsie Taveras
Notes	Trial registration: NCT03805295 Funding: American Council on Exercise DOI: NR General notes: eligible participants are children enrolled in the BOKS program. Students in the intervention arm will participate in the BOKS program in Winter-Spring 2018. They will serve as the control group in Fall 2018

NCT03817021 2019

Study name	ONE PATH
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Head Start centers Country: USA Country income: high income Age (years): 2-6
Interventions	Intervention type: dietary Intervention setting: community Brief description: addition of responsive feeding (RF) and appetite regulation components to an existing evidence-based intervention, the Nutrition and Physical Activity Self-Assessment of Child Care (NAP SACC) program. The 3 candidate intervention components include 1) RF interactive web-based training curriculum and coaching for Early Childhood Education ("ECE provider intervention"), 2) classroom curriculum that teaches regulation strategies to preschool children ("child intervention"), and 3) responsive parenting (RP) curriculum and interactive activities for parents that provide opportunities to practice RF at home ("parent intervention").
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	July 2022
Contact information	Jennifer S Williams (jfs195@psu.edu)
Notes	Trial registration: NCT03817021 Funding: National Institutes of Health (NIH) DOI: NR General notes: eligible children must be enrolled in a participating Head Start center

NCT03980262 2019

Study name	EHF (Empowering Healthy Families)
Methods	Study design: cluster RCT Unit of allocation: church Unit of analysis: individual
Participants	Setting: 24 churches Country: USA Country income: high income Age (years): 6-10
Interventions	Intervention type: dietary and activity Intervention setting: community (church) Brief description: "HCHF+ integrates healthful eating and physical activity with parenting education (parent role modeling and child feeding practices) and was recently shown to improve parent and child nutrition behaviors for participants in the Expanded Food and Nutrition Education (EFNEP) program. OrganWise Guys (OWG) will be used for children in first and

	second grades (ages 6-8). Choose Health: Food, Fun and Fitness (CHFF), developed by Cornell University, will be used for children in grades three through five (ages 8-10). HCHF+ includes 9 sessions to be delivered weekly."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February 2019
Contact information	Kathryn W Hosig (khosig@vt.edu)
Notes	Trial registration: NCT03980262 Funding: NR DOI: NR General notes: NR

NCT03996109 2019

Study name	LiGHT (Living Green and Healthy for Teens)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: community in Hamilton, Ontario Country: Canada Country income: high income Age (years): 10-16
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: Canadian smartphone app-based program that combines health promotion (healthy eating, active living, screen time and sleep) with additional novel motivators such as environmental stewardship (e.g. reduce prepackaged foods, walk rather than drive) and cost-savings (e.g., eat at home rather than restaurants), that may further increase the likelihood of behaviour change. Aim2Be smartphone app system and BnLt smartphone app (comparison). Aim2Be smartphone app system: "Youth-parent dyads will receive the LiGHT program (addressing healthy eating, physical activity, screen time and sleep) via the Aim2Be smartphone app for 1 year. It provides personalization beginning with creation of an avatar and identifying user motivations, offers progressive goal-setting considering readiness, sub-tasks, milestones, self-monitoring tools with feedback and positive reinforcement. It applies behaviour change techniques, provides a knowledge centre, simulation narratives to enable decision making, and separate social exchange platforms for parents and youth to share ideas and challenges with peers. A Virtual Coach has been programmed using motivational interviewing theory. Gamification includes elements of choice, challenge, uncertainty, discovery, and kudos for achieving outcomes in the process of developing motivations, skills and mastery." Behavioral: BnLt smartphone app: "Youth-parent dyads will receive a simple app called BnLt for 1 year. It provides web-links to external websites that provide information and tips on healthy eating and activity, including the Canada Food Guide, Canadian Society of Exercise Physiology recommendations for physical activity, screen time and sleep for youth, and other resources."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	December 2021
Contact information	LiGHT Trial study coordinator (light@phri.ca)
Notes	Trial registration: NCT03996109 Funding: NR DOI: NR General notes: eligible participants are youth living in a home setting with at least one smartphone or tablet and internet access in the household, one parent or guardian (the "primary parent") who is able to attend all study visits and youth or parent identifying a need or potential to improve health behaviours

NCT04072549 2018

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools Country: USA Country income: high income Age (years): 6-10
Interventions	Intervention type: dietary and activity Intervention setting: school (summer camp) Brief description: free summer programming: "The summer day camps are not singularly focused, such as sport camps or academic only camps. Rather, the camps provide indoor and outdoor opportunities for children to be physically active each day, provide enrichment and academic programming, as well as provide breakfast, lunch, and snacks. To standardize programming, the schools operate their camps on the same daily schedules which are developed by the same district-level personnel, with identical programmatic content delivered across all schools. The schools also provide the same meals to all children enrolled. The meals adhere to the Summer Food Service Program nutrition guidelines and are reimbursed through existing federal food programs."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	August 2019
Contact information	Michael Beets (beets@mailbox.sc.edu)
Notes	Trial registration: NCT04072549 Funding: NR

	DOI: NR General notes: NR

NCT04608188 2020

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in South Carolina Country: USA Country income: high income Age (years): 5-12
Interventions	Intervention type: dietary and activity Intervention setting: school (summer camp) Brief description: "Children in the intervention will attend a summer day camp operated at their school. The intervention camps will operate according to routine practice, with no assistance from the investigative team. The camps provide indoor and outdoor opportunities for children to be physically active each day, provide enrichment and academic programming, as well as provide breakfast, lunch, and snacks. All camp meals will adhere to the United States Department of Agriculture Summer Food Service Program nutrition guidelines. The control children will not receive an intervention of any kind and will be asked to go about their summer as they typically would."
Outcomes	Measured (or planned) outcome(s): BMI; zBMI
Starting date	November 2020
Contact information	Glenn Weaver
Notes	Trial registration: NCT04608188 Funding: NR DOI: NR General notes: NR

NCT04644224 2020

Study name	RE-AIM framework
Methods	Study design: cluster RCT Unit of allocation: household Unit of analysis: individual
Participants	Setting: households recruited from allocated churches Country: USA Country income: high income Age (years): 10-16
Interventions	Intervention type: unclear (see intervention brief description) Intervention setting: community (church) Brief description: parents/caregivers (group 1) or families (group 2) attend monthly health coaching sessions over 1 hour each for 12 months, 9 resource navigation sessions over 12 months, and monthly support groups for 12 months. Control group families receive an educational handbook on cancer prevention.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	January 2019
Contact information	Lorna McNeill (lmcneill@mdanderson.org)
Notes	Trial registration: NCT04644224 Funding: NR DOI: NR General notes: eligible participanats are dyad parent/caregiver and child aged between 10-16 years. Parents/caregivers self-identify as black or African American and are living with obesity (BMI greater than or equal to 30)

NCT04772859 2021

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: a public elementary school in Hermosillo, Sonora Country: Mexico Country income: upper-middle income Age (years): 9-12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: online Lifestyle Intervention: "Nutrition education: presentations based on the Planet Nutrition program, a dedicated website, and the Zoom application, will be used to deliver the intervention. The website will be used to upload the nutrition materials and the recorded sessions. Participants will work on self-monitoring of different health behaviors. Physical activity: The classes will be delivered by the Physical Activity team through the Zoom application. A website will be used to upload the recorded sessions. Parents participation. The same website and a private Facebook group will be used to upload nutrition information once a week."

Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February 2019
Contact information	Rolando Giovanni Díaz Zavala (giovanni.diaz@unison.mx)
Notes	Trial registration: NCT04772859 Funding: NR DOI: NR General notes: NR

NCT04886817 2021

Study name	SCOPE-IT
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Wake Forest Country: USA Country income: high income Age (years): 1-8
Interventions	Intervention type: dietary Intervention setting: home Brief description: intervention based on the use of 4 components: an educational video, provision of a water-promotion "toolkit," a mobile phone application (app), and a series of 14 computerized interactive voice response (IVR) phone calls to parents to compare families' SSB's consumption behaviors
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	June 2021
Contact information	Kristina H Lewis
Notes	Trial registration: NCT04886817 Funding: NR DOI: NR General notes: eligible participants are children who receives health care attention at Wake Forest pediatric or family medicine practices and consumes 2 or more SSB and/or fruit juice total per day

NCT04905966 2021

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: public or private schools of the 22 districts of Caaguazú Department Country: Paraguay Country income: upper-middle income Age (years): NR (children)
Interventions	Intervention type: activity; dietary and activity (multi-arm study) Intervention setting: school Brief description: nutrition education sessions and physical activity classes: "An additional 45 minute weekly physical education class and 5 weekly active break sessions of 10 minutes each will be added to the provisions of the children's curriculum. In addition, schools will receive high intensity nutrition education, that is, 3 weekly nutrition education classes of one hour in each session over a period of 6 months. Schools receiving a lower intensity nutrition education served as control. This group received 3 sessions of 1 hour with a total of 3 educational sessions over the 6 month period. The educational material was the same as the intervention group but the development of lessons was not as specific and deep as the intervention group."
Outcomes	Measured (or planned) outcome(s): zBMI; proportion of children classified as undernourished, normal, overweight and with obesity (according to WHO standards)
Starting date	June 2018
Contact information	Patricia Rios
Notes	Trial registration: NCT04905966 Funding: NR DOI: NR General notes: NR

NCT04915092 2021

Study name	CoSIE (Co-creation of Service Innovation - Evaluation)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: clinics in Reggio Emilia Country: Italy Country income: high income Age (years): 3-11
Interventions	

	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: CoSIE app: "The app is a mobile phone application compatible with both iOS and Android operating system. Parents are able to register their children and to keep track of their weight status and activities. The app include five themes: child development, physical activity, healthy food, critical situations, BMI. Push notification on healthy behaviours, on important event taking place in the province of Reggio Emilia, on food advices based on seasonality and on party tips are constantly delivered by the app."
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	June 2021
Contact information	Laura Bonvicini (laura.bonvicini@ausl.re.it)
Notes	Trial registration: NCT04915092 Funding: NR DOI: NR General notes: eligible participants are parents of children aged 3 to 11 presneting for a new well child visit or for a sport medicin visit or presenting for a childhood obesity visit at the AUSL (Azienda Unita' Sanitaria Locale) Reggio Emilia clinics, including family pediatricians clinics.

NCT04971044 2021

Study name	COACH (Competency Based Approaches for Community Health) 2
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: hoseholds in Nashville Country: USA Country income: high income Age (years): 4-7
Interventions	Intervention type: dietary and activity Intervention setting: home + community Brief description: "COACH is a multi-level intervention, consisting of 1) developmentally appropriate health curriculum for 4-6 year old children; 2) family-based content that both targets parent weight loss and leverages a shared parent-child experience to improve family health behaviors; 3) community-level intervention to improve access and quality of family-based programming at local Parks and Rec centers." "Using novel multi-component assessments throughout the study, the intervention identifies individual, family, and community barriers to healthy behaviors and delivers structured yet personalized intervention content in 7 domains: fruits/vegetables, snacks, sugary drinks, physical activity, sleep, media use, and parenting."
Outcomes	Measured (or planned) outcome(s): BMI; zBMI; BMI percentile
Starting date	November 2021
Contact information	William J Heerman (Bill.Heerman@vumc.org)
Notes	Trial registration: NCT04971044 Funding: National Institutes of Health DOI: NR General notes: eligible particpants were children from parent/legal guardian with a body mass index of =25kg/m^2 and <40 kg/m^2, establishing risk for obesity without existing severe obesity

NCT05112185 2021

Study name	Healthy Drinks, Healthy Futures
Methods	Study design: cluster RCT Unit of allocation: childcare Unit of analysis: individual
Participants	Setting: 14 childcare centers in California Country: USA Country income: high income Age (years): preschool-age children
Interventions	Intervention type: dietary Intervention setting: community (childcare center) Brief description: "The Healthy Drinks, Healthy Futures intervention consists of increased access to healthy beverages in childcare centers and education directed to children and their families to increase the intake of healthy beverages, including motivational beverage counseling for families and lessons for children in childcare centers. Intervention group will receive BPA-free self-serve pitchers and cups for serving water at mealtimes, individualized education to help families set healthy drinks goals for their family, and a curricula focused on increasing intake of water and healthy beverages."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	October 2022
Contact information	Anisha Patel (anipatel@stanford.edu)
Notes	Trial registration: NCT05112185 Funding: National Institutes of Health DOI: NR General notes: NR

NCT05334420 2022

Study name	HDHK (Healthy Dads, Healthy Kids)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in the Greater Houston Area Country: USA Country income: high income Age (years): 5-11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: "Group based lifestyle behavioral intervention for weight loss for fathers and increased physical activity for their child. The program meets weekly 90-minute sessions over 10 weeks. Each week covers different topics for fathers and a corresponding session for kids. The program encourages fathers to be healthy, positive role models for their children, and teaching fathers weight loss strategies, authoritative parenting strategies and to encourage healthy behaviors in their kids. Fathers and kids are encouraged to eat healthy, reduce their screen time and be more active."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	April 2022
Contact information	Teresia O'Connor (teresiao@bcm.edu)
Notes	Trial registration: NCT05334420 Funding: National Institutes of Health DOI: NR General notes: eligibl e participants were fathers with BMI ≥ 25 - 40

NCT05350267 2022

Study name	HALO-2 (Health and Lifestyle Behaviors in Offspring)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Cincinnati Country: USA Country income: high income Age (years): 6-12
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: "HALO focuses on providing each mother with education and parenting strategies to improve her child's healthy lifestyle behaviors, such as her child's eating and physical activity, while she is engaged in her own lifestyle behavior change after bariatric surgery."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	March 2022
Contact information	Margaret H Zeller (meg.zeller@cchmc.org)
Notes	Trial registration: NCT05350267 Funding: NR DOI: NR General notes: the intervention is designed for mothers who recently had bariatric surgery who have a school-aged child with a BMI > the 70th and <120% of the 95th percentile

NCT05395364 2022

Study name	BeE-school (Be Empowered in school)
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: six TEIP schools Country: Portugal Country income: high income Age (years): 6-12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: "intervention program based on the promotion of health literacy and lifestyles, specifically on children's: 1-health literacy and infodemic resilience; 2- lifestyles (e.g. dietary intake, 24h-movement behaviour); 3-overweight and obesity; 4-blood pressure."
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2022
Contact information	Rafaela D Rosário

Notes	Trial registration: NCT05395364 Funding: NR DOI: NR General notes: TEIP: Territórios Educativos de Intervenção Prioritária (Programme for Priority Intervention Educational Areas)

NCT05424107 2022

Study name	INTKIDMEDPRED
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Cordoba Country: Spain Country income: high income Age (years): 6-18
Interventions	Intervention type: dietary Intervention setting: home Brief description: individualized and directed nutritional intervention with pre-and post-intervention evaluation of the adherence to the Mediterranean diet by a health care professional
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2018
Contact information	Francisco Javier Fonseca del Pozo
Notes	Trial registration: NCT05424107 Funding: NR DOI: NR General notes: eligible participants were pre-diabetic children (defined as presence of HbA1c levels between 5.7 and 6.4% in the blood tests)

NCT05461703 2022

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 15 public schools from Hermosillo, Sonora Country: Mexico Country income: upper-middle income Age (years): 9-11
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: group 1: Planet Nutrition Program (PNP) implemented by nutrition and physical activity advanced students (studying the last semesters of the degree or who have completed subjects but do not have the degree); group 2: PNP implemented by school teachers and 3)
Outcomes	Measured (or planned) outcome(s):
Starting date	December 2022
Contact information	Rolando Giovanni Díaz Zavala (giovanni.diaz@unison.mx)
Notes	Trial registration: NCT05461703 Funding: NR DOI: NR General notes: NR

NCT05482165 2022

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: six primary schools in Ningbo City, Zhejiang Province Country: China Country income: upper-middle income Age (years): 8-10
Interventions	Intervention type: unclear (see intervention brief description) Intervention setting: school Brief description: the students of this group will receive multi-faceted intervention activities toward weight management
Outcomes	Measured (or planned) outcome(s): BMI; zBMI
Starting date	September 2022
Contact information	Li Li 9 (lilyningbo@163.com)
Notes	Trial registration: NCT05482165 Funding: NR

	DOI: NR General notes: NR

Porter 2019

Study name	Growing Resilience
Methods	Study design: cluster RCT Unit of allocation: household Unit of analysis: individual
Participants	Setting: households in the Wind River Indian Reservation Country: USA Country income: high income Age (years): 5 and older
Interventions	Intervention type: dietary Intervention setting: home Brief description: 2 years of support designing, installing and maintaining a home food garden of at least 80 square feet (approximately 7 square meters). Families randomly assigned to intervention will receive a full gardening support package for 2 years
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	Februaru 2016
Contact information	Professor Ashley Adamson (ashley.adamson@ncl.ac.uk)
Notes	Trial registration: ISRCTN91136472 Funding: "The trial is funded by the National Prevention Research Initiative, website (http://www.npri.org.uk). The Funding Partners are: Alzheimer's Research Trust; Alzheimer's Society; Biotechnology and Biological Sciences Research Council; British Heart Foundation; Cancer Research UK; Chief Scientist Office, Scottish Government Health Directorate; Department of Health; Diabetes UK; Economic and Social Research Council; Health and Social Care Research and Development Division of the Public Health Agency (HSC R&D Division); Medical Research Council; The Stroke Association; Wellcome Trust; Welsh Assembly Government; and World Cancer Research Fund." DOI: The authors declare that they have no competing interests. General notes: NR

Ramírez-Rivera 2021

Study name	Evaluation of an Online Lifestyle Intervention in Mexican School Children During COVID-19 Pandemic
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: public elementary school in Hermosillo, Sonora Country: Mexico Country income: upper-middle income Age (years): 9-12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: online lifestyle intervention based on 'Planet Nutrition' programme, includes nutrition, physical activity, health, and behavior change strategies (31 x 1h sessions with nutrition education and PA, over 4 months) physical activity, health, and behavior change strategies
Outcomes	Measured (or planned) outcome(s): BMIz change; weight, height
Starting date	February 2021
Contact information	Rolando Giovanni Díaz Zavala (giovanni.diaz@unison.mx)
Notes	Trial registration: NCT04772859 Funding: NR DOI: NR General notes: eligible participants were 4th, 5th and 6th grade students of the participating public elementary school with access to internet and an electronic device

Rashid 2022

Study name	i-MaCHeL (Interactive Malaysian Childhood Healthy Lifestyle (i-MaCHeL) intervention programme)
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: preschools in the state of Terengganu, located on the East Coast of Peninsular Malaysia. There are eight districts of Terengganu, and this study will only include two districts: Kuala Terengganu and Kuala Nerus Country: Malasya Country income: upper-middle income Age (years): 5-6
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: a web-based, theory-driven, 3-month, health promotion intervention to change weight-related behaviour in preschool child-parent dyads. Intervention consists of i-MaCHeL classroom activities (13 modules), while the parents will access the i-MaCHeL Web-based educational programme and numerous parent-child home-based online activities. The

	children in the control group will continue with any existing health-related activities, while the parents will receive the link to the general health newsletters.
Outcomes	Measured (or planned) outcome(s): BMI-z, HRQOL
Starting date	March 2022
Contact information	Sharifah Wajihah Wafa (sharifahwajihah@unisza.edu.my)
Notes	Trial registration: NCT04711525 Funding: NR DOI: NR General notes: the parent/guardian of the preschool children are eligible for the study if they could read and understand either English or Malay; are aged between 25 to 49 years; have regular internet access via a tablet device, mobile phone, or computer/laptop; have regular access to a phone with texting capability; have WhatsApp accounts or agree to create the accounts and; are comfortable to read/view materials on electronic devices

RBR-9crqgt

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Ifal Murici and Satuba campus from Monsenhor Clóvis Duarte de Barros State School, União dos Palmares Country: Brazil Country income: upper-middle income Age (years): 10-19
Interventions	Intervention type: dietary Intervention setting: school Brief description: the intervention group will receive information on healthy eating through internet based techniques, eg. text messaging, quiz and virtual games. the control group will receive information on healthy eating through conventional nutrition education techniques, eg. Rack Cards
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	1 February 2017 (date of first enrolment)
Contact information	Nassib Bezerra Bueno (nassib.bueno@fanut.ufal.br)
Notes	Trial registration: RBR-9crqgt Funding: Instituto Federal de Alagoas; Universidade Federal de Alagoas DOI: NR General notes: NR

Sanchez-Lopez 2019

Study name	MOVI-da10!
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: eight schools (rural and urban areas) from Cuenca province, Spain Country: Spain Country income: high income Age (years): 4-6
Interventions	Intervention type: activity Intervention setting: school Brief description: three arms intervention: MOVI-da10-Enriched! intervention, MOVI-da10-Standard! intervention and the control group. MOVI-da10-Enriched! group performed enriched PA integrated into the academic curriculum including two active breaks lasting 10 min, 5 days/week. The children belonging to the MOVI-da10-Standard! group performed PA breaks (with low cognitive demand, where curricular contents were not reinforced) including two active breaks lasting 10 min, 5 days/week. In the control group, regular PA continued
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2017
Contact information	Abel Ruiz-Hermosa (Abel.RuizHermosa@uclm.es)
Notes	Trial registration: NR Funding: "This study was funded by the Ministry of Economy and Competitiveness-Carlos III Health Institute (FIS PI19/01919). ARH is supported by a grant from the the Regional government (3A2400/NL38532). ASC and ART are supported by a grant from the University of Castilla-La Mancha (Fi17/332 and 2018-CPUCLM-7813, respectively)." DOI: The authors declare that they have no competing interests. General notes: "The intervention period lasted one academic year (from October 2017 to May 2018), during which children in the two intervention groups received on average two breaks/day lasting 10 min in the classroom every school day. The breaks did not require specific material."

Swindle 2022

Study name	WISE (Together, We Inspire Smart Eating')
Methods	Study design: cluster RCT (adaptive) Unit of allocation: Early Care and Education site Unit of analysis: individual

Participants	Setting: Early Care and Education (ECE) sites in four regions: Central Arkansas (CA), Arkansas River Valley, North Central Louisiana (LA), and Southeast Louisiana Country: USA Country income: high income Age (years): 3 and older
Interventions	Intervention type: dietary Intervention setting: school Brief description: WISE is a curriculum that aims to increase children's intake of carotenoid-rich fruits and vegetables
Outcomes	Measured (or planned) outcome(s): BMI; cost effectiveness
Starting date	June 2022
Contact information	Taren M Swindle (tswindle@uams.edu)
Notes	Trial registration: NCT05050539 Funding: "National Cancer Institute of the National Institutes for Health (NIH) under Award Number NIH NCI R37CA25113. Drs. Curran and Swindle are supported by the Translational Research Institute (TRI), UL1TR003107, through the National Center for Advancing Translational Sciences of the NIH. Drs. Swindle and Rutledge are supported by NIH R03 DK117197 and the Lincoln Health Foundation. Dr. Swindle is supported by NIH R21CA237985 and NIH P20GM109096. The content is solely the responsibility of the authors and does not necessarily represent the official views of funding agencies." DOI: Dr. Leanne Whiteside-Mansell, Dr. Taren Swindle, and UAMS have a financial interest in the technology (WISE) discussed in this presentation/publication. These financial interests have been reviewed and approved in accordance with the UAMS conflict of interest. The content is solely the responsibility of the authors and does not necessarily represent the official views of funding agencies. General notes: "Sites will be from 4 geographic regions: Central AR, AR River Valley, North Central LA, and Southeast LA. A site is one Early Care and Education (ECE) location; a site may have multiple classrooms with up to 20 children per classroom. Sites will start the stydiy in 3 cohorts, 25–28 sites per year in 3 school years (across Y1-Y4). An enhanced non-responder trial design. All sites start with low intensity intervetion and those considered non-responders are randomized to intensive vs stay on low intensity."

Szeszulski 2020

Study name	Athletes for life
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: parent/child dyad from a community center in Phoenix, Arizona Country: USA Country income: high income Age (years): 6-11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: children will participate in 12 weeks of semiweekly sports skill programing and nutrition sessions. Concurrently, parents will participate in sports-focused activity and behavior change sessions that focus on nutrition, chronic disease prevention, and healthy eating.
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	July 2016
Contact information	Noe C Crespo (ncrespo@sdsu.edu)
Notes	Trial registration: NCT03761589 Funding: "This work was funded by American Heart Association Grant 14SDG20490382, awarded to Dr. Crespo. Preparation of this manuscript was funded in part by The National Cancer Institute/NIH Grant-National Cancer Institute/NIH Grant T32/CA057712, awarded to the University of Texas Health Science Center at Houston School of Public Health Cancer Education and Career Development Program. Partial funding was provided by the Michael & Susan Dell Center for Healthy Living for Jacob Szeszulski for his contribution. None of the funding agencies played any role in the design, data collection, analysis, interpretation, or reporting of data from this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute or the National Institutes of Health." DOI: The authors declare that they have no competing interests General notes: NR

Sánchez-Gómez 2012

Study name	Savinghearts project
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: public primary schools in the Madrid Region Country: Spain Country income: high income Age (years): 7-8
Interventions	Intervention type: dietary Intervention setting: school Brief description: "Intervention arm 1: Group 'MC' (music concert): children attend a music concert that delivers obesity-preventing/cardiovascular health messages; Intervention arm 2: Group 'HB' (healthy breakfast): the children will attend a participatory class providing the same information but involving the description and making of a healthy breakfast and then eating it in the session."
Outcomes	Measured (or planned) outcome(s): reduction in BMI percentile among children deemed overweight/obese prior to the interventions.

Starting date	January 2012
Contact information	Blanca Novella
Notes	Trial registration: NCT01418872 Funding: NR DOI: The authors declare they have no competing interests. General notes: NR

Takehara 2019

Study name	NR
Methods	Study design: cluster RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 10 public primary schools in Sukhbaatar District, Ulaanbaatar, Mongolia Country: Mongolia Country income: lower-middle income Age (years): 10-12
Interventions	Intervention type: activity Intervention setting: school Brief description: in the preparation phase the participants performed 20-minute exercise programs aimed at practicing the movements and synchronizing them with music. In the second phase, the participants performed 10-minute exercise programs consisting of a 3-minute main session and stretching
Outcomes	Measured (or planned) outcome(s): BMI; proportion of children with obesity and overweight;
Starting date	February 2018 (recruitment start date)
Contact information	Kenji Takehara (takehara-k@ncchd.go.jp)
Notes	Trial registration: JPRN-UMIN000031062 2018 Funding: "This work was supported by JSPS KAKENHI Grant Number 17H04501 (to RM), 16H06405 (to HS). The study protocol underwent peer review by the funding body. The funding body does not have any roles in the design of this study, data collection, data analysis, interpretation of result, or writing the manuscript." DOI: None to declare General notes: NR

Thompson 2013

Study name	Butterfly Girls and the Quest for Founder's Rock
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Texas Country: USA Country income: high income Age (years): 8-10
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: an 8-episode online program delivered as an animated, interactive comic, which promotes healthy diet and physical activity
Outcomes	Measured (or planned) outcome(s): BMI change, BMI percentile
Starting date	November 2012
Contact information	Deborah Thompson (deborah.thompson@usda.gov)
Notes	Trial registration: NCT01481948 Funding: "This project was supported by the National Institute on Minority Health and Health Disparities grant #MD005814 (to Dr. Thompson). This work is also a publication of the USDA/ARS, Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas, and funded in part with federal funds from the USDA/ARS under Cooperative Agreement No. 58-6250-0-008. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organizations imply endorsement from the U.S. government. We would like to thank the expert panel members who participated in this research." DOI: "The authors declare that they have no competing interest." General notes: the intervention delivered online and the location of recruitment is not stated (the authors are based in Texas). "Eligibility criteria are: an 8 to 10 year-old African American girl with a personal email address, internet access, and a parent or legal guardian who allows their child to participate and is willing to participate in the parent component."

Trost 2021

Study name	The Healthy Conversations @ Playgroup
Methods	Study design: cluster RCT Unit of allocation: community playgroup Unit of analysis: individual
Participants	Setting: 60 community playgroups operating in three states across Australia: Queensland, South Australia, and Western Australia Country: Australia

	Country income: high income Age (years): 1 and older
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: playgroups receive 5 fortnightly face-to-face sessions for 10 weeks (one school term) on-site at weekly scheduled playgroup meetings. Each session consists of two 10-15 minute 'healthy conversations' led by a trained peer facilitator. The five 'Healthy Conversation' topics focus on mealtimes, limiting screens, supporting movement skills, bedtime routines, and celebrating achievements.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	April 2021
Contact information	Prof Stewart Trost (s.trost@qut.edu.au)
Notes	Trial registration: ACTRN12621000055808 Funding: "This project is funded by the Medical Research Future Fund (MRFF) Preventative Public Health Research Initiative (2019; APP1200764). The MRFF has not contributed to the design of the study, nor will it have a role in data collection, management, analysis, and interpretation, nor in the dissemination of findings." DOI: "The authors declare that they have no competing interests." General notes: NR

Walters 2012

Study name	Həli?dx(w)/Healthy Hearts Across Generations project
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: tribal Health Clinic in the Pacific Northwest Country: USA Country income: high income Age (years): NR (see General notes)
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: the intervention focused on cardiovascular health with a focus on reduction of BMI. Specifically, the MI component for the treatment condition targeted (1) increasing physical activity or movement for the parent and family, (2) reducing the consumption of snack foods, sweets, and sugared soft drinks, (3) increasing the availability of fresh fruits and vegetables in the home, and (4) decreasing sedentary activities and screen time. Personal coaches focused on physical health–related support and activities, and the group sessions included cooking and exercise classes. The comparison arm was based on a previously developed tribal intervention called the Family Life Journey, which focuses on increasing family cohesiveness, communication, and connectedness
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2010
Contact information	Karina L. Walters (ude.wu@5wk)
Notes	Trial registration: NR Funding: "This work was supported by a cooperative agreement between the National Heart, Lung, and Blood Institute (NHLBI) and the Indigenous Wellness Research Institute, University of Washington School of Social Work, and a subcontract with the Northwest Tribal partner (U01-HL 087322). Additional support was provided by an NHLBI Diversity Supplement Grant." DOI: NR General notes: NR

Wang 2021

Study name	H2GO!
Methods	Study design: cluster RCT Unit of allocation: afterschool club Unit of analysis: individual
Participants	Setting: 10 Massachusetts Alliance of Boys and Girls Clubs Country: USA Country income: high income Age (years): 9-12
Interventions	Intervention type: dietary Intervention setting: community (after school clubs) Brief description: weekly group-based interactive health sessions delivered by trained Boys and Girls Clubs staff. The primary objectives are to decrease SSB intake among youth and to promote water intake
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	October 2020
Contact information	Monica L. Wang (mlwang@bu.edu)
Notes	Trial registration: NR Funding: "This study is funded by the National Institutes of Health (NIH) National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Grant # R01DK120713-01A1 (PI: Wang). MW, LSM, JW, SL, and MR are supported by NIDDK Grant # R01DK120713-01A1. JW is additionally supported by NIH, National Center for Complementary and Integrative Health Grant # 1UG3AT010621–01 and NIH, National Center for Advancing Translational Sciences Grant #1UL1TR001430."

	DOI: "The authors declare that they have no competing interests." General notes: NR

Whelan 2022

Study name	RESPOND
Methods	Study design: cluster RCT (stepped wedge) Unit of allocation: local government area Unit of analysis: individual
Participants	Setting: 10 local government areas in the Ovens Murray and Goulburn regions of Victoria Country: Australia Country income: high income Age (years): 7-12
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: multicomponenet intervention including: systems approach capacity building (face-to-face training and online support); community-led intervention activity; knowledge, engagement and social network analyses; collaborative Governance and Implementation Structure (Collective Impact);
Outcomes	Measured (or planned) outcome(s): zBMI; overweight/obesity prevalence; cost-effectiveness
Starting date	January 2019 (baseline measurements)
Contact information	Dr Claudia Strugnell (claudia.strugnell@deakin.edu.au)
Notes	Trial registration: NR Funding: "RESPOND is funded through National Health and Medical Research Council (NHMRC) (APP115572), VicHealth, Nexus Primary Health and Goulburn Valley Primary Care Partnership. JW and SA are members of the National Health and Medical Research Council (NHMRC) funded Centre of Research Excellence in Food Retail Environments for Health (RE-FRESH) (APP1152968) The opinions, analysis, and conclusions in this paper are those of the authors and should not be attributed to the NHMRC. JW is supported by a Deakin University Dean's postdoctoral research fellowship. MN is supported by the NHMRC Ideas grant 'PRECIS: PRecision Evidence for Childhood obesity prevention InterventionS' (GNT2002234)." DOI: None declared General notes: "The primary outcomes (zBMI and overweight/obesity prevalence) will be collected in repeat cross-sectional surveys among primary school students in grade 2 (aged approx. 7–8 years), grade 4 (aged approx. 9–10 years) and grade 6 (aged approx. 11–12 years)."

ASP: after-school programme; BMI: body mass index; CDC: Centers for Disease Control and Prevention; DOI: declaration of interest; NR: not reported; OB: obesity; OW: overweight; PA: physical activity; RCT: randomized controlled trial; SSB: sugar-sweetened beverage; WHO: Whorld Health Orgaization; YMCA: Young Men's Christian Association; zBMI: age and gender standardised BMI;

Risk of bias

Risk of bias for analysis 1.1 BMI short term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection reported re	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su ju
Chai 2019	Low risk of bias	No concern, randomization and concealment were appropriate and no baseline differences suggesting problems with the randomization process.	Low risk of bias	No evidence of any deviations from the intended intervention that arose because of the trial context. Data were analysed according to an intention to treat analysis that included participants that dropped out before follow-up measures were collected.	High risk of bias	Serious concerns over missing data 69% and 53% in the intervention groups and 40% in the control group; attrition is high and different between groups and there is no statistical evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using	Some concerns	No spe stat ana ava sug resu sele mul ana no p spe to c

				"The primary analyses for intervention outcomes were intention-to-treat, defined as using available data from all randomised participants and multiple imputation by chained equations for missing data, and were performed using linear mixed models."				standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Hendrie 2011	Low risk of bias	No concerns in this domain, randomization allocation sequence concealment conducted appropriately, and no baseline differences reported. Participants were identified and recruited prior to randomization and some baseline difference percent of boys/girls likely due to chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No concerns, no missing data beside two families dropping out for personal reasons and one family moving interstate	Low risk of bias	No concerns in this domain - outcome measured reliably and outcome assessors blinded to allocated intervention	Some concerns	No p spe stat ana ava sug resu sele mul ana no p spe to c
Nicholl 2021	Low risk of bias	No concerns over the randomization process and concealment and no differences in baseline characteristics were observed.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred as the participants were blinded to the receiving dairy products. A modified ITT analysis excluding the data from the participants missing at follow-up was conducted	Some concerns	Some concern over the proportion of missing data in the control group (12%) that may introduce bias in the results	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Outcome assessors were not aware of the intervention received by study participants.	Some concerns	A p ana pub alor tern mai with out resu ther can whe ana con acc the resu sele mul elig out mea or n elig ana data
Paineau 2008	Low risk of bias	Schools were stratified by district, status	Low risk of bias	There is no information regarding	Low risk of bias	Data at follow-up were missing from 6-	Low risk of bias	No concerns over measurement	Some concerns	No p spe stat

		(school participating or not in the study), and number of participants in each school to ensure that all 3 groups would be homogeneous with regards to social/educative characteristics and recruitment methods. randomization was performed according to a computer-generated randomization list. No details about allocation concealment but given that the schools were matched prior to randomization this should not be an issue. Families were recruited prior to randomization. No baseline differences between groups for anthropometric indicators but a difference was found for age in children between group B and controls		deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		8% of families (balanced between groups); missing data for BMI were imputed using the mean value in the whole cohort. No concerns given the low percent of missing data in both groups.		of the outcome, assessors were blinded to allocation		ana ava sug resu sele mul ana no p spe to c
Sichieri 2008	Some concerns	It is unclear whether randomization was completed adequately as there is no information about the random component used, and there is no information about allocation concealment: the author stated that schools ranking was based on the prevalence of overweight and of obesity, and randomization was generated by blocking of four schools. The last two in the list were randomly assigned to intervention or control groups, balancing the groups by BMI. No major	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. The intervention was delivered by research assistants so it is unlikely they would have deviated from the intended intervention. Intention-to-treat analysis employed.	Some concerns	Data available from all clusters. Missing data were from 18 and 19% of the participants in the intervention and control group, respectively. No statistical analysis producing evidence to show result not biased by missing data. The authors reported that they did an intention to treat analysis and an analysis for only completers, but only the completers data are shown. Missingness could depend on the true value but it seems unlikely.	Low risk of bias	Measurement of the outcome was appropriate. The same measurements were taken using standardised measures, however there is no information about who the outcome assessors were. There was also a difference in the measurement timepoints reported: 'the mean follow-up time was slightly greater in the control group (8.24 months v. 7.96 months)'. There is no information about who outcome assessors were. Unclear	Some concerns	No spe stat ana ava incl trial Out mea repo spe trial No that resu bee fron ana data stat ana com

		baseline differences to suggest a problem with the randomization process. All participants recruited before randomization of clusters. There were no baseline imbalances to suggest differential identification or recruitment of individuals between intervention groups.				Missingness was even across the groups and anthropometric indices between those students with follow-up data on intake compared with those who refused to participate were similar for BMI.		if outcome assessors were blind to assignment as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 1.2 BMI medium term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Sel rep
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Autho judgem
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of	Some concern

								intervention, this is highly unlikely	
Cunha 2013	Some concerns	randomization and concealment were conducted using appropriate methods. No baseline differences in number of schools and number of participants, school pair were randomised matched by prevalence of excessive weight. Enrolment was conducted prior to randomization but parental consent was obtained after randomization, and it may have been given to participants based on the group allocation. Some baseline difference in BMI and proportion of participants with obesity and overweight (higher in the control group). Final analysis reported was not adjusted for baseline difference in BMI	Low risk of bias	Compliance with the intervention was verified by questionnaire. An intention to treat analysis is not reported explicitly but based on the CONSORT flowchart participants were analysed according to their allocated group	Some concerns	Some concern over missing data, 23% on the intervention group and 24% in the control group (as calculated taking into count the participants that joined the study after randomization). Participants with missing data at follow up were included in the final analysis but method used to handle missing data is not reported. Reason for missing data includes parental consent not given after randomization, which may be related to the true value of the outcome (baseline BMI was higher in the control group).	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern
Davis 2021	High risk of bias	No details about randomization methods and concealment. Same number of clusters were allocated in both groups. Some difference between the groups in proportion of overweight students and parental education at baseline. As reported in flowchart, participants were recruited after the randomization; knowledge of allocated intervention may have affected participation	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted (only complete data students were included in final analysis)	Some concerns	Data from all schools were included in final analysis, 87% of the participants completed post-intervention clinical and survey measures. Attrition was 14.9% in intervention group and 12.4% in control group. Missing data imputation was also reported: we assumed that the missing values of the variables of interest were missing at random and the multiple imputation	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight	Some concern

			into the study as shown by a substantial differences in consenting participants (87% in the intervention school and 72% in the control schools consented).The educational attainment levels of the parents differed between groups with a higher percentage of parents in the intervention group compared to the control having completed a high school education or some college. There were no other differences in child or parental demographics between the intervention and control groups. There are statistically significant differences in weight status categories, with the intervention children compared to control children having a lower prevalence of overweight. Intervention compared to control children have higher diastolic blood pressure rates and higher fruit intake.				technique using 10 imputations under a multivariate normal model. The variables included in the imputation model were: sex, age, pre and post primary outcomes, percentage of free and reduce lunch pre and post intervention, and the interaction of the child race/ethnicity. No evidence that the results were not biased by missing data.		measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
James 2004	Low risk of bias	randomization took place and allocation concealment likely employed. Clusters were randomised according to a random number table, with blinding to schools or classes. Both groups were similar at baseline for distributions of age, sex, consumption of sweetened carbonated drinks, and percentage	Some concerns	Participants were likely to be aware they were in a trial due to providing consent. Participants were likely aware of the intervention due to having new activities/ workshops to attend. Those delivering interventions were the trials team, so they were also aware. In the discussion, authors state	Some concerns	There is no information to suggest that any clusters dropped out, suggesting all clusters contributed data. 13% of the participants were missing in the intervention and 6% in the control. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend	Low risk of bias	Measurement of the outcome was appropriate. Measurement would be unlikely to differ across groups as it was conducted by a member of the research team using the same techniques. The outcome assessor would have known a trial was taking place as they were part of	Some concern

		overweight or obese. At the time of consent, parents and children were unaware of randomization group. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.		'Certain schools did change, encouraging consumption of water. This was seen in both the intervention group and the control group.' This seems to be a deviation brought on due to trial context and likely caused contamination. It is unlikely that this deviation would have affected BMI. An intention-to-treat analysis was used.		on true value. Reasons for missing were participants being absent, refusing or moving school. Missingness is similar across groups.		the research team (an investigator). The investigator who conducted measurements also delivered the intervention. The measurement of height and weight, using standardised measures, by researchers is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Keshani 2016	High risk of bias	Some concern due to uncertainty around allocation sequence concealment. Unclear if parental consent was asked before or after randomization; concern over the exclusion from the study of the students and parents who had no desire to participate or did not attend in more than one third of the nutrition education classes or did not answer more than 20% of the questionnaire, as reason for non-participation may have been affected by the knowledge of the allocated group	High risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. It seems that a per protocol analysis was conducted as they stated that those students and parents who had no desire to participate or did not attend in more than one third of the nutrition education classes or did not answer more than 20% of the questionnaire items were excluded from the analyses.	High risk of bias	Concerns over missing data from 24.5% of the intervention groups and 21% of the control group. Reasons of dropouts included changing school, being absent in more than 3 educational sessions, and not completing the questionnaires. There is the possibility that missingness was related to the outcome and this may introduce bias in the results	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern
Lent 2014	Some concerns	No details about randomization methods or	Low risk of bias	There is no information regarding	Some concerns	Some concerns over missing data	Low risk of bias	The measurement of height and	Some concern

		concealment; same number of schools in each group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.		deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		and no evidence that results were not biased; similar proportion of data missing from both groups (20% and 23% in the intervention and control group, respectively) but no evidence that the reason for missing data is not related to the true value of the outcome is reported.		weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Meng 2013 (Beijing)	High risk of bias	No details regarding the randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after randomization. Some baseline differences in BMI and zBMI between groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Not reported if and how many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups, therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced between the groups	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be	Some concern

								influenced by knowledge of intervention, this is highly unlikely.	
NCT00224887 2005	Some concerns	No details about the randomization method or concealment and limited details on baseline characteristics; the study data are reported within the trial registration and limited information are provided	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted.	Low risk of bias	No issues with missing data as attrition was low in both group and the reported reason for missingness was not related to the trial	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concern
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if they were appropriate: 'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis with completers and imputation of missing data was conducted but participants remained in the groups they had been randomised to.	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it only for individuals. The abstract mentions 16 clusters, whereas the results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff measuring the outcomes could not be blinded due to the randomization by practice due to the location of the measurement visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern

		half size of intervention) but likely due to allocation ratio in randomization.				states. No reasons for missing data are given.				

Risk of bias for analysis 1.3 BMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of t reported resu	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Sup f judge
James 2004	Low risk of bias	randomization took place and allocation concealment likely employed. Clusters were randomised according to a random number table, with blinding to schools or classes. Both groups were similar at baseline for distributions of age, sex, consumption of sweetened carbonated drinks, and percentage overweight or obese. At the time of consent, parents and children were unaware of randomization group. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Some concerns	Participants were likely to be aware they were in a trial due to providing consent. Participants were likely aware of the intervention due to having new activities/ workshops to attend. Those delivering interventions were the trials team so they were also aware. In the discussion, authors state 'Certain schools did change, encouraging consumption of water. This was seen in both the intervention group and the control group.' This seems to be a deviation brought on due to trial context and likely caused contamination. It is unlikely that this deviation would have affected BMI. An intention-to-treat analysis was used.	Some concerns	There is no information to suggest that any clusters dropped out, suggesting all clusters contributed data. 33% of participants were missing in the intervention and in the control. No statistical analysis producing evidence to show result not biased by missing data. missingness could depend on true value. Reasons for missingness are participants being absent, refusing or moving school. Missingness is even across groups but percent of missing data is relatively high.	Low risk of bias	Measurement of the outcome was appropriate. Measurement would be unlikely to differ across groups as it was conducted by a member of the research team using the same techniques. The outcome assessor would have known a trial was taking place as they were part of the research team (an investigator). The investigator who conducted measurements also delivered the intervention. The measurement of height and weight, using standardised measures, by researchers is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No pre specif statist analys plan o protoc availa No evi to sug select report BMI report planne metho No pre specif statist analys plan availa compa
Lent 2014	Some concerns	No details about randomization methods or concealment; same number of schools in each	Low risk of bias	There is no information regarding deviations from the intended	High risk of bias	Concerns over missing data and no evidence that results were not	Low risk of bias	The measurement of height and weight using standardised measures, is	Some concerns	No pre specif statist analys plan availa

		group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.		intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		biased; proportion of data missing from the two groups were very different (25% and 40% in the intervention and control group, respectively) and no evidence that the reason for missing data is not related to the true value of the outcome is reported.		relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		No sugge the re was select from multip analys but no specif plan t compa

Risk of bias for analysis 1.4 zBMI short term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Au jud
Chai 2019	Low risk of bias	No concern, randomization and concealment were appropriate and no baseline differences suggesting problems with the randomization process.	Low risk of bias	No evidence of any deviations from the intended intervention that arose because of the trial context. Data were analysed according to an intention to treat analysis that included participants that dropped out before follow-up measures were collected. "The primary analyses for intervention outcomes were intention-to-	High risk of bias	Serious concerns over missing data 69% and 53% in the intervention groups and 40% in the control group; attrition is high and different between groups and there is no statistical evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight	Sor cor

				treat, defined as using available data from all randomised participants and multiple imputation by chained equations for missing data, and were performed using linear mixed models."				measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Damsgaard 2014	Some concerns	randomization was appropriate and allocation was concealed. Baseline values do not suggest issues with randomization but there is no information given about demographics. . randomization took place before recruitment of participants. It is possible recruitment was affected by order of randomization as although year groups were randomised, participants were not blinded to allocation. There were no major baseline differences suggesting differential identification or recruitment.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Analysis strategy was based on the intention to treat plan.	Some concerns	There is no mention of clusters dropping out of the study. 8.3% of children withdrew from the study mainly due to change of schools or class, dislike of or too time-consuming measurements or dislike of the NND school meals. The results of the intention-to-treat analyses were confirmed by complete case analyses and by adjusted analyses, indicating that the findings are related to the school meals and not confounded by physical activity or pubertal development. Non-completers did not differ from completers with regard to sex or year group distribution, age, anthropometry or pubertal stage, but were less likely to be of high educational background and more likely to be immigrants/descendants.	Low risk of bias	Measurement of the outcome was appropriate. Study staff likely knew about the allocation as they describe it as 'unblinded'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Lov bia
Fulkerson 2010	Some concerns	Details on method of randomization or concealment are not reported. The article stated that there was no difference between the two groups at baseline but data are not reported.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. It is not reported whether analysis was conducted by an intention to treat plan	Low risk of bias	All participants provided data at follow-up	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The	Sor cor

								height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Hendrie 2011	Low risk of bias	No concerns in this domain, randomization allocation sequence concealment conducted appropriately, and no baseline differences reported. Participants were identified and recruited prior to randomization and some baseline difference percent of boys/girls likely due to chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No concerns, no missing data beside two families dropping out for personal reasons and one family moving interstate	Low risk of bias	No concerns in this domain - outcome measured reliably and outcome assessors blinded to allocated intervention	Sor cor
Nicholl 2021	Low risk of bias	No concerns over the randomization process and concealment and no differences in baseline characteristics were observed.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred as the participants were blinded to the receiving dairy products. A modified ITT analysis excluding the data from the participants missing at follow-up was conducted	Some concerns	Some concern over the proportion of missing data in the control group (12%) that may introduce bias in the results	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Outcome assessors were not aware of the intervention received by study participants.	Sor cor
Paineau 2008	Low risk of bias	Schools were stratified by district, status (school participating or not in the study), and number of participants in each school to ensure that all 3 groups would be	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to	Low risk of bias	Data at follow-up were missing from 6-8% of families (balanced between groups); missing data for BMI were imputed using the mean value in the whole cohort. No concerns given the low percent of missing data in both groups.	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	Sor cor

		homogeneous with regards to social/educative characteristics and recruitment methods. randomization was performed according to a computer-generated randomization list. No details about allocation concealment but given that the schools were matched prior to randomization this should not be an issue. Families were recruited prior to randomization. No baseline differences between groups for anthropometric indicators but a difference was found for age in children between group B and controls		suspect these occurred. An intention to treat analysis was conducted.						
Viggiano 2018	High risk of bias	There is not enough information provided to determine if randomization was conducted appropriately and there is no information about allocation concealment. Baseline data is not provided in a table or in detail in the text. The authors reported that there were 837 children in the treated group and 476 children in the control group which is imbalanced. They also say that '128 overweight and 68 obese children in the treated group and 226 overweight and 124 obese children in the control group at baseline which is an imbalance and may reflect issues with the randomization method. There is no information provided to	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. There is no information about the type of analysis used but it seems likely to be modified ITT or ITT as schools were randomised (so less likely to receive other intervention).	Some concerns	No clusters (schools) were lost to follow-up as this is not mentioned. 22.2% of the children in the treated group and 25.2% in the control group were lost to follow-up. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could be related to the true value. However, missingness was fairly even across groups and they say in the discussion that 'we had an elevated number of children lost to follow-up due to school absence at the first post-assessment and further drop out as a result of children in class V moving to middle school at the second post assessment.'	Low risk of bias	There is no information about measurement of the outcome, however as it is height and weight it is likely to be appropriate and it was appropriately measured in previous studies by the same authors using this intervention. There is no information about outcome assessors, protocols used or where children were measured. There is no information about who outcome assessors were or whether they knew of the trial. There is no information about who outcome assessors were or if they were blinded. It seems likely they would not	So cor

		determine the sequence of enrolment and randomization. There were baseline imbalances, with there being 837 students in the treatment group and 476 in the control (5 schools in each). H						have been blinded in a trial like this. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
de Ruyter 2012	Low risk of bias	randomization and concealment conducted appropriately, and methods extensively reported in the trial protocol. No difference in baselines except for higher parental education in intervention group.	Low risk of bias	Both per protocol and intention to treat analyses were performed and results of both analyses are reported	Low risk of bias	Data from 12% of the participants were missing from both intervention and control group. Analysis showed no effect of missing data on the results when using an alternative method for handling missing data (complete case analysis with covariate adjustment) that yielded very similar results and levels of significance. Low concern as similar attrition in both groups.	Low risk of bias	Standardised methods for weight and height measurement were used as reported in the trial protocol. Same instruments were used to assess the two groups. The trial is double-blinded	Lov bia

Risk of bias for analysis 1.5 zBMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selectio reporte	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight	Some concerns	T s a a t p r a p w r s n e o n a a d

								measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		
Coleman 2012	High risk of bias	Some concern over the lack of details on randomization and concealment methods; no difference between cluster arms at baseline. Serious concern over the selection of the participants into the study that occurred after the schools randomizations and that may have been affected by knowledge of the assigned intervention; some evidence of higher zBMI in the intervention group at baseline.	Low risk of bias	No concerns over deviation from intended intervention and data were analysed according to an intention to treat plan	High risk of bias	Statistical analyses showed that results were not biased because of missing data, however, the level of attrition was high in both groups (43-48%) and this may have introduced bias.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N s s a a s re s n a n s t
Davis 2021	High risk of bias	No details about randomization methods and concealment. Same number of clusters were allocated in both groups. Some difference between the groups in proportion of overweight students and parental education at baseline. As reported in flowchart, participants were recruited after the randomization; knowledge of	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted (only complete data students were included in final analysis)	Some concerns	Data from all schools were included in final analysis, 87% of the participants completed post-intervention clinical and survey measures. Attrition was 14.9% in intervention group and 12.4% in control group. Missing data imputation was also reported: we assumed that the missing values of the	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised	Some concerns	N s s a a s re s n a n s t

		allocated intervention may have affected participation into the study as shown by a substantial differences in consenting participants (87% in the intervention school and 72% in the control schools consented).The educational attainment levels of the parents differed between groups with a higher percentage of parents in the intervention group compared to the control having completed a high school education or some college. There were no other differences in child or parental demographics between the intervention and control groups. There are statistically significant differences in weight status categories, with the intervention children compared to control children having a lower prevalence of overweight. Intervention compared to control children have higher diastolic blood pressure rates and higher fruit intake.				variables of interest were missing at random and the multiple imputation technique using 10 imputations under a multivariate normal model. The variables included in the imputation model were sex, age, pre and post primary outcomes, percentage of free and reduce lunch pre and post intervention, and the interaction of the child race/ethnicity. No evidence that the results were not biased by missing data.		measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Fulkerson 2015	Some concerns	randomization conducted by the study statistician using a computer-generated randomization schedule. However, the parent could choose which child include in the trial: "If more than one child in a family meets study eligibility	Low risk of bias	The main protocol deviation was program start time as delays occurred when families did not arrive as scheduled but this would not have introduced bias. Not specified but it appears that intention to treat analysis was	Some concerns	At post-intervention data were missing from 9% and 5% in the intervention and control group, respectively. There was a significantly lower retention among non-white participants and those	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. Data collection staff members are	Some concerns	N s s a a s r s n a n s t

		criteria, parents are allowed to choose which child would participate in the assessments." No details about concealment. Significant difference in parent BMI (intervention is lower than control) but the trial is small so probably due to chance.		conducted based on participants flowchart and results tables		receiving economic assistance. No evidence that results were not biased.		not told the study group in which families were assigned; however, blinding is not guaranteed as participants may indicate study assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
James 2004	Low risk of bias	randomization took place and allocation concealment likely employed. Clusters were randomised according to a random number table, with blinding to schools or classes. Both groups were similar at baseline for distributions of age, sex, consumption of sweetened carbonated drinks, and percentage overweight or obese. At the time of consent, parents and children were unaware of randomization group. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Some concerns	Participants were likely to be aware they were in a trial due to providing consent. Participants were likely aware of the intervention due to having new activities/ workshops to attend. Those delivering interventions were the trials team, so they were also aware. In the discussion, authors state 'Certain schools did change, encouraging consumption of water. This was seen in both the intervention group and the control group.' This seems to be a deviation brought on due to trial context and likely caused contamination. It is unlikely that this deviation would have affected BMI. An intention-	Some concerns	There is no information to suggest that any clusters dropped out, suggesting all clusters contributed data. 13% of the participants were missing in the intervention and 6% in the control. No statistical analysis producing evidence to show result not biased by missing data. Missing could depend on true value. Reasons for missing were participants being absent, refusing or moving school. Missingness is similar across groups.	Low risk of bias	Measurement of the outcome was appropriate. Measurement would be unlikely to differ across groups as it was conducted by a member of the research team using the same techniques. The outcome assessor would have known a trial was taking place as they were part of the research team (an investigator). The investigator who conducted measurements also delivered the intervention. The measurement of height and weight, using standardised measures, by researchers is relatively robust. The height and weight measurements are used to	Some concerns	N s s a p a e s s r r p n p s a a c

				to-treat analysis was used.				produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Lent 2014	Some concerns	No details about randomization methods or concealment; same number of schools in each group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Some concerns over missing data and no evidence that results were not biased; similar proportion of data missing from both groups (20% and 23% in the intervention and control group, respectively) but no evidence that the reason for missing data is not related to the true value of the outcome is reported.	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N s s a a s r s n a n s t
Meng 2013 (Beijing)	High risk of bias	No details regarding the randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after randomization. Some baseline differences in BMI and zBMI between groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Not reported if and how many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups, therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using	Some concerns	N s s a a s r s n a n s t

						between the groups		standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if they were appropriate: 'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control half size of intervention) but likely due to allocation ratio in randomization.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis with completers and imputation of missing data was conducted but participants remained in the groups they had been randomised to.	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it only for individuals. The abstract mentions 16 clusters, whereas the results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper states. No reasons for missing	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff measuring the outcomes could not be blinded due to the randomization by practice due to the location of the measurement visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N s s a a p f e s n r h s b f e o n N t r s n a d s a c

						data are given.				
de Ruyter 2012	Low risk of bias	randomization and concealment conducted appropriately, and methods extensively reported in the trial protocol. No difference in baselines except for higher parental education in intervention group.	Low risk of bias	Both per protocol and intention to treat analyses were performed and results of both analyses are reported	Some concerns	Data from 20% and 18% of the participants were missing from the intervention and control group, respectively. Analysis showed no effect of missing data on the results when using an alternative method for handling missing data (complete case analysis with covariate adjustment) that yielded very similar results and levels of significance. some concern as attrition was substantial in both groups.	Low risk of bias	Standardised methods for weight and height measurement were used as reported in the trial protocol. Same instruments were used to assess the two groups. The trial is double-blinded	Low risk of bias	P a re d tr B in tr a a th

Risk of bias for analysis 1.6 zBMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	
Coleman 2012	High risk of bias	Some concern over the lack of details on randomization and concealment methods; no difference between cluster arms at baseline. Serious concern over the selection of the participants into the study that occurred after the schools randomizations and that may have been affected by knowledge of the assigned intervention; some evidence of higher zBMI in the intervention group at baseline.	Low risk of bias	No concerns over deviation from intended intervention and data were analysed according to an intention to treat plan	High risk of bias	Statistical analyses showed that results were not biased because of missing data, however, the level of attrition was high in both groups (43-48%) and this may have introduced bias.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although	Some concerns	No sta pla sug res fro ana pre to

								theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Fulkerson 2015	Some concerns	randomization conducted by the study statistician using a computer-generated randomization schedule. However, the parent could choose which child include in the trial: "If more than one child in a family meets study eligibility criteria, parents are allowed to choose which child would participate in the assessments." No details about concealment. Significant difference in parent BMI (intervention is lower than control) but the trial is small so probably due to chance.	Low risk of bias	The main protocol deviation was program start time as delays occurred when families did not arrive as scheduled but this would not have introduced bias. Not specified but it appears that intention to treat analysis was conducted based on participants flowchart and results tables	Low risk of bias	At follow-up data were missing from 5% and 2% in the intervention and control group, respectively. No concerns over the small attrition	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. Data collection staff members are not told the study group in which families were assigned; however, blinding is not guaranteed as participants may indicate study assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No sta pla sug res fro ana pre to
Han 2006	High risk of bias	No details about what randomization methods was used or whether the allocation sequence was concealed. Same number of schools/group and similar number of students enrolled in each arm.. No information regarding the timing or participants	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not reported but based on the tables of the results it seems like participants were analysed	Low risk of bias	All the schools were retained at follow-up over 99% of the students were retained at follow-up in each group	Low risk of bias	No information of the method used to measure hight and weight. Not reported but as the study setting is schools, it is likely that weight and hight were by school nurses as part of the routine health check.	Some concerns	No ana ass tha res ac pre ana wa be ou av ana re pr ch ob no da inf

			recruitment, only that the survey randomly selected 280 students from grades 1 to 4 in 10 elementary schools to ask questions. There is not enough information to assess if selection of individual participants was affected by knowledge of the intervention assigned to the cluster. Baseline characteristics not reported		according to the allocated group.						pro stu ava
James 2004	Low risk of bias	randomization took place and allocation concealment likely employed. Clusters were randomised according to a random number table, with blinding to schools or classes. Both groups were similar at baseline for distributions of age, sex, consumption of sweetened carbonated drinks, and percentage overweight or obese. At the time of consent, parents and children were unaware of randomization group. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Some concerns	Participants were likely to be aware they were in a trial due to providing consent. Participants were likely aware of the intervention due to having new activities/ workshops to attend. Those delivering interventions were the trials team, so they were also aware. In the discussion, authors state 'Certain schools did change, encouraging consumption of water. This was seen in both the intervention group and the control group.' This seems to be a deviation brought on due to trial context and likely caused contamination. It is unlikely that this deviation would have affected BMI. An intention-to-treat analysis was used.	Some concerns	There is no information to suggest that any clusters dropped out, suggesting all clusters contributed data. 33% of participants were missing in the intervention and in the control. No statistical analysis producing evidence to show result not biased by missing data. Missing could depend on true value. Reasons for missingness are participants being absent, refusing or moving school. Missingness is even across groups but percent of missing data is relatively high.	Low risk of bias	Measurement of the outcome was appropriate. Measurement would be unlikely to differ across groups as it was conducted by a member of the research team using the same techniques. The outcome assessor would have known a trial was taking place as they were part of the research team (an investigator). The investigator who conducted measurements also delivered the intervention. The measurement of height and weight, using standardised measures, by researchers is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Some concerns	No sta pla ava evi sug rep rep pla me spe ana ava co

								this is highly unlikely.		
Lent 2014	Some concerns	No details about randomization methods or concealment; same number of schools in each group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Concerns over missing data and no evidence that results were not biased; proportion of data missing from the two groups were very different (25% and 40% in the intervention and control group, respectively) and no evidence that the reason for missing data is not related to the true value of the outcome is reported.	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No sta pla sug res fro an pre to
Viggiano 2018	High risk of bias	There is not enough information provided to determine if randomization was conducted appropriately and there is no information about allocation concealment. Baseline data is not provided in a table or in detail in the text. The authors reported that there were 837 children in the treated group and 476 children in the control group which is imbalanced. They also say that '128 overweight and 68 obese children in the treated group	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. There is no information about the type of analysis used but it seems likely to be modified ITT or ITT as schools were randomised (so less likely to receive other intervention).	High risk of bias	No clusters (schools) were lost to follow-up as this is not mentioned. 67.9% of children in the treated group and 51.7% in the control group were lost to follow-up. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could be related to the true value. However, missingness was fairly	Low risk of bias	There is no information about measurement of the outcome, however as it is height and weight it is likely to be appropriate and it was appropriately measured in previous studies by the same authors using this intervention. There is no information about outcome assessors, protocols used or where children were measured. There is no information about who outcome assessors	Some concerns	No sta pla evi sug res be the fro eli me sug nu ha fro an but an co

		and 226 overweight and 124 obese children in the control group at baseline which is an imbalance and may reflect issues with the randomization method. There is no information provided to determine the sequence of enrolment and randomization. There were baseline imbalances, with there being 837 students in the treatment group and 476 in the control (5 schools in each). H				even across groups and they say in the discussion that they had an elevated number of children lost to follow-up due to school absence at the first post-assessment and further drop out as a result of children in class V moving to middle school at the second post assessment. Attrition bias may affect the results given the high percent of missing data.		were or whether they knew of the trial. There is no information about who outcome assessors were or if they were blinded. It seems likely they would not have been blinded in a trial like this. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
de Ruyter 2012	Low risk of bias	randomization and concealment conducted appropriately, and methods extensively reported in the trial protocol. No difference in baselines except for higher parental education in intervention group.	Low risk of bias	Both per protocol and intention to treat analyses were performed and results of both analyses are reported	Some concerns	Data from 29% and 22% of the participants were missing from the intervention and control group, respectively. Analysis showed no effect of missing data on the results when using an alternative method for handling missing data (complete case analysis with covariate adjustment) that yielded very similar results and levels of significance. some concern as attrition was substantial in both groups.	Low risk of bias	Standardised methods for weight and height measurement were used as reported in the trial protocol. Same instruments were used to assess the two groups. The trial is double-blinded	Low risk of bias	Pre ana rep the Bo int ana rep to

Risk of bias for analysis 1.7 Percentile short term

Study	Bias

	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection reported r	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su ju
Fulkerson 2010	Some concerns	Details on method of randomization or concealment are not reported. The article stated that there was no difference between the two groups at baseline but data are not reported.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. It is not reported whether analysis was conducted by an intention to treat plan	Low risk of bias	All participants provided data at follow-up	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No spe stat ana ava sug res sele mu ana no spe to c
Nicholl 2021	Low risk of bias	No concerns over the randomization process and concealment and no differences in baseline characteristics were observed.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred as the participants were blinded to the receiving dairy products. A modified ITT analysis excluding the data from the participants missing at follow-up	Some concerns	Some concern over the proportion of missing data in the control group (12%) that may introduce bias in the results	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Outcome assessors were not aware of the intervention received by study participants.	Some concerns	A p ana pub alo ter ma with out res the car whe ana cor acc the res sele mu elig out me or r elig ana dat

				was conducted						
Seguin-Fawler 2021	Low risk of bias	One-to-one randomization was generated by Qualtrics in blocks of four within each of the 12 farm communities. Multiple staff members reported assignments to participants, thereby reducing the likelihood of assignment prediction by study staff.	Low risk of bias	No deviations from the intended intervention that arose because of the trial context were reported and intention to treat analysis was conducted	Some concerns	Data were missing from 20% of participants in the intervention and 31% of the control group. To explore for attrition, bias the authors compared baseline values for all outcomes for respondents and nonrespondents at one-season (fall) follow-up. Missing follow-up data was associated with two healthier behaviours and six less healthy behaviours at baseline, and unrelated for the other 30 outcomes. These findings do not provide strong evidence that systematic bias resulted from missing data.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	Ana res cor acc pre ana rep stu tha pub to t ana

Risk of bias for analysis 1.8 Percentile medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of reported res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su judg
Davis 2021	High risk of bias	No details about randomization methods and concealment. Same number of clusters were allocated in both groups. Some difference between the groups in proportion of overweight students and parental education at baseline. As reported in flowchart, participants	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted (only complete data students were included in final analysis)	Some concerns	Data from all schools were included in final analysis, 87% of the participants completed post-intervention clinical and survey measures. Attrition was 14.9% in intervention group and 12.4% in control group. Missing data imputation was also	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The	Some concerns	No spe stat ana plar ava No sug the was sele fro mul ana but spe plar com

		were recruited after the randomization; knowledge of allocated intervention may have affected participation into the study as shown by a substantial differences in consenting participants (87% in the intervention school and 72% in the control schools consented).The educational attainment levels of the parents differed between groups with a higher percentage of parents in the intervention group compared to the control having completed a high school education or some college. There were no other differences in child or parental demographics between the intervention and control groups. There are statistically significant differences in weight status categories, with the intervention children compared to control children having a lower prevalence of overweight. Intervention compared to control children have higher diastolic blood pressure rates and higher fruit intake.				reported: we assumed that the missing values of the variables of interest were missing at random and the multiple imputation technique using 10 imputations under a multivariate normal model. The variables included in the imputation model were: sex, age, pre and post primary outcomes, percentage of free and reduce lunch pre and post intervention, and the interaction of the child race/ethnicity. No evidence that the results were not biased by missing data.		measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Lent 2014	Some concerns	No details about randomization methods or concealment; same number of schools in each group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to	Some concerns	Some concerns over missing data and no evidence that results were not biased; similar proportion of data missing from both groups (20% and 23% in the	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although	Some concerns	No p spe stat ana plar avai No sug the was sele fro mul ana

		consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.		treat analysis was conducted.		intervention and control group, respectively) but no evidence that the reason for missing data is not related to the true value of the outcome is reported.		theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		but spe plar com
van de Berg 2020	High risk of bias	Four schools in each geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to each group. It is unclear if participants were recruited before or after the schools randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition	Some concerns	No deviations have been reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in the results table but the schools data were analysed according to their allocated group.	High risk of bias	No information regarding missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	Ana the was con acc a pr spe ana plar rep the prot that pub prio data ana

		were seen across treatment conditions suggesting that knowledge of assigned intervention could have affected selection or participation of the dyads into the study.								

Risk of bias for analysis 1.9 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of reported res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su judg
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore participant ay have been aware of their allocated group, however, the authors reported that participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an intervention group based on sixth grade school.	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were missing completely at random or missing at random.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No spe stat ana plar avai No sug the was sele from mul ana but spe plar com
Lent 2014	Some concerns	No details about randomization methods or concealment; same number of	Low risk of bias	There is no information regarding deviations from the	High risk of bias	Concerns over missing data and no evidence that results	Low risk of bias	The measurement of height and weight using standardised	Some concerns	No spe stat ana plar

		schools in each group. All students were eligible for inclusion in the study and had to give consent to participate. Unclear if consent was given before or after randomization but it seems that almost all student were enrolled in the study (3% lost before baseline measurements). There were no baseline differences in age, gender or weight category between students from control or intervention schools but there were significantly more Asian students in the control group and significantly more Hispanic/Latino students in the intervention group.		intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		were not biased; proportion of data missing from the two groups were very different (25% and 40% in the intervention and control group, respectively) and no evidence that the reason for missing data is not related to the true value of the outcome is reported.		measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		ava No sug the was sele fro mul ana but spe pla co

Risk of bias for analysis 2.1 BMI short term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selecti reporte	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	
Clemes 2020	Low risk of bias	randomization and allocation concealment were appropriate. There were no baseline differences suggesting issues with randomization. Ethnicity differed slightly between groups, but this could be due to chance. Flowchart in the protocol suggests study participants were recruited before randomization of schools. No baseline imbalances suggesting differential identification or recruitment and all students were invited to participate. Similar number of students	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Intention-to-treat analysis was used.	Low risk of bias	All clusters completed the trial. Data were available for 97% of those randomised; two pupils in the control group were unable to provide follow-up measures as they were absent from school on the days they were taken. Three children (1 control, 2 intervention) moved away from the area during the study and hence changed schools. One control group participant withdrew their assent prior to the follow-up measures.	Low risk of bias	Measurement of the outcome was appropriate: 'At each measurement point children's height and body mass (without shoes) were measured directly using standard procedures by trained research staff'. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standard procedures 'At each measurement point children's height and body mass (without shoes) were measured directly using standard procedures by trained research staff'. Trained researcher staff	Low risk of bias	

		consenting in each group.						conducted measurements so likely they knew about the trial: 'At each measurement point children's height and body mass (without shoes) were measured directly using standard procedures by trained research staff'. The protocol states 'The statistician performing the analyses will be blinded to the schools allocation to the study arms, as will the community researchers undertaking the outcome measurements.'		
De Bock 2013	Low risk of bias	No concerns in this domain - randomization and allocation sequence concealment seems appropriate. Participants were identified prior to randomization and no baseline difference were reported, beside the size of the intervention group being higher than the control group.	High risk of bias	Serious concerns in this domain due to 3 preschool not implementing the allocated intervention	High risk of bias	Serious concerns over missing data: it is unclear how many participants did not report BMI measurements as BMI is a secondary outcome; based on the missing data for physical activity, 63% and 74% of the participants in the intervention and control group, respectively, did not have outcome measured. There is not statistical test showing that results were not biased by missing data and the difference in the proportion of missing data in the two groups is higher than 10%.	Low risk of bias	Method of outcome measure was appropriate and outcome assessors were blinded to group allocation	High risk of bias	
Diaz-Castro 2021	Low risk of bias	No concerns over the randomization procedures or concealment and there are no differences in baseline characteristic between the two groups.	Some concerns	Some concerns over the lack of reporting on the analysis plan used	Some concerns	Some concerns regarding the lack of information about whether there was any missing data	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI.	Some concerns	

								Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		
Drummy 2016	High risk of bias	randomization and concealment method not reported. One hundred fifty children aged 9 and 10 in seven primary schools in Northern Ireland were invited to participate in the study. Parental consent was granted for 120 children. Weight and BMI at baseline was higher in the intervention group at baseline and such differences may affect t the outcome results	Low risk of bias	No evidence of deviation from intended intervention. No explicitly reported, but numbers reported for each group in table 1 are consistent with an intention to treat analysis	Some concerns	89% of the participants were included in the analysis post-intervention; the number assigned to each group at baseline is not reported therefore we can't assess if the number of loss to follow-up was similar in both group.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	
Ford 2013	Some concerns	Some concern over lack of details about concealment of the allocation sequence and baseline data only reported for these participants that completed the intervention and had outcome measurement at follow-up.	High risk of bias	Serious risk of bias over the analysis used to estimate the effect of the intervention. Five participants were excluded from the analysis for not having completed the activity as required by assignment to the intervention, that is the analysis was conducted per protocol and not as intention to treat as appropriate.	Some concerns	Unclear how many participants were missing from the analysis in each group as number of participants randomised to each group is not reported, only the number of participants retained at follow up; assuming that an equal number of participants were randomised to each group (i.e. 87), data were available from 88.5% and 86% of the participants in the intervention and control group, respectively.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by	Some concerns	

						No evidence that the results were not biased by missing data.		knowledge of intervention, this is highly unlikely.		
Ha 2021	Low risk of bias	randomization methods and concealment are adequate, no baseline difference in between clusters. Families and children identified prior to randomization by recruitment at schools. No baseline difference in children characteristics but some difference in parents education between the two groups, that is probably due to chance	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	Small attrition only in the intervention group (2% of participants missing outcome measures)	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were blinded to group allocation	Some concerns	
Ketelhut 2022	Low risk of bias	No concerns over the randomization process and allocation concealment, this is a small trial and the baseline differences in BMI are likely due to chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Serious concerns over missing data. Large proportion of missing data (55% in the control group and 62% in the intervention group, assuming that equal number of participants were recruited ine ach group. Although the reason for missingness is unlikely related to the true value of the outcome, the proportion of missing data is high and this may introduce bias in the results	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	
Lau 2016	Some concerns	Some concern due to randomization method and details of concealment details not being reported; no baseline differences reported.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to	Low risk of bias	No concern over missing data, data at follow-up were available from all participants.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised	Some concerns	

				suspect these occurred. An intention to treat analysis was conducted.				procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Lazaar 2007	Some concerns	There is not enough information provided to determine if randomization was conducted appropriately and there is no information about allocation concealment; the author stated that a draw was carried out in order to choose the schools with an additional 6-month PA programme. There were no baseline differences to suggest issues with the randomization process. Recruitment took place prior to randomization. Baseline anthropometric data revealed no significant differences between groups for any of the outcome variables.	Low risk of bias	No information given about deviations from intended interventions, but no reason to suspect these occurred. 98.9% of data present so likely correct analysis used. Also we'd assume the participants are kept in their intervention groups because it is implemented within the school curriculum.	Low risk of bias	There is no suggestion that any clusters (schools) dropped out. The authors reported that anthropometric data were collected after 6 months of intervention for 98.9% of the cohort children	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to have differed across groups because the same methods were used and 'Trained professionals performed the anthropometric measurements'. Unclear if outcome assessors knew the trial was taking place or if outcome assessors were blinded to assignment. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns
Martinez-Vizcaino 2020	High risk of bias	Schools were randomly allocated by using the statistical package StatsDirect; some concern due to no	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial	Low risk of bias	Data were missing from 11% of the participants in both intervention and control group. No differences in	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems	Some concerns

		details regarding allocation concealment. No baseline differences between groups were reported. Selection in the study may have been affected by knowledge of allocated group as consent was requested after randomization and response rate was higher in the control than in the intervention group (83% vs 53%).		context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		age, sex or BMI between children who had valid data and those who did not were found.		likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Newton 2014	Low risk of bias	The method of randomization was appropriate, and it is likely that allocation was concealed: a block randomization procedure was generated by a study statistician utilizing SAS software, with a block size of four. The randomization sequence was placed in sealed, numbered envelopes. The clinic coordinator opened the next envelope in the sequence after a participant successfully completed all eligibility criteria. No major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No participants were lost to follow-up in this study.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups as it seems like they were taken by study staff. The article says 'The assessment staff was not blinded to the participant assignment.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	
Rhodes 2019	Low risk of bias	randomization and allocation concealment were appropriate. Participants were randomised using an online program, Research randomiser.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. Participants flowchart	Some concerns	The author stated that 42 participants in the planning plus education group and 38 education group participants completed the study to the 26-week end point	Low risk of bias	Measurement of the outcome likely to be appropriate - specifics not given. Measurements unlikely to differ as conducted by researchers using the same protocols. 'The	Low risk of bias	

		This program provided a simple randomization. Participants were allocated to these conditions using a 1:1 ratio. Initial recruiters were blinded to treatment allocation as this was concealed by a trial coordinator (who performed the randomization). No baseline differences to suggest issues with randomization.		suggests that an intention-to-treat analysis used.		(overall 22% attrition). There is no evidence that the result was not biased by missing data. Missingness could depend on its true value. Reasons for attrition include: 'lack of interest to continue (41%), changes in family circumstances such as divorce (18%), and a child's refusal to wear the accelerometer (14%).' Attrition numbers were not statistically different across the groups. It seems likely to not be related to BMI.		lead trial coordinator conducted study protocol quality control training and crosschecks with all research assistants to ensure standardization.' The intervention delivery team were not blinded but fitness testers were. No mention of whether the researchers measuring BMI were blinded but seems unlikely 'Fitness testers were blind to the condition the families were randomised to; however, the intervention delivery team was aware of the condition, so they could deliver appropriate intervention materials.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		
Thivel 2011	Some concerns	The article states that children were randomly assigned but does not explain the random component used, and allocation concealment is not detailed. There appeared to be no major baseline differences. Participants were assessed for eligibility and recruited from the schools that	Low risk of bias	There is no information to suggest they were blinded to this. There is no information regarding deviations from the intended intervention that arose due to the trial context but no reason to suspect these occurred. It appears an intention-to-treat analysis was used, as results table presents data	High risk of bias	There is no information provided about missing data to determine the answers to this domain, leaving it at high risk of bias.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust.	Some concerns	

		agreed to participate before randomization of clusters. There were no baseline imbalances to suggest differential identification or recruitment of individuals between groups. There were 14 clusters in intervention and 5 clusters in control, but with the same number of participants in the intervention and control overall, and equal split between boys and girls. No information provided for demographics within each school (cluster), only at the individual level, for baseline data.		from the full participant sample.				The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
de Greeff 2016	Low risk of bias	There is not enough information provided about randomization to determine if the methods were appropriate, but it was performed by the national Bureau for Economic Policy Analysis that was not involved in the study. Allocation was concealed. There were no baseline differences suggesting issues with randomization. 'No differences were found between the control and the intervention group, apart from age and grade. A higher percentage of third-grade children were included in the control group and because of this, the control group was	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Each school had one grade in the intervention group and the control group so it is possible contamination took place, but this is not highlighted as happening. Unclear from the paper but likely they used modified intention-to-treat analysis excluding missing participants, and in a cluster trial within schools it seems unlikely that participants would switch	Low risk of bias	There is no mention of any clusters dropping out of the study. It appears that data were available for nearly all participants. Though a flow diagram is not presented, the authors reported that ten outliers and two children who attended less than 80% of the intervention lessons were excluded from further analyses (3% of the total sample)	Low risk of bias	Measurement of the outcome was appropriate. Trained researchers conducted measurements so likely they knew about the trial: 'Height and weight were measured while the children were wearing gym clothes without shoes. Instructed researchers administered the test battery following the protocol standardized to ensure consistency in the test administration.' There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements	Some concerns	

		significantly older compared to the intervention group' These differences did not persist when the grades were investigated separately. . No information provided about order of randomization of schools and recruitment of individuals. It is unlikely selection was affected as all students were invited to participate from the grades involved - nothing to suggest they were aware of assigned group. No baseline imbalances suggesting differential identification or recruitment and all students were invited to participate.		classes mid-way.				are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	

Risk of bias for analysis 2.2 BMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selectio reporte	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	
Barbeau 2007	Some concerns	No information given about the method of randomization, or whether allocation was concealed. There were no significant differences between the intervention and control groups for any of the variables at baseline.	Low risk of bias	There is no information given about deviations due to trial context, but no reason to suspect these occurred. An appropriate intention to treat analysis was employed.	High risk of bias	The retention rate was 81% for the control group and 84% for the intervention group. However, the authors selected the sibling with the lowest proportion of missing data: the small number of siblings in this study precluded the use of analytical methods that would have permitted nesting within family. Therefore, one sibling was selected within each family. The sibling	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome unlikely to differ as conducted by trained staff members and 'structured fidelity checks' were undertaken. No mention that outcome assessors were blinded to the trial. No mention that outcome assessors were blind to allocation. The measurement of height and weight using standardised	Some concerns	N s s a p a e s s r r p r e s r r f e a c p r s t

						selected was the one who had the least missing data. This procedure may have introduced selection bias if the missingness was related to the BMI measure at follow-up.		measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	Is a trial protocol registered
De Bock 2013	Low risk of bias	No concerns in this domain - randomization and allocation sequence concealment seems appropriate. Participants were identified prior to randomization and no baseline difference were reported, beside the size of the intervention group being higher than the control group.	High risk of bias	Serious concerns in this domain due to 3 preschools not implementing the allocated intervention	High risk of bias	Serious concerns over missing data: it is unclear how many participants did not report BMI measurements as BMI is a secondary outcome; based on the missing data for physical activity, 63% and 74% of the participants in the intervention and control group, respectively,	Low risk of bias	Method of outcome measure was appropriate and outcome assessors were blinded to group allocation	High risk of bias	Source reported within trial documents

						did not have outcome measured. There is not statistical test showing that results were not biased by missing data and the difference in the proportion of missing data in the two groups is higher than 10%.				Random effects
Farmer 2017	Some concerns	randomization conducted by coin flip and concealment by sealed opaque envelopes. Pairs of schools were created by matching for region, school roll and decile ranking. Same number of schools in each group. Participants were recruited after randomization and, although participation rate were similar in the two groups, participation in the study may have been affected by knowledge of the allocated group.	Low risk of bias	Some student transferred from schools assigned to intervention to schools assigned to control and vice versa, but this was not due to the trial. A modified intention to treat analysis was conducted.	Some concerns	Data were missing from 6% and 12.6% from the intervention and control group, respectively and no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were blind to group allocation.	Some concerns	Missing outcome data
Ha 2021	Low risk of bias	randomization methods and concealment are adequate, no baseline difference in between clusters. Families and children identified prior to randomization by recruitment at schools. No baseline difference in children characteristics but some difference in parents education between the two groups, that is probably due to chance	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Some concern over missing data: attrition is slightly higher in the intervention group (9.4% vs 6%) and reason for missing data is not reported;	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were blinded to group allocation	Some concerns	Missing outcome data
Howe 2011	Some concerns	Details of the randomization process and allocation concealment not reported; however, baseline	Low risk of bias	The authors reported that 50% of the participants in the intervention group attended less	Low risk of bias	No concerns over missing data, all participants were retained at follow-up	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors	Some concerns	Missing outcome data

		characteristics appear to be balanced. Participants were randomised into either the intervention group or the control group with a ratio of three to two, respectively. In the instance of siblings, the first to be tested was randomised and the remaining sibling(s) was/were placed in the same group..		than 60% of the intervention. Authors reported data from the attenders and not attenders separately, but we have merged the two sub-groups according to an intention to treat analysis				were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Khan 2014	Low risk of bias	Pairs of participants were matched for demographics and fitness, and a coin was flipped to determine group assignment; no indication of allocation concealment but randomization was performed by an independent researcher who was not involved in the data collection. There were no significant differences between the groups in age, cardiorespiratory fitness, and body composition at baseline.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were missing from 17.6% (12/68) of the participants from the control group, none from the intervention group. Missing data at follow-up were imputed with values observed at baseline and no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures and the assessors were blinded to allocated intervention.	Some concerns	
Kriemler 2010	Low risk of bias	randomization was conducted by computer generated random number table that was in the hands of a person not involved in the study; no details of concealment	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason	Low risk of bias	All schools/classes present at follow-up; data from 4% and 8% of participants were missing in the intervention and control group,	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained	Low risk of bias	

		but we have no reason to suspect there was no concealment or that lack of concealment would have introduced any bias as randomization was performed by a person not involved in the study. A randomization ratio of 3:2 was chosen to gain more experience with the intervention and to reduce costs of the trial. All students were eligible and were identified prior to randomization. No significant differences existed between the groups at baseline		to suspect these occurred. An intention to treat analysis was conducted.		respectively. The authors reported that children with a baseline assessment but no follow- up assessment did not differ from the remaining children in terms of age, sex, and the primary and secondary outcome variables at baseline (data not shown), suggesting that missingness may not be related to the true value of the outcome.		research staff using standardised procedures and the assessors were blinded to allocated intervention.		
Li 2010	Some concerns	No details about method of randomization or allocation concealment; the authors stated that they randomly selected two districts from the eight in urban Beijing. Then ten primary schools from each district were randomly chosen and assigned to be either an intervention or control group. Equal number of clusters in each group. Presumably all students were eligible to participate in the trial; based on participants flowchart, recruitment of participants occurred after randomization with a response rate of 96%. There were no significant differences between the intervention and control groups in anthropometric measures, family income level, or mother's	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted. Participants who were lost to follow-up were excluded from the analysis.	Some concerns	No school or class dropped out of the study; attrition was 11% in both groups. Subjects lost to follow-up and those who remained in the program had similar characteristics. There is no evidence that the results were not biased by missing data.	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. The research staffs who conducted the measurement were blinded to the intervention assignment.	Some concerns	N s a a s r s r a r s t

		educational background.								
Martinez-Vizcaino 2014	Some concerns	randomization conducted using a computer-generated procedure and schools (clusters) were randomly allocated (by using opaque envelopes). Some difference in parents employment status between groups likely due to chance. All the children in the fourth and fifth grades in the 20 selected schools were considered eligible for study inclusion, request for consent was sent after randomization and this could have affected the decision of the children to take part in the study as schools were informed of the result of randomization after they agreed to participate in the study. Although the same rate of consent was achieved in the two groups (67% and 70%), knowledge of allocated group may have affected participation. Baseline data are only reported for these participants for which complete data at follow-up. There were no statistically significant differences between intervention and control participants in any baseline characteristics.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Analyses were performed according to intention-to treat, with children analysed in their original randomised allocation regardless of the number of MOVI-2 program sessions attended	Some concerns	Data at follow-up were available from all the schools but were missing from 18% of the participants in both the intervention and control group. Although there were no differences by sex, age or adiposity measurements at baseline between the children who completed the study and those who did not; some concern due to proportion of missing data being relatively high.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	P a
Martinez-Vizcaino 2022	High risk of bias	Some concern due to no details regarding allocation concealment. Serious concerns over the selection of participants into the study that occurred after	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason	High risk of bias	Concerns over the high proportion of missing data in the intervention group (30%) compared to the control (5%): reason for missingness are reported	Low risk of bias	No concern in this domain - The measurement of height and weight using standardised measures, is relatively robust. The height and	Low risk of bias	T p r a a w s a r s

		randomization. Knowledge of the assigned intervention could potentially had an effect on the decision of participants to enrol in the study.		to suspect these occurred. An intention to treat analysis was conducted.		and are not related to the trial or the outcome value; however, there is a high difference in attrition between the two groups and there is no evidence that results were not biased by missing data.		weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		
Meng 2013 (Beijing)	High risk of bias	No details regarding the randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after randomization. Some baseline differences in BMI and zBMI between groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Not reported if and how many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups, therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced between the groups	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N s s a e s r s r a r s t
Simon 2008	Some concerns	There is no information about the method of randomization or allocation concealment. Baseline characteristics were similar between groups. Recruitment took place prior to randomization. There were no baseline imbalances to suggest differential identification or recruitment of individual	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. They conducted intention-to-treat analysis.	Some concerns	There is no mention of any clusters dropping out, suggesting all clusters contributed data. Outcomes were obtained from 77% of the participants. They conducted a sensitivity analysis which showed little effect of missing data. ''All available data were used for the analyses,	Low risk of bias	Measurement of the outcome was appropriate. The procedures were standardized between schools. There is no information provided about whether outcome assessors were blinded to group assignment, but the trial registry says open label no masking so it	Low risk of bias	F a a 2 E r v e s r r h s t f e c r N t r s r

		participants between intervention groups				including those from participants lost to follow-up, assuming non-informative dropout. We conducted the same analyses using either the participants with at least one follow-up survey or participants who completed the study. These analyses had little effect on intervention estimates. Therefore, only results from the analyses using all the participants included at baseline are presented.' Missingness could depend on the true value. However, it seems unlikely because they give the reasons for missingness and the differences in missingness across groups is not substantial: 'The main reason for lack of follow-up was school transfer or school absence on the day of the survey. Students lost to follow-up were more frequently boys and slightly older but their anthropometric and physical activity characteristics did not differ from those of the follow-up students and were comparable between intervention and control groups.		seems likely they were not blinded. The measurement of height and weight by trained professionals using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		a c v s s a
Tanskey 2017	High risk of bias	randomization was performed by the trial statistician as block of 3 stratified by district; allocation was	High risk of bias	There is no information regarding deviations from the intended intervention that arose	Low risk of bias	It is not reported if any school from this subset withdraw after randomization. Of the participants	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to	High risk of bias	B p c c a r s D

		concealed to the recruitment staff. . Based on participants flowchart, participants were recruited into the study after the schools were randomised to each arm and it is possible that participation in the study was influenced by knowledge of the allocated intervention		due to the trial context, but no reason to suspect these occurred. No details regarding use of an ITT analysis and participants flowchart is not reported therefore we cannot assess whether participants were analysed according to their allocated group		eligible, 96% were included in the final analysis (no details of number with missing data per group). No evidence that the result was not biased by missing data, but the percent of missing data is relatively low (4%).		differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Vizcaino 2008	Some concerns	randomization was undertaken using a computer-generated procedure but there are no details about the allocation concealment. There are no major baseline differences to suggest a problem with the randomization process. Recruitment of schools took place prior to randomization but the request for parents and children informed consent came after randomization of schools. Therefore, this suggests that participants may have known if they were consenting to the intervention or the control, and knowledge of the allocated intervention could affect selection of the participants. However, all students in the chosen grades	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context but no reason to suspect these occurred. An intention-to-treat analysis was used.	Some concerns	There is no information provided about whether all clusters (classrooms) contributed data, suggesting no clusters dropped out. Data were available for 90.6% of the children in intervention and 95.5% in control. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value. Reasons for missing data are not provided, but attrition was similar across the groups.	Low risk of bias	Measurement of the outcome was appropriate. Measurement is unlikely to differ across groups as the same measurement methods were used and it was conducted by trained researchers. It seems likely outcome assessors knew the trial was taking place. Outcome assessors were not blind to assignment. The measurement of height and weight by researchers using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be	Some concerns	

		were invited to participate and similar rates of consent between the groups. There were no baseline imbalances that suggest differential identification or recruitment of individual participants between the intervention groups.						influenced by knowledge of intervention, this is highly unlikely.		
Wang 2018	Some concerns	randomization was performed by research team at the school level based on the 1:1 matching proportion within each urban district, using random numbers generated but no information on allocation concealment. Participants from intervention and control schools were comparable in age, sex and BMI. Participants flowchart reports that eligibility check and recruitment took place prior to randomization. No baseline imbalances suggesting differential identification or recruitment are reported and all students were invited to participate.	Low risk of bias	There is no suggestion it was blinded. There is no information to suggest deviations from intended interventions due to trial context. Participants flowchart suggests modified intention-to-treat analysis was used.	Low risk of bias	There is no suggestion that any clusters dropped out of the study. 2.31% of participants were missing in the intervention and 2.30% were missing in the control group.	Low risk of bias	Measurement of the outcome was likely to be appropriate as it was conducted by trained research staff according to protocols. Researchers completed assessments and so likely would have known about the trial. There is no information given to suggest that researchers were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N s a e s r r h s b f e c r N t r s r a c s a c

Risk of bias for analysis 2.3 BMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selectio reported	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	S j
Donnelly 2009	Some concerns	randomization method not described, and details of	Low risk of bias	No evidence of deviation from intended	High risk of bias	Two schools were lost after randomization, one due to	Low risk of bias	Measurement of the outcome was appropriate.	Low risk of bias	P ar av pr

		concealment not reported. No evidence of cluster baseline differences. All students were included in the study since it was adopted as a school curriculum. Unclear if participants were recruited before or after randomization, but the authors reported that consent was requested only for measurement of the secondary outcomes in a sub-sample of volunteer participants, suggesting that no consent was asked for BMI measurements. No baseline differences between groups were reported.		intervention. An intention to treat analysis was conducted		being allocated to the control group and one due to closing of the school. Almost all data were available for the retained participants (2-2.5%). Serious concerns over missing data from the school that left the study because it was allocated to control group that could lead to bias.		Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		ar co ac pl m tw bu re fr to (a m ev
Farmer 2017	Some concerns	randomization conducted by coin flip and concealment by sealed opaque envelopes. Pairs of schools were created by matching for region, school roll and decile ranking. Same number of schools in each group. Participants were recruited after randomization and, although participation rate were similar in the two groups, participation in the study may have been affected by knowledge of the allocated group.	Low risk of bias	Some student transferred from schools assigned to intervention to schools assigned to control and vice versa, but this was not due to the trial. A modified intention to treat analysis was conducted.	Some concerns	Data were missing from 18% and 23% from the intervention and control group, respectively and no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were blind to group allocation.	Some concerns	N sp st ar av su re se m ar nc sp to
Kriemler 2010	Low risk of bias	randomization was conducted by computer generated random number table that was in the hands of a person not involved in the study; no details of concealment	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no	High risk of bias	Data from 35% and 50% of participants were missing in the intervention and control group, respectively. The authors reported that z-	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained	Low risk of bias	A pu th A co ac wi sp

		but we have no reason to suspect there was no concealment or that lack of concealment would have introduced any bias as randomization was performed by a person not involved in the study. A randomization ratio of 3:2 was chosen to gain more experience with the intervention and to reduce costs of the trial. All students were eligible and were identified prior to randomization. No significant differences existed between the groups at baseline		reason to suspect these occurred. An intention to treat analysis was conducted.		scores of sums of four skinfolds, BMI and waist circumference were lower in participants than in non-participants, and also that more obese children and those with a migrant background dropped out although other participants' and non-participants. The authors tried to account for this possible bias by adding a propensity score to our model (to adjust for differential participation) showing that the results remained the same despite adjustment for participation differences. The level of attrition is substantially high, and we cannot excluded bias in the results.		research staff using standardised procedures and the assessors were blinded to allocated intervention.		
Li 2010	Some concerns	No details about method of randomization or allocation concealment; the authors stated that they randomly selected two districts from the eight in urban Beijing. Then ten primary schools from each district were randomly chosen and assigned to be either an intervention or control group. Equal number of clusters in each group. Presumably all students were eligible to participate in the trial; based on participants flowchart, recruitment of participants occurred after randomization with a response	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted. Participants who were lost to follow-up were excluded from the analysis.	Some concerns	No school or class dropped out of the study; attrition was 11% in both groups. Subjects lost to follow-up and those who remained in the program had similar characteristics. There is no evidence that the results were not biased by missing data	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. The research staffs who conducted the measurement were blinded to the intervention assignment.	Some concerns	N sp st ar av su re se m ar nc sp to

		rate of 96%. There were no significant differences between the intervention and control groups in anthropometric measures, family income level, or mother's educational background.								
Sacchetti 2013	Some concerns	Some concern over lack of details about method of randomization and whether the sequence allocation was concealed. All students within selected classes were eligible to be enrolled in the study. Unclear if selection occurred prior to randomization but the response rate was high (97%) therefore it is unlikely that knowledge of allocated intervention affected the participation rate selectively. There were no baseline differences between groups.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No reported whether an intention to treat analysis was conducted.	Some concerns	Missing data from 14% of the participants in both groups and reason for missingness is reported	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	N sp st ar av su re se m ar nc sp to
Simon 2008	Some concerns	There is no information about the method of randomization or allocation concealment. Baseline characteristics were similar between groups. Recruitment took place prior to randomization. There were no baseline imbalances to suggest differential identification or recruitment of individual participants	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. They conducted intention-to-treat analysis.	Some concerns	There is no mention of any clusters dropping out, suggesting all clusters contributed data. Outcomes were obtained from 77% of the participants. They conducted a sensitivity analysis which showed little effect of missing data. "All available data were used for the analyses,	Low risk of bias	Measurement of the outcome was appropriate. The procedures were standardized between schools. There is no information provided about whether outcome assessors were blinded to group assignment, but the trial registry says open label no masking so it seems likely	Low risk of bias	P ar av 20 B re wi ev su nu re ha se ba fr el ou m N th re se m ar

		between intervention groups				including those from participants lost to follow-up, assuming noninformative dropout. We conducted the same analyses using either the participants with at least one follow-up survey or participants who completed the study. These analyses had little effect on intervention estimates. Therefore, only results from the analyses using all the participants included at baseline are presented.' Missingness could depend on the true value. However, it seems unlikely because they give the reasons for missingness and the differences in missingness across groups is not substantial: 'The main reason for lack of follow-up was school transfer or school absence on the day of the survey. Students lost to follow-up were more frequently boys and slightly older, but their anthropometric and physical activity characteristics did not differ from those of the follow-up students and were comparable between intervention and control groups.		they were not blinded. The measurement of height and weight by trained professionals using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		da wi sp st ar
Telford 2012	High risk of bias	The study is described as randomised quasi-experimental and no further	Some concerns	There is no information regarding deviations from the intended	Some concerns	There are no details regarding missing data but from the protocol paper	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the	Some concerns	S co th pl re de

		details regarding randomization methods or concealment. No details or flowchart to report whether participants were identified and recruited before or after randomization and knowledge of the allocated intervention could affect selection of the participants.		intervention that arose due to the trial context, but no reason to suspect these occurred. Not reported if the analysis was conducted according to an ITT plan but the intervention was delivered as part of the school curriculum therefore is very unlikely that participants did not attend the intervention sessions for reason related to the trial.		it appear that 30 schools were randomised to intervention and control, with 400 and 430 children respectively in the control and intervention group. Only 29 schools are reported in the main paper, suggesting that one school was not included in the analysis, and the number of participants with BMI data are reported as 312 and 308 in the intervention and control group respectively (27% and 23% of missing data). Although attrition is balanced between groups, there is no statistical evidence that results were not biased and the reason for missingness is not reported, therefore there is no enough information on missing data to assess for bias.		outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		ar ou
Wendel 2016	High risk of bias	There is not enough information provided to determine the random component used in randomization or if allocation was concealed. Baseline characteristics are only presented for the final sample size rather than all randomised. As a result of attrition and participant exclusion, treatment and control group sample sizes were disproportionate across schools and grades. Despite these discrepancies, there were no significant	Some concerns	This study excluded people who dropped out (i.e., due to moving school), did not participate in line with the protocol (i.e., sat on a bouncy ball rather than a chair) or switched to classrooms that were not participating in the study. Some participants did cross-over to the other arm of the study, however they accounted for this by making four	Some concerns	Data are missing from 40% of the participants int he intervention group and from 47% in the control group. One grade at one of the schools was excluded from data collection in the second year of the study as a result of students switching to classrooms that were not participating in the study. Missing data is balanced across groups and reasons are given to explain it such as switching classrooms, moving	Low risk of bias	Measurement of the outcome was likely to be appropriate as researchers measured height and weight in the classroom. Measurement is unlikely to have differed as researchers conducted it and they mention 'the process was repeated' at conclusion of the study. Researchers completed assessments and so would have known about the trial. There is no information given to suggest that researchers	Some concerns	N sp st ar av ev su nu re ha se ba fr el ou m N th re se m ar da st ar co

		differences in baseline characteristics such as race/ethnicity, gender, and BMI category. randomization of schools appears to have taken place prior to recruitment of students. It is not clear whether students/parents knew which arm the school had been randomised to prior to giving consent, and knowledge of the allocated intervention could affect selection of the participants. Baseline data is not provided for all participants randomised therefor we have uncertainty on whether there is any selection bias due to randomization and selection issues.		groups including a group who stayed in arm 1 and a group who stayed in arm 2 and analysing these. They therefore did not analyse them in the original group to which they were randomised. There is potential for a substantial impact on the result - 59 people crossed over from treatment to control and 23 crossed over from control to treatment. These were therefore not included in the 'true' arm A and arm B groups. However, we analysed data merging the groups originally allocated to intervention or control and therefore our analysis was conducted according to an intention to treat plan.		schools etc. There is no reported statistical analysis producing evidence to show result not biased by missing data; attrition is high in both groups and could introduce bias in the results.		were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 2.4 zBMI short term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Se rep
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Autho judgem
Barnes 2015	Low risk of bias	The method of randomization was adequate and allocation sequence was concealed. Similar numbers of families and equal number of mothers with more that none daughters were assigned to each group. Family	Low risk of bias	Participants, carers and those delivering the intervention were likely aware of the assigned intervention during the trial. This is because the intervention included after school activity sessions, whereas the control group	Low risk of bias	Data were available for nearly all participants randomised.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline	Some concern

		assessment of eligibility was conducted prior to randomization. Eight families had more than one daughter participating (4 allocated to in each arm), it is not reported whether other families had more than one daughter eligible but they only enrolled one. There appears to be no major baseline differences to suggest a problem with randomization.		did not. There is no information about deviations but no reason to suspect deviations occurred due to the trial context. An intention to treat analysis was conducted				assessment, but it does not mention whether they were blinded at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Breheny 2020	Low risk of bias	randomization was appropriate and it seems allocation was concealed until clusters were enrolled and assigned due to being conducted by an independent statistician. Baseline characteristics and outcome measures were well balanced between the intervention and control arms although children in the control arm were slightly less likely to live in deprived areas (IMD quintiles 3–5) and fewer were in the White ethnic group. Recruitment took place before randomization.	Low risk of bias	Participants may not have known they were in a trial because it formed part of the curriculum (adding in a run around in each class), and the whole school was randomised to take part. However, they did consent to outcome measurements, and it is possible they would have been told about the trial by staff or realised themselves as it involves a new intervention (the daily mile). Participants, carers and those delivering the intervention were aware of intervention assignment. They say 'Due to the nature of the intervention it was not possible to mask school staff, children, family members and project staff to the intervention allocation. There is no information given about deviations to intended interventions	Some concerns	Three clusters (schools) dropped out: two schools (one intervention and one control) dropped out due to a change in headteacher, the third (intervention) school dropped out as it amalgamated with a nearby secondary school. In addition, 4% of the children were lost to follow-up in the intervention and 5% in the control. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness at this time point was mainly due to the loss of clusters which was due to a new headteacher taking over/school structure changing. They do not provide reasons for missing data at the individual level. The level of attrition is relatively low in both group and missingness does not differ between intervention/control.	Low risk of bias	Measurement of the outcome was appropriate. Measurement is unlikely to differ because the protocol says 'Participant's height and weight are measured in school at baseline, 4 and 12 months, by trained researchers using a standard protocol' It is likely the outcome assessors knew the trial was taking place as they were research staff. The authors says that all research staff undertaking the physical measurements were blinded to intervention allocation.	Low risk bias

				due to the trial context, but no reason to suspect these occurred. It appears that modified intention-to-treat was used as participants with outcome assessment data were analysed according to allocated arm, irrespective of whether or not the participants adhered to the intervention.'					
Diaz-Castro 2021	Low risk of bias	No concerns over the randomization procedures or concealment and there are no differences in baseline characteristic between the two groups.	Some concerns	Some concerns over the lack of reporting on the analysis plan used	Some concerns	Some concerns regarding the lack of information about whether there was any missing data	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concern
Lazaar 2007	Some concerns	There is not enough information provided to determine if randomization was conducted appropriately and there is no information about allocation concealment; the author stated that a draw was carried out in order to choose the schools with an additional 6-month PA programme. There were no baseline differences to suggest issues with the randomization process. Recruitment took place prior to randomization. Baseline anthropometric data revealed no significant	Low risk of bias	No information given about deviations from intended interventions, but no reason to suspect these occurred. 98.9% of data present so likely correct analysis used. Also we'd assume the participants are kept in their intervention groups because it is implemented within the school curriculum.	Low risk of bias	There is no suggestion that any clusters (schools) dropped out. The authors reported that anthropometric data were collected after 6 months of intervention for 98.9% of the cohort children.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to have differed across groups because the same methods were used and 'Trained professionals performed the anthropometric measurements'. Unclear if outcome assessors knew the trial was taking place or if outcome assessors were blinded to assignment. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI.	Some concern

		differences between groups for any of the outcome variables.						Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Martinez-Vizcaino 2020	High risk of bias	Schools were randomly allocated by using the statistical package StatsDirect; some concern due to no details regarding allocation concealment. No baseline differences between groups were reported. Selection in the study may have been affected by knowledge of allocated group as consent was requested after randomization and response rate was higher in the control than in the intervention group (83% vs 53%).	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	Data were missing from 11% of the participants in both intervention and control group. No differences in age, sex or BMI between children who had valid data and those who did not were found.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern
Newton 2014	Low risk of bias	The method of randomization was appropriate, and it is likely that allocation was concealed: a block randomization procedure was generated by a study statistician utilizing SAS software, with a block size of four. The randomization sequence was placed in sealed, numbered envelopes. The clinic coordinator opened the next envelope in the sequence after	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No participants were lost to follow-up in this study.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups as it seems like they were taken by study staff. The article says 'The assessment staff was not blinded to the participant assignment.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to	Some concern

		a participant successfully completed all eligibility criteria. No major baseline differences to suggest a problem with randomization.						produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	

Risk of bias for analysis 2.5 zBMI medium term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Se re
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Autho judgem
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concern
Breheny 2020	Low risk of bias	randomization was appropriate and it seems allocation was concealed until clusters were enrolled and assigned due to being conducted by an independent statistician. Baseline characteristics and outcome measures were well balanced between the intervention and	Low risk of bias	Participants may not have known they were in a trial because it formed part of the curriculum (adding in a run around in each class), and the whole school was randomised to take part. However, they did consent to outcome measurements, and it is	Some concerns	Three clusters (schools) dropped out: two schools (one intervention and one control) dropped out due to a change in headteacher, the third (intervention) school dropped out as it amalgamated with a nearby secondary school. In addition, 6% of the children were lost to follow-up in the intervention and 9% in the control. There is no reported	Low risk of bias	Measurement of the outcome was appropriate. Measurement is unlikely to differ because the protocol says 'Participant's height and weight are measured in school at baseline, 4 and 12 months, by trained researchers	Low risk bias

		control arms although children in the control arm were slightly less likely to live in deprived areas (IMD quintiles 3–5) and fewer were in the White ethnic group. Recruitment took place before randomization.		possible they would have been told about the trial by staff or realised themselves as it involves a new intervention (the daily mile). Participants, carers and those delivering the intervention were aware of intervention assignment. They say 'Due to the nature of the intervention it was not possible to mask school staff, children, family members and project staff to the intervention allocation. There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. It appears that modified intention-to-treat was used as participants with outcome assessment data were analysed according to allocated arm, irrespective of whether or not the participants adhered to the intervention.'		statistical analysis producing evidence to show result not biased by missing data. Missingness at this time point was mainly due to the loss of clusters which was due to a new headteacher taking over/school structure changing. They do not provide reasons for missing data at the individual level. The level of attrition is relatively low in both group and missingness does not differ between intervention/control.		using a standard protocol' It is likely the outcome assessors knew the trial was taking place as they were research staff. The authors says that all research staff undertaking the physical measurements were blinded to intervention allocation.	
Farmer 2017	Some concerns	randomization conducted by coin flip and concealment by sealed opaque envelopes. Pairs of schools were created by matching for region, school roll and decile ranking. Same number of schools in each group. Participants were recruited after randomization and, although participation rate were similar in the two groups, participation in	Low risk of bias	Some student transferred from schools assigned to intervention to schools assigned to control and vice versa, but this was not due to the trial. A modified intention to treat analysis was conducted.	Some concerns	Data were missing from 6% and 12.6% from the intervention and control group, respectively and no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were blind to group allocation.	Some concerr

		the study may have been affected by knowledge of the allocated group.							
Khan 2014	Low risk of bias	Pairs of participants were matched for demographics and fitness, and a coin was flipped to determine group assignment; no indication of allocation concealment but randomization was performed by an independent researcher who was not involved in the data collection. There were no significant differences between the groups in age, cardiorespiratory fitness, and body composition at baseline.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were missing from 17.6% (12/68) of the participants from the control group, none from the intervention group. Missing data at follow-up were imputed with values observed at baseline and no evidence that results were not biased by missing data	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures and the assessors were blinded to allocated intervention.	Some concern
Li 2010	Some concerns	No details about method of randomization or allocation concealment; the authors stated that they randomly selected two districts from the eight in urban Beijing. Then ten primary schools from each district were randomly chosen and assigned to be either an intervention or control group. Equal number of clusters in each group. Presumably all students were eligible to participate in the trial; based on participants flowchart, recruitment of participants occurred after randomization with a response rate of 96%. There were no significant differences between the intervention and control groups in anthropometric	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted. Participants who were lost to follow-up were excluded from the analysis.	Some concerns	No school or class dropped out of the study; attrition was 11% in both group. Subjects lost to follow-up and those who remained in the program had similar characteristics. There is no evidence that the results were not biased by missing data	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. The research staffs who conducted the measurement were blinded to the intervention assignment.	Some concern

		measures, family income level, or mother's educational background.							
Martinez-Vizcaino 2022	High risk of bias	Some concern due to no details regarding allocation concealment. Serious concerns over the selection of participants into the study that occurred after randomization. Knowledge of the assigned intervention could potentially had an effect on the decision of participants to enrol in the study.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Concerns over the high proportion of missing data in the intervention group (30%) compared to the control (5%): reason for missingness are reported and are not related to the trial or the outcome value; however, there is a high difference in attrition between the two groups and there is no evidence that results were not biased by missing data.	Low risk of bias	No concern in this domain - The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Low risk bias
Meng 2013 (Beijing)	High risk of bias	No details regarding the randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after randomization. Some baseline differences in BMI and zBMI between groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Not reported if and how many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups, therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced between the groups	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern
Morgan 2019	Low risk of bias	The randomised allocation sequence was generated by a statistician who did not have contact with	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due	Some concerns	It is no clear if data from BMI were missing as participants flowchart only reported for primary outcome data	Low risk of bias	Weight and heigh measured using appropriate methods and unlikely to	Some concern

		participants. The allocation sequences (stratified by fathers' body mass index [BMI]) were generated by a computer-based random number producing algorithm and stored in a restricted folder. Group assignment information was prepacked into identical, sealed opaque envelopes and numbered according to the randomization schedule by a research assistant who was not involved in enrolment, assessment, or allocation. No baseline differences reported. No concerns in this domain - individuals were recruited prior to randomization; no major baseline differences to suggest differential identification and recruitment.		to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		(father and daughter physical activity). bias due to missing data not formally tested. No baseline differences between completers and non-completers suggests missing data unlikely due to outcome values.		differ between intervention and control group. Outcome assessors likely knew the allocation. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Muller 2016	Some concerns	Randomization was conducted by an independent person so we don' t think there was any problem with the allocation conceallement but randomization method is not reported. . According to the participants flow-diagram baseline data were colelcted after parental consent was given and prior to randomization. Baseline characteristics were balanced betwee the two groups	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted.	Low risk of bias	Only a small proportion of missing data and balanced between the groups (4.4% in the intervention group and 6.7% in the contorl group)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically	Some concerr

								the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Muller 2019	High risk of bias	Concerns with the randomization method and lack of concealment. Allocation sequence generated by simple randomization by the research team on the basis of a computer-generated random number list. First, four schools not to get any intervention were randomly selected, and then each of the four remaining schools was randomly allocated to one of the following intervention combinations. Three schools received physical activity (PA) and five schools did not: the unbalanced number of cluster for this comparison is due to non-PA interventions not being accounted for in this analysis.. Schools were selected prior to randomization based on eligibility criteria but participants enrolled int h study after randomization and knowledge of the allocated group may have affected their choice of participation. No significant differences in primary outcome measures, such as obesity, skinfolds and cardiorespiratory fitness at baseline were detected, when comparing schools with and without physical	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted.	High risk of bias	All schools had data and were included in the analysis. Missing data for 12% from physical activity group and 43% from no physical activity group. Large different in attrition between intervention and control groups and no analysis was conducted to assessed for bias No reason for missingness is reported and no sensitivity analysis was performed.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk bias

		activity intervention.							
Tanskey 2017	High risk of bias	randomization was performed by the trial statistician as block of 3 stratified by district; allocation was concealed to the recruitment staff. . Based on participants flowchart, participants were recruited into the study after the schools were randomised to each arm and it is possible that participation in the study was influenced by knowledge of the allocated intervention	High risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details regarding use of an ITT analysis and participants flowchart is not reported therefore we cannot assess whether participants were analysed according to their allocated group	Low risk of bias	It is not reported if any school from this subset withdraw after randomization. Of the participants eligible, 96% were included in the final analysis (no details of number with missing data per group). No evidence that the result was not biased by missing data but the percent of missing data is relatvelly low (4%).	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	High risk bias
Wang 2018	Some concerns	randomization was performed by research team at the school level based on the 1:1 matching proportion within each urban district, using random numbers generated but no information on allocation concealment. Participants from intervention and control schools were comparable in age, sex and BMI. Participants flowchart reports that eligibility check and recruitment took place prior to randomization. No baseline imbalances suggesting differential identification or	Low risk of bias	There is no suggestion it was blinded. There is no information to suggest deviations from intended interventions due to trial context. Participants flowchart suggests modified intention-to-treat analysis was used.	Low risk of bias	There is no suggestion that any clusters dropped out of the study. 2.31% of participants were missing in the intervention and 2.30% were missing in the control group.	Low risk of bias	Measurement of the outcome was likely to be appropriate as it was conducted by trained research staff according to protocols. Researchers completed assessments and so likely would have known about the trial. There is no information given to suggest that researchers were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements	Some concern

		recruitment are reported and all students were invited to participate.						are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Yin 2012	Some concerns	To assure that similar types of schools were present in both the intervention and control arms, we first stratified schools on the basis of geographic location (urban, suburban, and rural). Schools then were randomised within strata to control or experimental arms of the project using a random number table. No information regarding allocation sequence concealment. Recruitment of students occurred without knowledge of allocated group for the first 30% of the participants, the rest of the participants were recruited after randomization to increase the sample size in low enrolment schools. The authors examined the potential bias in subject enrolment in the project due to lack of treatment concealment and they found no significant interaction effect of time of consent (spring vs. fall) and assignment of treatment group on the primary outcome variables (percentage body fat and fitness) at baseline after adjustment to	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Data were analysed according to an intention to treat analysis. Primary analyses where these in which children were excluded from the analysis if they had crossover school migrations (i.e., intervention to control or control to intervention). Three percent of data points were excluded from analysis due to crossover school migrations.	Some concerns	Three percent of data points were excluded from analysis due to crossover school migrations. According to the participants flowchart, at this follow-up time data were missing from 21% of the intervention and 12% of the control participants. The authors reported that It was difficult to assess the reasons for missing data at each follow-up time point (i.e., lost to follow-up or discontinued intervention) because children were allowed to rejoin the program at any time after absence from the study. Frequent change of schools within same school year (20–25%) also made the tracking difficult. We are uncertain on whether their results are biased by missing data	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concern

		student background variables (sex, race, and age).							

Risk of bias for analysis 2.6 zBMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection reported r	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su ju
Farmer 2017	Some concerns	randomization conducted by coin flip and concealment by sealed opaque envelopes. Pairs of schools were created by matching for region, school roll and decile ranking. Same number of schools in each group. Participants were recruited after randomization and, although participation rate were similar in the two groups, participation in the study may have been affected by knowledge of the allocated group.	Low risk of bias	Some student transferred from schools assigned to intervention to schools assigned to control and vice versa, but this was not due to the trial. A modified intention to treat analysis was conducted.	Some concerns	Data were missing from 18% and 23% from the intervention and control group, respectively and no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were blind to group allocation.	Some concerns	No spe sta ana ava sug res sel mu ana no spe to c
Kovalskys 2016	High risk of bias	Some concern around lack of randomization method and allocation concealment details; the number of participants at baseline differed between intervention and control, but this may arise from variation in numbers in the clusters and unlikely an issue of randomization. . No information about timing of recruitment and randomization. Participation was voluntary pending consent from	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat analysis was conducted.	High risk of bias	No information on whether data were available at follow up, for all clusters. Although the abstract states that 760 participants were enrolled, the outcome data does not include the number of participants analysed. There is no information about sensitivity analysis for missing data, or if any data were missing, or reasons for missing data. People could potentially not choose to be measured if they were	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by 'trained examiners' using the same protocol. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be	Some concerns	No spe sta ana ava sug res sel mu ana no spe to c

		the parents. Weight stigma could have influence choice to participate if the participants had knowledge of allocated group prior enrolment.				concerned about their weight (obesity stigma). So missingness of data could depend on the outcome value being measured.		influenced by knowledge of intervention, this is highly unlikely.		
Li 2010	Some concerns	No details about method of randomization or allocation concealment; the authors stated that they randomly selected two districts from the eight in urban Beijing. Then ten primary schools from each district were randomly chosen and assigned to be either an intervention or control group. Equal number of clusters in each group. Presumably all students were eligible to participate in the trial; based on participants flowchart, recruitment of participants occurred after randomization with a response rate of 96%. There were no significant differences between the intervention and control groups in anthropometric measures, family income level, or mother's educational background.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted. Participants who were lost to follow-up were excluded from the analysis.	Some concerns	No school or class dropped out of the study; attrition was 11% in both groups. Subjects lost to follow-up and those who remained in the program had similar characteristics. There is no evidence that the results were not biased by missing data	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. The research staffs who conducted the measurement were blinded to the intervention assignment.	Some concerns	No spe sta ana ava sug res sel mu ana no spe to c
Salmon 2022	Low risk of bias	No concerns over the recruitment process, schools were randomly allocated to one of four groups using computer-generated blocks of four by a statistician not involved in the	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A	Some concerns	The authors reported that zBMI data were available from 564 participants (i.e. 95% of the participants); no details of missing data in each group and bias may arise if the proportion of missingness is	Low risk of bias	No concern in this domain - The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI.	Low risk of bias	Da pro res ana acc wit spe ana rep stu

		trial, therefore we assumed that the allocation was concealed. No concerns over identification and recruitment of the participants		modified intention to treat analysis was conducted.		not balance between groups; however, the overall proportion is relatively low and we have no particular concerns of attrition bias in these results.		Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		
Simon 2008	Some concerns	There is no information about the method of randomization or allocation concealment. Baseline characteristics were similar between groups. Recruitment took place prior to randomization. There were no baseline imbalances to suggest differential identification or recruitment of individual participants between intervention groups	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. They conducted intention-to-treat analysis.	Some concerns	There is no mention of any clusters dropping out, suggesting all clusters contributed data. Outcomes were obtained from 77% of the participants. They conducted a sensitivity analysis which showed little effect of missing data. ''All available data were used for the analyses, including those from participants lost to follow-up, assuming noninformative dropout. We conducted the same analyses using either the participants with at least one follow-up survey or participants who completed the study. These analyses had little effect on intervention estimates. Therefore, only results from the analyses using all the participants included at baseline are presented.' Missingness could depend on the true value. However, it seems unlikely because they give the reasons for missingness and the differences in missingness across groups is not	Low risk of bias	Measurement of the outcome was appropriate. The procedures were standardized between schools. There is no information provided about whether outcome assessors were blinded to group assignment, but the trial registry says open label no masking so it seems likely they were not blinded. The measurement of height and weight by trained professionals using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	Pre ana ava 200 BM rep wit evi sug nur res hav sel bas fro eli out me No tha res sel mu ana dat wit spe sta ana

							substantial: 'The main reason for lack of follow-up was school transfer or school absence on the day of the survey. Students lost to follow-up were more frequently boys and slightly older but their anthropometric and physical activity characteristics did not differ from those of the follow-up students and were comparable between intervention and control groups.				
Yin 2012	Some concerns	To assure that similar types of schools were present in both the intervention and control arms, we first stratified schools on the basis of geographic location (urban, suburban, and rural). Schools then were randomised within strata to control or experimental arms of the project using a random number table. No information regarding allocation sequence concealment. Recruitment of students occurred without knowledge of allocated group for the first 30% of the participants, the rest of the participants were recruited after randomization to increase the sample size in low enrolment schools. The authors examined the potential bias	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Analyses only included data from participants who reported 40% attendance to the intervention.	High risk of bias	Three percent of data points were excluded from analysis due to crossover school migrations. According to the participants flowchart, at this follow-up time data were missing from 40% of the intervention and 30% of the control participants. The authors reported that It was difficult to assess the reasons for missing data at each follow-up time point (i.e., lost to follow-up or discontinued intervention) because children were allowed to rejoin the program at any time after absence from the study. Frequent change of schools within same school year (20–25%) also made the tracking difficult. the high level of attrition and the large	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No spe sta ana ava evi sug nur res hav sel bas fro eli out me No tha res sel mu ana dat sta ana cor

		in subject enrolment in the project due to lack of treatment concealment and they found no significant interaction effect of time of consent (spring vs. fall) and assignment of treatment group on the primary outcome variables (percentage body fat and fitness) at baseline after adjustment to student background variables (sex, race, and age).				difference between th two group suggest that missingness could have been related to the outcome value and therefore the results could be biased.					

Risk of bias for analysis 2.7 Percentile short term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of the reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support judgem
Newton 2014	Low risk of bias	The method of randomization was appropriate, and it is likely that allocation was concealed: a block randomization procedure was generated by a study statistician utilizing SAS software, with a block size of four. The randomization sequence was placed in sealed, numbered envelopes. The clinic coordinator opened the next envelope in the sequence after a participant successfully completed all eligibility criteria. No major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No participants were lost to follow-up in this study.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups as it seems like they were taken by study staff. The article says 'The assessment staff was not blinded to the participant assignment.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Some concerns	No pre-specified statistica analysis p available. reason to suggest r selected multiple outcome measure - BMI rep in trial reg No sugge the result selected multiple analyses, no pre-specified to compa

								this is highly unlikely		

Risk of bias for analysis 2.8 Percentile medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Supp fo judger
van de Berg 2020	High risk of bias	Four schools in each geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to each group. It is unclear if participants were recruited before or after the schools randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition were seen across treatment conditions suggesting that knowledge of assigned intervention could have affected selection or participation of the dyads into the study.	Some concerns	No deviations have been reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in the results table but the schools data were analysed according to their allocated group.	High risk of bias	No information regarding missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	Analysi the res was conduc accord a pre-specifie analysi plan reporte the stu protoc that wa publish prior to data analyse

Risk of bias for analysis 2.9 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection reported r	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su ju
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore participant ay have been aware of their allocated group, however, the authors reported that participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an intervention group based on sixth grade school.	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were missing completely at random or missing at random.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No p spe stat ana ava sug resu sele mul ana no p spe to c
Muller 2016	Some concerns	Randomization was conducted by an independent person so we don' t think there was any problem with the allocation conceallement but randomization method is not reported. . According to the participants flow-diagram baseline data were colelcted after parental consent was given and prior to randomization. Baseline	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis was conducted.	Some concerns	Data were missing from 15% of the intervention groups and 14% of the control group; although attrition is balanced between the two groups, reason for missingness is not reported and there is no statistical evidence that results	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The	Some concerns	No p spe stat ana ava sug resu sele mul ana no p spe to c

		characteristics were balanced betwee the two groups				were not biased.		measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Wendel 2016	High risk of bias	There is not enough information provided to determine the random component used in randomization or if allocation was concealed. Baseline characteristics are only presented for the final sample size rather than all randomised. As a result of attrition and participant exclusion, treatment and control group sample sizes were disproportionate across schools and grades. Despite these discrepancies, there were no significant differences in baseline characteristics such as race/ethnicity, gender, and BMI category. randomization of schools appears to have taken place prior to recruitment of students. It is not clear whether students/parents knew which arm the school had been randomised to prior to giving consent, and knowledge of the allocated intervention could affect selection of the participants. Baseline data is not provided for all participants randomised therefor we have	Some concerns	This study excluded people who dropped out (i.e., due to moving school), did not participate in line with the protocol (i.e., sat on a bouncy ball rather than a chair) or switched to classrooms that were not participating in the study. Some participants did cross-over to the other arm of the study, however they accounted for this by making four groups including a group who stayed in arm 1 and a group who stayed in arm 2 and analysing these. They therefore did not analyse them in the original group to which they were randomised. There is potential for a substantial impact on the result - 59 people	Some concerns	Data are missing from 40% of the participants int he intervention group and from 47% in the control group. One grade at one of the schools was excluded from data collection in the second year of the study as a result of students switching to classrooms that were not participating in the study. Missing data is balanced across groups and reasons are given to explain it such as switching classrooms, moving schools etc. There is no reported statistical analysis producing evidence to show result not biased by missing data; attrition is high in both groups and could introduce bias in the results.	Low risk of bias	Measurement of the outcome was likely to be appropriate as researchers measured height and weight in the classroom. Measurement is unlikely to have differed as researchers conducted it and they mention 'the process was repeated' at conclusion of the study. Researchers completed assessments and so would have known about the trial. There is no information given to suggest that researchers were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No p spe stat ana ava evi sug num resu hav sele bas fro eligi out mea No s that resu sele mul ana data stat ana com

		uncertainty on whether there is any selection bias due to randomization and selection issues.		crossed over from treatment to control and 23 crossed over from control to treatment. These were therefore not included in the 'true' arm A and arm B groups. However, we analysed data merging the groups originally allocated to intervention or control and therefore our analysis was conducted according to an intention to treat plan.						

Risk of bias for analysis 3.1 BMI short term

Study	Bias							
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of t outcome	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support judgem
Annesi 2016	High risk of bias	There are no details about the randomization process or allocation concealment. The control group had 15 participants classed as overweight/ obese, whilst the intervention group at 28, however there was no significant difference between the groups on BMI or BMI percentile. No information provided about order of recruitment of participants and randomization. Details of characteristics not provided per site so unable to tell if likely differences in recruitment.	Low risk of bias	Participants knew they were in a trial - written consent from parents and verbal assent from children. It is likely participants, carers and those delivering the intervention knew about the trial due to the nature of it (enhanced activities and letters home in the experimental group). Participants and parents signed informed consent and staff were trained. However, they do say that participants and parents were blinded to assignment and the goals of the research. There is no information	Some concerns	No suggestion any sites dropped out of the study. No information about participant numbers or missing data throughout the study. There is no reported statistical analysis producing evidence to show result not biased by missing data. No information about missing data but they do say that participants who were missing any data did not significantly differ from the sample as a whole on any demographic or study measure, suggesting any missing data was not related to the true value of the outcome.	Low risk of bias	Measurem of the outc was appropriat Measurem of the outc unlikely to as conduc by trained members ' identical manner' ar 'structured fidelity che were undertake mention th outcome assessors blinded to trial. No mention th outcome assessors blind to allocation. measurem of height a weight usi standardis measures relatively r The height weight measurem are used t produce B Although theoretical

				regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No information given about whether intention to treat was used, no note of participant numbers throughout the study, however it seems likely that participants would not have crossed over due to sites being the unit of randomization.				recorded measures be influenc knowledge interventio this is high unlikely.
Annesi 2017	High risk of bias	randomization was appropriate, as sites were assigned via computer-generated numbers, and it is likely this concealed allocation. They state that there were no significant differences between groups at baseline on key variables. No information provided about order of recruitment of participants and randomization. Details of characteristics not provided per site so unable to tell if likely differences in recruitment.	Low risk of bias	Participants knew they were in a trial - written consent from parents and verbal assent from children. It is likely participants, carers and those delivering the intervention knew about the trial due to the nature of it (enhanced activities and letters home in the experimental group). Participants and parents signed informed consent and staff were trained. However, they do say that participants and parents were blinded to assignment and the goals of the research. There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was followed	Some concerns	No suggestion any sites dropped out of the study. 14% of data are missing in the study but the authors do not break it down by time points. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missing data could be due to the true value however they say they established that the missing data was missing at random so it likely was not due to true value	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc unlikely to as conduc by trained members a 'structured fidelity che were undertaker mention th outcome assessors blinded to trial. No mention th outcome assessors blind to allocation. measurem of height a weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.

Baranowski 2003	Some concerns	No information given about the random component used in randomization, or whether allocation was concealed. There were differences between treatment and control groups at baseline. However, the trial has a small sample size so it is possible this could be due to chance. .	Low risk of bias	There is no information given about deviations due to trial context, but no reason to suspect these occurred. It appears that an appropriate modified intention to treat analysis was employed.	Low risk of bias	Data were missing from 89% of the intervention and 87.5% of the control group. However, analyses showed data missing completely at random and analyses performed with and without imputed data had similar results.	Low risk of bias	Height and weight wer measured appropriate Measurem unlikely to differed between interventio groups due being conducted trained sta Data colle were blinde group assignmen
Beech 2003	Low risk of bias	randomization was stratified by field center and an urn randomization procedure was used to generate the treatment allocation sequences. The different sequences were stored on a computer at the study center and accessed using an interactive voice response telephone system. It is likely allocation was concealed due to the use of this centralised method. Groups were similar at baseline. .	Low risk of bias	Participants were aware of their assigned intervention, as this could not be blinded. Carers and people delivering the intervention were aware of the participants' assigned intervention. There is no evidence of deviations from the intended intervention due to the trial context, though parents of the girls in the comparison group were disappointed with their daughters assignment to the control and did see information about hip hop classes on recruitment materials. An appropriate intention to treat analysis was used.	Low risk of bias	Data were available for all participants of the study.	Low risk of bias	The metho measuring outcome w appropriate measurem was unlike have differe between interventio groups. Outcome assessors likely awar the assigne interventio The measurem of height a weight by researcher using standardis measures, relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely
Brown 2013	Some concerns	No method of randomization or concealment reported. Baseline data only reported for participants that completed the study, so we are unable to assess whether there	Low risk of bias	No indication of deviation from intended intervention or that an intention to treat analysis was	Some concerns	16% of the participants in each group did not complete the study and reasons for discontinuing the sessions/study included moving	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as it w

		were any difference among the whole sample of randomised participants.		implemented but according to the CONSORT flowchart participants were analysed according to their allocated group.		house, vacation, transportation problems and loss of interest in the program. Results table report that data were missing from one additional participant in the intervention group, but this is not mentioned in the text or flowchart. No analysis to assess for bias due to missing values is reported. Attrition is balanced between groups but substantial that there may be some bias int he results.		conducted trained res staff using standardis procedures There is no mention of researcher being blinc group allocation. measurem of height a weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Chen 2010	Low risk of bias	randomization and allocation concealment appeared adequate: 'children and parents were randomly assigned to the intervention group or the waiting list control group by a computer-generated random number assignment. The use of a computer-generated process suggests allocation would have been concealed. There were no major baseline differences.	Low risk of bias	Participants were aware of their assigned intervention during the trial and. It is not clear who delivered the intervention, but it seems likely it was the research assistants and it is likely they would have been aware, as there is no mention of blinding for this. There is no information provided about deviations and whether these were due to the trial context but no reason to suspect these occurred. No information is provided on the number of participants in the final dataset analysed but the participants flowchart suggests they were likely analysed in the group they were randomised. It is likely a modified intention-to-treat.	High risk of bias	The article states that 94% of children in the intervention group and 75% of children in the control group completed baseline and follow-up measures. The article does not split the missing data by time point, it only reports it overall. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value and was not even across the groups. However, baseline characteristics did not differ significantly between children who completed the follow-up assessments and children who dropped out of the study' so it may be unlikely to be related to BMI. The large difference between groups suggests that missing ness could be related to the outcome value.	Low risk of bias	There is no information about how height and weight wer measured scales use etc). BMI v calculated appropriate 'dividing bo mass in kilograms height in m squared (kg/m2).' L to be appropriate The article suggests research assistants measured height and weight: 'Research assistants to the stud and administer of the questionna for children complete. Children al had their weight, hei waist and h circumfere and blood pressure measured. Therefore, seems unli that it woul differ acros groups. No information provided a whether

								outcome assessors aware of interventio received b study participant The measurem of height a weight by researcher relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely
De Heer 2011	Some concerns	No details regarding randomization and concealment. No information provided about order of randomization of schools and recruitment of individuals. It is unlikely selection was affected as all students were invited to participate from the grades involved - nothing to suggest they were aware of assigned group. No baseline imbalances suggesting differential identification or recruitment and all students were invited to participate.	Low risk of bias	Not explicitly reported but according to participants flowchart, participants data were analysed according to their allocation group	Low risk of bias	Data were missing from 17% of the intervention group participants, from 8% of the control group and from 6 % of the spillover group. To assess whether certain characteristics were associated with increased likelihood of dropping out, the authors compared afterschool participants who did not participate with those who did participate in the follow-up. In bivariate analyses, they detected no significant baseline differences in demographic characteristics or any of the dependent variables between dropouts and those who completed both baseline and follow-up measurements.	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as it conducted trained res staff using standardis procedures There is n mention of researcher being blinc group allocation. measurem of height a weight usi standardis measures relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Duncan 2019	Some concerns	randomization method was appropriate, but it is not clear if allocation was concealed. No baseline imbalances that suggest a problem with randomization. Schools were allocated to intervention or control before individual participants were recruited/assessed for eligibility. It is unlikely selection was affected as all students were invited	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Modified intention-to-treat analysis	Some concerns	There is no suggestion that any clusters dropped out of the study. 90% and 85% of the participants were analysed at 6 months in the intervention and in the control group, respectively. There is no reported statistical analysis producing	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as conducted trained res assistants standard protocols research assistant w

			to participate from the grades involved - nothing to suggest they were aware of assigned group. No baseline imbalances suggesting differential identification or recruitment and all students were invited to participate.		was used. The authors say 'Intention-to-treat analyses were used to test the efficacy of the intervention, regardless of adherence to homework tasks.'		evidence to show that results were not biased by missing data. Missingness could depend on the true value. The authors note that data was missing due to 'absent days, changing school and withdrawals'. Missingness was even across the groups and seems unlikely to relate to the true value.		provided w appropriate level of anthropom training by experience researcher prior to dat collection.' Research assistants completed measurem therefore t likely knew about the t 'Each rese assistant w provided w appropriate level of anthropom training by experience researcher prior to dat collection.' Outcome assessors not blinded allocation ' team of research assistants responsible data collec were not blinded to allocation.' measurem of height a weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
	Fairclough 2013	Some concerns	randomization was performed using a using a random number generator, it is unclear whether the allocation sequence was concealed. No evidence of baseline differences. According to the participants flow diagram parental consent was asked prior to randomization, thus selection/participation into the study was not affected by knowledge of the allocated intervention. Some baseline differences were reported, probably due to chance and regression models were adjusted for	Low risk of bias	There are no details regarding whether an intention to treat analysis was conducted but flow diagram suggests that participants data were analysed according to their allocated group.	High risk of bias	One intervention school withdrew from the study due to reasons external to the project, prohibiting collection of follow-up data at this school. According to the flow diagram, at follow-up, data were missing from 23% of the participants in the control group and 38% in the intervention, however, the final analysis only included 53% of	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as it conducted trained res staff using standardis procedures There is no mention of researcher being blinc group allocation. measurem of height a weight usir

		outcome measures at baseline.				the participants in the intervention group. No baseline differences between completer and non-completers were reported, however attrition is high and the difference in missing data between the groups is very large and it is possible that missingness in intervention group is associated with true value of outcome.		standardis measures relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Gentile 2009	Some concerns	randomization methods and allocation concealment are unclear. The article states that the study was randomised, however no information is provided about the random component used or about allocation concealment. No major differences at baseline between intervention and control groups were reported. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups. No information provided breaking it down per cluster.	High risk of bias	There is no information provided about deviations from the intended interventions, but no reason to suspect these occurred. Unclear regarding analysis used. Number of participants in the flowchart and results table not add up for baseline (fewer participants listed in the flowchart). No information given about sample size analyse. It is therefore difficult to determine the analysis type used due to lack of information.	Some concerns	Missing data not provided per cluster (school), but per intervention or control group, so cannot determine whether all clusters provided data. Data was available from 91% and 97% of the participants in the intervention and control group respectively. However, note that Figure 1 and table 1 do not align in terms of number of participants. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. There are no reasons provided about why participants dropped out beyond saying they moved or opted out. A large amount of the missing participants 'opted out'. Missingness was higher in the intervention group, however the lack of information makes it hard to determine if it likely depended on the true value.	Low risk of bias	Measurem of the outc was appropriate Measurem were cond using standardis methods b school nur therefore, were unlik vary across groups. Th no informa about whe school nur knew the t was taking place. The no informa about whe school nur were blind the interve assignmen The measurem of height a weight usi standardis measures relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Habib-Mourad 2014	Some concerns	Schools were randomised using a coin toss, but no information on allocation concealment. Article states 'students' baseline characteristics in their respective school pairs were comparable and any differences could be	Low risk of bias	No information given about deviations from intended interventions but no reason to suspect they occurred. Participants flowchart and	Low risk of bias	Data were available from all clusters and for nearly all participants within clusters: 97% and 96% completed the study in the intervention group in the control	Low risk of bias	Measurem of the outc was appropriate 'Anthropor measurem including height, we and waist circumfere

		due to chance due to small study. Individual participants were recruited after the schools had been randomised. however, it is unlikely that selection of individual participants was affected by knowledge of the intervention assigned to the cluster, as all students in the specified grades were invited to take part. It seems to have not made a difference to them accepting as group sizes are similar. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups - 'students' baseline characteristics in their respective school pairs were comparable.		results table suggest that intention to treat analysis conducted because the sample numbers align.		group, respectively.		were carrie at both tim points usin standardiz techniques calibrated equipment (Seca bala and Stadiomet model 117 Germany, plastic measuring tape).' Assessme took place the classro using standardis techniques both time points. No informatio about who outcome assessors but likely t either be children or triallists as conducted the classro and based other informatio provided a triallists implement the interve Both of the knew the t was taking place. No informatio about who outcome assessors so unclear they were blinded to assignmen The measurem of height a weight, usi standardis measures, relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Hopper 2005	High risk of bias	No details regarding the method of randomization are reported and lack of information about allocation concealment; the number of recruited classroom was not balanced between the	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial	Some concerns	Some concerns over lack of information about missing data	Low risk of bias	No concer this domai The measurem of height a weight usi standardis measures,

		two groups (9 program classrooms and 6 control classrooms); it is not reported whether the authors randomised the schools at a ratio different than a 1: 1 and this unbalance may suggests issues with the randomization methods. No information is provided about the order of recruitment and randomization and knowledge of the allocated intervention may have influenced participation into the study. The number of participants in each group is not balanced (due to unbalanced number of clusters). There were also some other baseline differences: a significant difference in ethnic grouping was observed between participation group: the program group had a higher proportion of non-Caucasian students than the control group.		context, but no reason to suspect these occurred. An intention to treat analysis was conducted.				relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely
Hull 2018	Low risk of bias	A computerized random number generator was used, and the allocation was concealed until after baseline assessments were completed. No baseline unbalances between groups. Parental consent was obtained and eligibility of children was assessed prior to randomization. No baseline differences among children and parents in the two groups	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were missing from 30% of the participants in the intervention group 33% in the control group. Reasons for missingness were mostly being unable contact, relocation, and conflict of schedule. The large proportion of missing data in both groups suggests that missingness could be related to the true value of the outcome	Low risk of bias	According the study protocol, h and weight measured standardiz methods. Outcome measures collected b trained stu staff. The interviewer were mask group assignmen and interve staff did no collect measurem on particip after randomiza to reduce informatio bias.
Jansen 2011	High risk of bias	All schools were paired according to size, proportion of migrants and neighbourhood into 13 comparable pairs. One school could not be paired and was excluded from the study. randomization took place within each pair with the toss of a coin by an officer of the municipal education service in the presence of the fist author of the study. No details reported about allocation sequence concealment. Not clear if consent forms were collected before or after	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	After randomization six schools were lost (3 in each group) due to withdrawal of schools (1 school/group) and implementation of the intervention components prior to the study (2 schools/group). Missing data from children in schools that were excluded after randomization are not accounted for in the analysis. Follow-up measurements	Low risk of bias	Measurem of the outc was appropriat Measurem of the outc was unlike differ as it conducted trained res staff using standardis procedures There is no mention of researcher being blind group allocation. measurem of height a

			randomization and whether participants were aware of allocated intervention. Not clearly stated but it seems that all students in the recruited schools were eligible to participate. At baseline pupils in intervention schools had higher BMI (grades 6 – 8) and waist circumference (grades 6 – 8) and lower scores on 20 m shuttle run as compared to control schools. This suggests that participation in the study may have been affected by knowledge of allocated group.				were available for 84% of the participants. Missing value analyses were performed for children lost to follow-up as compared to children with follow-up measurements, using logistic regression with socio-demographic characteristics (gender, age and ethnic background), belong term terming to intervention or control group and baseline measurements as independent variables. Subsequently, missing data were imputed using multiple imputation. Complete case analyses yielded similar results as analyses based on multiple imputation. The later are reported.		weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Kipping 2008	Some concerns	Random allocation to intervention or control school was concealed and done by one of the authors but there is not enough information to determine if randomization was appropriate. Baseline characteristics for those pupils included in the analysis were similar for those from the intervention and control schools, with the exception of the proportion walking or cycling to school, but differences could be due to chance. Recruitment took place prior to randomization. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. The authors note that the proportion of walking or cycling to school was higher in the control but they say there was concealed random allocation.	Low risk of bias	There is no information provided about deviations from the intended interventions due to trial context. It seems deviations took place, with teachers saying they 'found it difficult to fit the lessons into the timetable and only two teachers taught all the lessons'. However, this seems to be due to real-world context not trial context. Modified intention-to-treat used: 'All analyses were undertaken using an intention to treat protocol, regardless of the number of lessons taught in intervention schools. However, we only included in the analyses	High risk of bias	There is no information to suggest that any clusters dropped out, suggesting all clusters contributed data. 76.1% had BMI data collected in intervention and 69.5% in control (of this 75.2% and 64.1% used in the analysis). No statistical analysis producing evidence to show result were not biased by missing data. Missingness could depend on true value. Reasons are not given for the missing BMI data. Attrition is slightly higher in the intervention group. Data included in the analysis are from less participants than the number of retained at follow-up with over 10% difference in the numbers between intervention and control group.	Low risk of bias	Measurem of the outc was appropriate Measurem unlikely to across gro as using standardis measures. Outcome assessors probably lik to know tri taking plac due to beir asked to ta the measurem which seer be not star procedure. Outcome assessors blinded to allocation 'School he assistants, were blinde the allocat schools, to height and weight measurem

				those children with complete data at baseline and outcome.'				
Liu 2019	Some concerns	randomization method reported but no details regarding concealment: randomly assigned (1:1) to either the intervention or the control group using computer-generated randomization sequences. After randomization, schools were informed of their experimental group allocation and took baseline measures. Students were recruited prior to randomization. Baseline characteristics between the intervention and control groups were similar, except that children in the control group reported more frequent consumption of vegetables than in the intervention group	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	All 12 schools completed the trial. Measurements of weight and height were available for 97.2% of the participants. Potentially low risk of bias as only a small proportion of data are missing that is balanced between the two groups	Low risk of bias	Measurem of the outc was appropriate informatio about whe outcome assessors aware of th trial but it seems like a trial like t There is no informatio given to su that outcor assessors blind to assignmen The measurem of height a weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Liu 2022	Low risk of bias	No concerns with the randomization process, randomization was centrally performed by a researcher and allocation sequence was concealed. The same number of schools with similar number of participants was randomised to each group. Recruitment of participants and baseline assessments were conducted before randomization. No differences in baseline characteristics were observed.	Low risk of bias	No concerns over deviations from intended intervention. The analysis were conducted according to a modified intention to treat protocol excluding participant with data missing at follow-up.	Low risk of bias	All schools were retained at follow-up. Very little proportion of missing data in the intervention group (0.2%) and the control group (2.5%).	Low risk of bias	Outcome measures collected b trained outcome assessors the same device and forms acc to the stan methods a procedures assessors measuring children's height and weight wer blinded to group alloc of the scho

Morgan 2014	Low risk of bias	randomization was appropriate and allocation was concealed. The random allocation sequence was generated using a computer-based random number-producing algorithm. To ensure concealment, the sequence was generated by an independent statistician who did not have any contact with participants and given to the project manager. There appears to be no major baseline differences to suggest a problem with randomization and groups were of similar size.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Measurements were obtained for 81% of the sample. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value. However, it did not differ across groups and the groups did not differ in baseline characteristics which suggests it may not have been related to BMI. Reasons for drop out included being unable to commit and too many questionnaires.	Low risk of bias	Measurem of the outc was appro - see table Measurem unlikely to as they 'we taken at ar after-scho setting by trained sta using the s instrument each time point.' Assessors blinded for baseline assessmer there is no information about follo assessmer The measurem of height a weight, usi standardis measures, relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely
Nollen 2014	Some concerns	No information given about random component used in randomization and no mention of allocation concealment. There were some baseline differences (e.g. the control appeared to have higher neighbourhood economic disadvantage, and higher BMI). However, in such a small study these could be due to chance. .	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. No information given about type of analysis used and no sample size numbers given in results table. However, it seems likely that a modified intention-to-treat analysis was used excluding the participants who dropped out.	Some concerns	Data were available for 86.2% of participants. No sensitivity analysis undertaken to show result not biased by missing data. Missingness could depend on the true value, but it is unlikely because the study found 'The seven girls lost to follow-up (four mobile technology group and three control) did not differ from the 44 completers on baseline age, BMI, total energy, or percentage of calories obtained from fat.	High risk of bias	No informa about meth used to measure h and weight likely to be appropriate 'Height and weight wer measured without sho socks, or outerwear. There is no information about the methods to measure h and weight the proced conducted each group making it h to determi could have differed. Th is no information about whe outcome assessors aware of th interventio received by participant There is no information

								about meth used to measure h and weight determine assessmer could have been influe by knowled the interve received. T could be th case if it w e.g. self-measured.
Pena 2021	High risk of bias	randomization and sequence allocation concealment adequate; schools were randomised at a two intervention to one control ratio; some of the schools were assigned to the control group by a non-randomised method but we have only included the data from intervention and control groups that were appropriately randomised, therefore there is no concern over the randomization method with regards to the results included in our analyses. All students in fifth and sixth grades were eligible to participate in the study, regardless of weight or health status at baseline. Some difference in percent of boys and of public schools both higher in the control group, but these differences are presumably due to chance. According to the flowchart, participants were enrolled after randomization and the response rate was higher in the intervention (74%) than in the control (48%) group, suggesting that knowledge of the allocated intervention may had affected the rate of enrolment.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were missing from 13% of the participants in the intervention and from 13% of the participants (randomised and non-randomised) in the whole control group. it is not reported how many students were randomly allocated to the control group as the flow-chart is for the whole study including the non-randomised control schools. The authors conducted both complete case and multiple imputations analysis and found that the results are very similar. Some concerns over the uncertainty on missing data	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as it v conducted trained res staff using standardis procedures There is no mention of researcher being blind group allocation. measurem of height a weight usir standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Rerksuppaphol 2017	Some concerns	randomization was appropriate, but there is no information about allocation concealment. Children were randomly assigned to the intervention group or the control group' ' using a computerized program to the intervention group and control group, respectively. Groups were similar in size and there were no significant differences in baseline age, weight, height, BMI, waist and hip circumference and nutritional status between the two groups.	Low risk of bias	There is no information about deviations due to the trial context, there is a possibility for contamination as children within schools were randomised individually, but no evidence to show deviations occurred. Modified intention-to-	Low risk of bias	No concerns, all participants in the intervention group had data at follow-up and only one was lost-to-follow-up from the control group	Low risk of bias	Measurem of the outc was appropriate Measurem was unlike differ as it v 'collected trained res assistants. There is no information about whe outcome assessors aware of th interventio received by participant The measurem

				treat analysis used.				of height a weight, usi standardis measures, relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely
Rosario 2012	Low risk of bias	randomization took place according to a random number generator, no details about allocation concealment. There are some baseline differences, however these could be due to chance. . Participants flowchart shows that recruitment took place prior to randomization. There were no differences to suggest differential identification or recruitment of individual participants between intervention groups. There were differences in height and parents education level but this is not suggesting differential recruitment.	Low risk of bias	There is no information to suggest deviations from intended interventions due to trial context took place. A brief process evaluation showed the intervention went as planned and there is no reason to suspect additional activities were sought in the control group. Participants flowchart shows a modified intention-to-treat analysis was used, excluding participants who were lost to follow up.	Some concerns	None of clusters dropped out. Attrition rates were high but did not differ between intervention and control group (35.2% and 38.1%, respectively). There was no statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, but it seems unlikely as it was even across groups and the authors explained that BMI and major sociodemographic characteristics did not differ significantly between the children who participated in the baseline and those not included in the final assessment. Additionally reasons are provided that do not seem related to the true value (mostly school transfer, and a few due to parent refusal and absence from school).	Low risk of bias	Measurem of the outc was appropriat each scho previously trained per performed anthropom evaluation using standardiz procedures Measurem unlikely to across gro Outcome assessors knew the t was taking place due being train each scho previously trained per performed anthropom evaluation using standardiz procedures Outcome assessors blinded to assignmen
Rosenkranz 2010	Some concerns	randomization was conducted using a random number generator, no information about allocation concealment. At baseline there were no significant differences by condition for demographic variables. Participants flowchart shows that recruitment took place prior to randomization. There were no differences to	Low risk of bias	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. Flowchart of participants suggests modified intention-to-	Low risk of bias	None of the clusters dropped out. Participants with available data were 97% in the intervention and 93% in the control group.	Low risk of bias	Measurem of the outc was appropriat Measurem unlikely to across gro as conduc by researc using standardis methods. Outcome assessors knew the t

		suggest differential identification or recruitment of individual participants between intervention groups.		treat analysis was used.				was taking place beca they were research assistants. Outcome assessors blinded to assignmen the beginn the study.
Safdie 2013	Some concerns	They state that randomization took place for both clusters and individuals within clusters, but there is no information about the random component used, nor about allocation concealment. Participants flow-chart shows that recruitment of schools took place prior to randomization. Individual participants were randomly selected to take part from those who had consented in the randomised schools. Unclear whether consent was given before or after randomization, but according to the participants flowchart it seems that recruitment occurred after randomization with a refusal rate of 20% overall (not reported per group); unclear if differential identification/recruitment of individual participants occurred. School characteristics did not vary across the three intervention groups and there appeared to be no major differences across the groups at baseline.	Some concerns	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. The authors stated that there were deviations from implementation the physical activity intervention (not implementing them all) but they put this down to real world context e.g. limited space and competing activities. The authors state an intention-to-treat analysis was employed using imputation for missing data.	Low risk of bias	None of the schools were lost at the follow-up. Data from 96%, 96% and 98% participants were analysed in the basic and plus intervention group and in the control group, respectively, for anthropometry. The authors used imputation but no sensitivity analysis or other methods showed that the result is not biased by missing data, however, missing is relatively low and well balanced between groups.	Low risk of bias	Measurem of the outc was appropriate Though measurem techniques were appropriate there is no information about outc assessors, hard to kno measurem of the outc could have differed ac groups. Th no informa about who outcome assessors or if they w blind to gro assignmen The measurem of height a weight usi standardis measures relatively r The height weight measurem are used to produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Sgambato 2019	Low risk of bias	randomization was conducted by research assistants unrelated to the present study using opaque envelopes. Equal number of schools and similar number of students in each arm. Eligibility of participants was established prior to randomization as they signed consent returned before participants randomly allocated to each group. No baseline differences were reported.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	Data were missing from intervention group (90% retained) and the control group (945 retention) mainly due to students leaving the school, therefore not for reasons related to the true value of the outcome	Low risk of bias	Measurem of the outc was appropriate Measurem of the outc was unlike differ as it conducted trained res staff using standardis procedures There is no mention of researcher being blinc

								group allocation. measurem of height a weight usir standardis measures relatively r The height weight measurem are used t produce B Although theoretical recorded measures be influenc knowledge interventio this is high unlikely.
Stolley 1997	Some concerns	Concerns over the lack of information on the method of randomization and on the allocation sequence concealment; there were no baseline differences reported;.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A consort diagram is not included but the publication is date priort o CONSORT requirement and it is not easy to assess whether participants were analysed according to theyr allocated group.	High risk of bias	At follow-up data were missing from 44% and 33% of the intervention and control group daughters, respectively; we have concern over the high attrition in both groups and over participants that dropped out of the study had lower weight at baseline, as this could introduce bias in the results.	Low risk of bias	Hight and weight wer measured the paediatrici using robus and reliabl methods. T same train personnel assessed t outcome ir groups All assessmer personnel blind to randomiza procedures study hypothese
Story 2003	Low risk of bias	randomization was stratified by field center and an urn randomization procedure was used to generate the treatment allocation sequences. The different sequences were stored on a computer at the study center and accessed using an interactive voice response telephone system. Groups were similar at baseline.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	Data were missing from only one participant at follow-up (3.6% of the control group)	Low risk of bias	Measurem of the outc was appropriat Measurem of the outc was unlike differ as it conducted trained res staff using standardis procedures There is nc mention of researcher being blinc group allocation. measurem of height a weight usir standardis measures relatively r The height weight measurem are used t produce B Although theoretical

									recorded measures be influenc knowledge interventio this is high unlikely.

Risk of bias for analysis 3.2 BMI medium term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	ju
Annesi 2016	High risk of bias	There are no details about the randomization process or allocation concealment. The control group had 15 participants classed as overweight/ obese, whilst the intervention group at 28, however there was no significant difference between the groups on BMI or BMI percentile. No information provided about order of recruitment of participants and randomization. Details of characteristics not provided per site so unable to tell if likely differences in recruitment.	Low risk of bias	Participants knew they were in a trial - written consent from parents and verbal assent from children. It is likely participants, carers and those delivering the intervention knew about the trial due to the nature of it (enhanced activities and letters home in the experimental group). Participants and parents signed informed consent and staff were trained. However, they do say that participants and parents were blinded to assignment and the goals of the research. There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No information given about whether intention to treat was used, no note of participant numbers throughout the study, however it seems likely that participants would not have crossed over	Some concerns	No suggestion any sites dropped out of the study. No information about participant numbers or missing data throughout the study. There is no reported statistical analysis producing evidence to show result not biased by missing data. No information about missing data but they do say that participants who were missing any data did not significantly differ from the sample as a whole on any demographic or study measure, suggesting any missing data was not related to the true value of the outcome.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome unlikely to differ as conducted by trained staff members 'in an identical manner' and 'structured fidelity checks' were undertaken. No mention that outcome assessors were blinded to the trial. No mention that outcome assessors were blind to allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c

				due to sites being the unit of randomization.					
Annesi 2017	High risk of bias	randomization was appropriate, as sites were assigned via computer-generated numbers, and it is likely this concealed allocation. They state that there were no significant differences between groups at baseline on key variables. No information provided about order of recruitment of participants and randomization. Details of characteristics not provided per site so unable to tell if likely differences in recruitment.	Low risk of bias	Participants knew they were in a trial - written consent from parents and verbal assent from children. It is likely participants, carers and those delivering the intervention knew about the trial due to the nature of it (enhanced activities and letters home in the experimental group). Participants and parents signed informed consent and staff were trained. However, they do say that participants and parents were blinded to assignment and the goals of the research. There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was followed	Some concerns	No suggestion any sites dropped out of the study. 14% of data are missing in the study but the authors do not break it down by time points. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missing data could be due to the true value however they say they established that the missing data was missing at random so it likely was not due to true value	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome unlikely to differ as conducted by trained staff members and 'structured fidelity checks' were undertaken. No mention that outcome assessors were blinded to the trial. No mention that outcome assessors were blind to allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively	S c

								robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided data. Overall, 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be dependent on the outcome true value.	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were. It is unclear if outcome assessors were blinded as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c
Gentile 2009	Some concerns	randomization methods and allocation concealment are unclear. The article states that the study was randomised, however no information is provided about the random component used or about allocation concealment. No major differences at baseline between intervention and control groups were reported. Recruitment took place prior to	High risk of bias	There is no information provided about deviations from the intended interventions, but no reason to suspect these occurred. Unclear regarding analysis used. Number of participants in the flowchart and results	High risk of bias	Missing data not provided per cluster (school), but per intervention or control group, so cannot determine whether all clusters provided data. Data was available from 91% and 97% of the participants in the intervention and	Low risk of bias	Measurement of the outcome was appropriate. Measurements were conducted using standardised methods by school nurses; therefore they were unlikely to vary across groups. There is no information	S c

		randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups. No information provided breaking it down per cluster.		table not add up for baseline (fewer participants listed in the flowchart). No information given about sample size analyse. It is therefore difficult to determine the analysis type used due to lack of information.		control group respectively. However, note that Figure 1 and table 1 do not align in terms of number of participants. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. There are no reasons provided about why participants dropped out beyond saying they moved or opted out. A large amount of the missing participants 'opted out'. Missingness was higher in the intervention group, however the lack of information makes it hard to determine if it likely depended on the true value.		about whether school nurses knew the trial was taking place. There is no information about whether school nurses were blinded to the intervention assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Kain 2014	High risk of bias	Some concern over the lack of details on randomization methods and allocation concealment. Unclear if children were recruited before or after randomization; lack of baseline characteristics by group make it difficult to assess if there was any difference between the groups due to randomization issues.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Concerns over lack of details of missing data in each group. Of the participants in the original sample, 76.6% had follow-up data (numbers/groups are not reported); the authors reported that of those measured at follow up, 214 children were new students who began the school year in March 2012, so they were not present when we measured at baseline. To test if the BMI of children lost to follow up was different from that of children included in the sample, they compared their mean zBMI at baseline and found no significant difference.	High risk of bias	Concern over the method for measuring hight and weight not being reported (it would be of serious concern if measurements were done differently in different schools/groups) or if the outcome was self-reported.	S c
Klesges 2010	Some concerns	The article states 'randomization was stratified by recruitment wave and within each	Low risk of bias	There is no information regarding deviations from	Some concerns	Data were not available for all participants and analysis	Low risk of bias	Height and weight were measured appropriately,	L b

		wave, by community center. Eligible participants were randomly assigned to either the obesity prevention program or the self-esteem intervention. randomization occurred initially in 2 mirror image blocks of 15 participants. Later, independent blocks of 5 participants at each center were used to ensure a better balance between the 2 intervention groups.' It is unclear whether this is appropriate, there is no information on the random component used and there is no information on allocation concealment. There were 153 participants in the obesity intervention and 150 in the alternative intervention, and 'Mean values and distributions for the major demographic, anthropometric, dietary, and physical activity baseline measures were not significantly different between the 2 intervention groups'.		the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		included 72% of the intervention group participants and 80% of the control; in the sensitivity analyses indicated that imputation for missing data did not alter conclusions. Missingness could depend on its true value. No specific reasons are given for dropout. However, the authors state that there were no major differences between those who completed follow-up visits and those who didn't. There was no difference in BMI. This suggests it might be unlikely to be related to the true value, but the attrition is substantial and may introduce bias in the results.		and BMI was calculated appropriately. Measurements were unlikely to differ across groups due to using the same scales and being conducted by trained staff. Staff were masked to group assignment.	
Kobel 2017	Some concerns	There is not enough information provided about randomization and allocation concealment to determine if the methods used were appropriate. The protocol details that stratification was used but does not outline the random component used or whether allocation was concealed 'stratification according to number of classes and grade level (grade) was realized for the randomization process'. There were no baseline differences to suggest problems with randomization. It is not clear from the protocol or main paper in what order the schools were randomised and individuals were recruited (see protocol Figure 2). All pupils from the specified grades were invited to participate. The paper does suggest they would have known about their group allocation as it says it is not possible to blind it. This could have led to differential acceptance but not enough information to tell as Figure 2 in the protocol does not show	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not specifically stated by authors but seems like modified intention-to-treat analysis used.	High risk of bias	Two schools dropped out of the intervention group and five dropped out of the control group. 88% participants had anthropometric measures completed at both baseline and follow-up. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value. 1 school dropped out after randomization with a teacher withdrawing consent stating it was 'too much effort'. Another school dropped out because of request of parents. The authors reported that missingness at the individual level was due to	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by 'trained examiners' using the same protocol. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c

		consent rates at participant level. Table 1 in Kobel 2014 suggests no baseline imbalances suggesting differential identification or recruitment.				'family relocation, grade repetition, and sick leave. It says 'there were no differences between the intervention and control group in the numbers of losses to follow-up and missing data'. However, it also says 'children with missing values were more frequently overweight, obese and abdominally obese'. This suggests missingness may be related to the outcome BMI.			
Kubik 2021	Some concerns	randomization was conducted by a trial statistician using a computer-generated randomization schedule, no details about concealment. Some difference in baseline: higher proportion of obese children in the control group but models are adjusted for baseline BMI.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were missing from 6% and 9% of the participants in the intervention and control group, respectively. No analysis to test difference between completer and non-completer is reported and there is no evidence that results were not biased due to missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	L b
Liu 2019	Some concerns	randomization method reported but no details regarding concealment: randomly assigned (1:1) to either the intervention or the control group using computer-generated randomization sequences. After randomization, schools were informed of their experimental group allocation and took	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to	Low risk of bias	All 12 schools completed the trial. Measurements of weight and height were available for 97.4% of the participants. Potentially low risk of bias as only a small proportion of	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no	S c

		baseline measures. Students were recruited prior to randomization. Baseline characteristics between the intervention and control groups were similar, except that children in the control group reported more frequent consumption of vegetables than in the intervention group		treat analysis was conducted.		data are missing that is balanced between the two groups		information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Liu 2022	Low risk of bias	No concerns with the randomization process, randomization was centrally performed by a researcher and allocation sequence was concealed. The same number of schools with similar number of participants was randomised to each group. Recruitment of participants and baseline assessments were conducted before randomization. No differences in baseline characteristics were observed.	Low risk of bias	No concerns over deviations from intended intervention. The analysis were conducted according to a modified intention to treat protocol excluding participant with data missing at follow-up.	Low risk of bias	All schools were retained at follow-up. Very little proportion of missing data in the intervention group (2.7%) and the control group (1.6%)	Low risk of bias	Outcome measures were collected by the trained outcome assessors using the same device and/or forms according to the standard methods and procedures. The assessors measuring children's height and weight were blinded to the group allocation of the schools.	L b
Nemet 2011a	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to	Low risk of bias	No concerns over missing data as missingness is relatively low (8% and 10%) and balanced between the two group. Reason for missingness is reported as being absent on day of measurement.	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	S c

				treat analysis was conducted.					
Nemet 2011b	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat analysis was conducted.	Some concerns	Some concerns over missing data low although missingness is balanced between the two group (13% in both groups). Reason for missingness is reported as being absent on day of measurement, but there is not statistical evidence that the results were not biased.	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	S c
Puder 2011	Low risk of bias	It seems like adequate randomization and allocation concealment took place: for the selection and randomization opaque envelopes were used' and for practical reasons, and to reduce an effect of contamination, preschool classes integrated in the same school building were randomised into the same group. There were no baseline differences to suggest a problem with the randomization process. Recruitment took place prior to randomization. There were no baseline differences to suggest differential recruitment.	Low risk of bias	There is no information to suggest deviations from intended interventions due to trial context took place. They also assigned all preschool classes in the same school building to the same group to minimise contamination. Participants flowchart shows that a modified intention-to-treat analysis was used, excluding participants who moved away after baseline testing.	Low risk of bias	All randomised clusters provided data. BMI data were available form 98% of participants in the intervention group and 95% in the control group	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ across groups due to the standardised measurement methods used and consistency in outcome assessors. It seems like the outcome assessors knew the trial was taking place as they undertook training, but trained researchers measured outcomes and were blinded to group allocation.	L b
Safdie 2013	Some concerns	They state that randomization took place for both clusters and individuals within clusters, but there is no information about the random component used, nor about allocation concealment. Participants flow-chart shows that recruitment of schools took place prior to randomization. Individual participants were randomly selected to take part from those who had consented in the randomised schools. Unclear whether consent was given before or after randomization, but according to the participants flowchart it seems that recruitment occurred after randomization with a refusal rate of 20% overall (not reported per group); unclear if	Some concerns	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. The authors stated that there were deviations from implementation the physical activity intervention (not implementing them all) but they put this down to real world context e.g. limited space and competing activities. The authors state	Low risk of bias	One cluster from the 'plus' intervention arm did not contribute data at this time point as during the second year of intervention the school became a full-time school and was no long term termer eligible for inclusion in the study. Data from 86% and 78% of participants were available in the basic and plus intervention group and from 91% in the control group for anthropometry. The authors used imputation but no sensitivity	Low risk of bias	Measurement of the outcome was appropriate. Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were or if they were blind to group assignment. The measurement of height and	S c

			differential identification/recruitment of individual participants occurred. School characteristics did not vary across the three intervention groups and there appeared to be no major differences across the groups at baseline.		an intention-to-treat analysis was employed using imputation for missing data.		analysis or other methods to show the result is not biased by missing data. The missing cluster is not due to the true value but there is some difference in attrition between groups and the levels of attrition in the plus group is substantial		weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Sekhavat 2014	Some concerns	randomization was appropriate but not clear if allocation was concealed: participants were allocated to test and control groups using a computer generated randomization table in Microsoft Excel software and stratified according to age (6 to 8 years) old; 9 to 11 years old) and gender into 4 sub-groups. This technique helped balance the assignment of treatments in each stratum and yielded a balance in each treatment group. Therefore, participants according to the date of their appointment in the clinic were allocated from the beginning of the randomization table to test or control groups by the student research investigator. No baseline differences to suggest issues with randomization.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is unlikely that participants switched study arms.	Some concerns	Data were missing from 39% and 34% of the intervention and control group, respectively. There is no evidence that the result was not biased by missing data. Reasons for missingness were participants not turning up for the follow-up appointment (no further details). Missingness was high but similar in the intervention and control suggesting it might not be likely to be related to true value.	Low risk of bias	Measurement of the outcome was appropriate - 'An accurate electronic scale (Model 500KL, Health O meter®, USA) was used to weigh the participants in the study' and a stadiometer was used for height. Measurements unlikely to differ as conducted by researchers using the same protocols. Also 'The range of differences between the two examiners for height was only 0-0.5 cm and for weight was only 0-0.1 kg, which verifies the inter-examiner reliability (Table 1).' Researchers were not blinded 'blinding of the participants and the student research investigator (A.S.) to the intervention (short term counselling) was not possible.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically	S c

								the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Siegrist 2013	Some concerns	The article states randomization took place but there is no information presented about the random component used. There is also no information given about allocation concealment. Baseline data were similar between groups. Participants were recruited before randomization of clusters. There were no baseline imbalances to suggest differential identification or recruitment of individuals between intervention groups, proportions of participants that were overweight or obese were similar across groups.	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. Participants flowchart and results table suggest a modified intention-to-treat analysis was conducted, excluding missing data.	Some concerns	Data were available from all clusters (all 8 schools). BMI data were available at follow-up for 87% of the children in the intervention and in the control. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, however it seems unlikely because missingness was comparable in both groups and they note that the reasons were that 'children were ill or absent at the first or second examination date, or had left the school'.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ as completed by the same researchers who had been trained in using the measurement methods. It seems likely that the outcome assessors knew the trial was taking place as they are referred to as 'trained investigators'. There is no information provided about whether outcome assessors were blind to group assignment. The measurement of height and weight by researchers using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if they were appropriate: 'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis with completers and imputation of	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it only for individuals. The abstract mentions 16 clusters, whereas the results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff measuring the outcomes could not be blinded due to the randomization by practice due to the location of the measurement	S c

		randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control half size of intervention) but likely due to allocation ratio in randomization.		missing data was conducted but participants remained in the groups they had been randomised to.		beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper states. No reasons for missing data are given.		visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Stolley 1997	Some concerns	Concerns over the lack of information on the method of randomization and on the allocation sequence concealment; there were no baseline differences reported;.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A CONSORT diagram is not included but the publication is date prior To CONSORT requirement and it is not easy to assess whether participants were analysed according to their allocated group.	High risk of bias	At follow-up data were missing from 44% and 33% of the intervention and control group daughters, respectively; we have concern over the high attrition in both groups and over participants that dropped out of the study had lower weight at baseline, as this could introduce bias in the results.	Low risk of bias	Hight and weight were measured by the paediatrician using robust and reliable methods. The same trained personnel assessed the outcome in both groups All assessment personnel were blind to randomization procedures and study hypotheses.	S c
Xu 2015	Some concerns	randomization was conducted by computer generated sequence, no details regarding concealment, no baseline differences among clusters or participants groups. Students were recruited prior to randomization	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No concerns, attrition in both group (5% in the intervention and 7.5% in the control group). The main reasons for those lost to follow-up survey were that they were due to sickness or having other scheduled events on the survey day, which was	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to	L b

						evenly distributed in intervention and control groups. There were no significant differences in the percentage of children lost to follow-up between treatment groups or between the baseline BMI of those followed-up and not followed-up.		group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Xu 2017 (5 other cities)	Some concerns	Two-step cluster sampling method was used for subjects' selection, 6 schools from each other city were randomly chosen into the trial and then from each school, 2 classes from each grade were selected randomly in every school. No further details on the method of randomization and concealment. No baseline difference, six schools from each of the five cities were included in the study and the number of schools and classrooms in each arm is the same. Based on participants flowchart, students were asked for consent after randomization. A higher number of students in the control group declined to participate compared to the control group (7.6% vs 1.9%). This difference could be related to knowledge of the allocated intervention with less children interested in participating as control group. Baseline zBMI was higher in the treatment group suggesting that participants with a higher zBMI in the control group may have declined to participate when told they were allocated to the control group. However, this should not be introducing serious risk of bias as analysis was adjusted for baseline value of the outcome	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	All schools and classrooms were retained at follow-up. Only less than 5% of the data were missing from both groups due to loss to follow-up or discontinuation of the intervention and less than 2% of the outcome data were illogical missing and were not included in the analyses	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	S c

Risk of bias for analysis 3.3 BMI long term

Study	Bias

	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement
Brandstetter 2012	Some concerns	No details regarding randomization methods and concealment. Due to considerable differences between schools, especially in the number of participating pupils and in the proportion of pupils with migration background (5–94%), a stratified randomization procedure was chosen. This resulted in two groups of the same size, but could not prevent unequal proportions of pupils with migration background. Individual participants identified and recruited prior to randomization and some differences in baseline characteristics were reported in age of the intervention and control group, percentage with migration background but baseline values of anthropometric measures did not vary notably.	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Some concerns	All schools were retained and were included in the analysis. Participants missing were 17% from the intervention and 14.5% from the control. Reason for missingness reported; the attrition is similar in both groups but substantial and may affect the results.	Low risk of bias	The method of measuring the outcome was appropriate and measurement was unlikely to have differed between intervention groups. Outcome assessors were likely aware of the assigned intervention. The measurement of height and weight by researchers, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely
Caballero 2003	Some concerns	No information about randomization method and allocation concealment, only that schools were assigned to intervention and control groups by a process of stratified randomization. After the baseline measurements were made, upper and lower % of body fat strata were defined for schools at each site, and random allocation was determined for each stratum. . Participants were assessed for eligibility and recruited from the schools that agreed to participate before randomization of clusters. There were no baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Low risk of bias	It appears participants would have known they were in a trial, and they would have known about the assigned intervention because of consenting: 'Written informed consent was obtained from the parents, and verbal consent was obtained from the children for all measurement procedures and for intervention activities as required by school boards and tribal health authorities.' The article suggests carers/ those delivering the intervention would have known as well because 'Each intervention component	Some concerns	All clusters contributed data. Data were not available for 17% of the participants in the intervention and control groups. There is no evidence that the result was not biased by missing data e.g. no sensitivity analysis for BMI. Missingness could depend on the true value. No reasons are provided for participants being lost to follow-up. However, it seems unlikely because missingness is balanced across the intervention and control groups, and	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome would not have differed across groups because standardised scales were used, they were checked before use, and measurement staff were trained and validated. It is likely outcome assessors were aware a trial was taking place due to receiving training from the research team 'To avoid operator bias, measurement teams were not involved in delivering the intervention. Training, certification, and cross-validation of

			included a specific training plan. Teachers and food service staff were trained annually in local or regional meetings.' There is no information regarding deviations from the intended intervention that arose due to the trial context, but a process evaluation suggested a good level of implementation suggesting perhaps deviation due to trial context less likely. An intention-to-treat analysis was used.		this was a long term term study so attrition is to be expected.		measurement staff were done centrally or regionally, supervised by the Measurement Committee.' It is unclear whether outcome assessors were aware of the assigned intervention. The article states 'To avoid operator bias, measurement teams were not involved in delivering the intervention'. Though it state they were not involved in delivering the intervention, it does not say if they were aware of the assigned intervention. The measurement of height and weight using standardised measures by researchers is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided data. Overall, 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were It is unclear if outcome assessors were blinded as there is no information

						evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be dependent on the outcome true value.		about who outcome assessors were The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Foster 2008	High risk of bias	No information regarding randomization method and concealment only that schools were first organized into 5 clusters of 4 to 7 schools each, based on school size and type of food service, schools within each cluster were approached to participate in a predetermined, random order. When 2 schools in each cluster agreed to participate, the schools were randomly assigned as intervention or control schools. It is unclear if parental consent was asked prior to randomization; the authors reported that the consent rate across the 10 schools was similar between control (67.7%) and intervention (71.4%) schools. However, knowledge of the allocated intervention may have affected participation into the study. Some difference in ethnicity and proportion of overweight and obese (higher in intervention group) are reported, suggesting that selection bias may have occurred. To account for these differences at baseline, race/ethnicity was controlled for in subsequent analyses.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not explicitly reported, but use of a modified intention to treat analysis was mentioned when describing imputation data methods	High risk of bias	Attrition rates did not differ between intervention and control schools (31.9% vs 31.5%). The reasons for attrition a were transfer, repeated absences and refusals. The analyses that accounted for attrition (multiple imputation, baseline carried forward, and last observation carried forward) did not differ from the analyses using complete data. Thus, the results obtained from participants whose data we had at the relevant assessment points. Some concern over the high level of attrition.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were not blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Greve 2015	Some concerns	There is not enough information provided to determine if randomization and allocation concealment were appropriately completed. No baseline imbalances that suggest a problem with randomization. No information provided about order of randomization of schools	High risk of bias	We are using estimate from model 3, which is analysis as treated (per protocol); in this model participants from the intervention group are coded as control at time point prior to them	Some concerns	Of the 33 schools included, 4 schools were closed, and the study has data for two of them only, meaning 2/33 schools (clusters) in the intervention group were not included in	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial, but it seems likely. There is no information

		and recruitment of individuals. No information regarding randomization or enrolment provided to know if recruitment was affected by knowledge of allocation. No major baseline imbalances between groups.		receiving the intervention (per protocol analysis). This analysis can lead to bias due to misclassification of the allocated group.		analysis. The other two schools which closed were control schools and measurements for the years 2009/10 and 2010/11 at these control schools are included in the analysis. There was a high level of missing data (13.3%) due to school nurse short termages (meaning lack of measurements taken in some of the schools), but also to student mobility between schools during the school year and student absence from school on days of school nurse consultations. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value. However, the authors note that data was missing due to school nurse short termages leading to lacking measurements and children changing schools.		given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Grydeland 2014	Some concerns	Not enough information to determine if randomly allocated appropriately and no information given about allocation concealment. The baseline data is not presented for the whole sample but only for completers making it difficult to assess baseline differences. Participants were recruited before randomization of the clusters. Baseline data is not presented for the whole sample, only completers.	High risk of bias	There is no information to suggest there were deviations due to trial context. Full schools were randomised which might make this more unlikely (i.e. not classrooms within schools). The authors note the following but give no evidence to suggest anything took place. Per-protocol analysis	Some concerns	No suggestion that any clusters dropped out. 86% and 90% of participants that consented gave anthropometric data at follow-up in the intervention and in the control, respectively. Figures are slightly higher when calculated from the	Low risk of bias	Measurement of the outcome was appropriate, and it would have been unlikely to diffe across groups because it was conducted by trained staff an the same measurement techniques were used. It is likely outcome assessors were aware a trial was taking place due to

				used: 'A total of 1324 children provided data at both time points which constitute the analysed sample in this paper. A priori, per protocol and drop-out analyses were chosen over intention-to-treat'. Participants flowchart shows that intervention group 491 gave anthropometrics, but Table 3 shows only 465 included in analysis. Control 870 gave anthropometrics, but only 859 included in analysis. This has the potential to affect the result.		number of participants who gave baseline anthropometric measurements (93% vs 90%). Dropout analyses found that 4% of the participants lost to follow-up weighed more and had a higher BMI and zBMI than the investigated sample. This suggest missingness of these participants is possibly likely to be related to the true value.		receiving training from the research team. The article states 'Neither participants no investigators were blinded fo condition.' The measurement of height and weight by researchers, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Hull 2018	Low risk of bias	A computerized random number generator was used, and the allocation was concealed until after baseline assessments were completed. No baseline unbalances between groups. Parental consent was obtained and eligibility of children was assessed prior to randomization. No baseline differences among children and parents in the two groups	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were missing from 47% of the participants in the intervention and in the control group. Reasons for missingness were mostly being unable contact, relocation, and conflict of schedule. The large proportion of missing data in both groups suggests that missingness could be related to the true value of the outcome	Low risk of bias	According to the study protocol, hight and weight were measured using standardized methods. Outcome measures were collected by trained study staff. The interviewers were masked t group assignment, and interventio staff did not collect measurements on participants after randomization to reduce information bias.
Klesges 2010	Some concerns	The article states 'randomization was stratified by recruitment wave and within each wave, by community center. Eligible participants were randomly assigned to either the obesity prevention program or the self-esteem intervention. randomization occurred initially in 2 mirror image blocks of 15 participants. Later, independent blocks of 5 participants at each center were used to ensure a better balance between the 2 intervention groups.' It is	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were not available for all participants and analysis included 77% of the intervention group participants and 84% of the control; in the sensitivity analyses indicated that imputation for missing data did not alter conclusions. Missingness could depend on its true	Low risk of bias	Height and weight were measured appropriately, and BMI was calculated appropriately. Measurements were unlikely t differ across groups due to using the same scales and being conducted by trained staff. Staff were masked to group assignment.

		unclear whether this is appropriate, there is no information on the random component used and there is no information on allocation concealment. There were 153 participants in the obesity intervention and 150 in the alternative intervention, and 'Mean values and distributions for the major demographic, anthropometric, dietary, and physical activity baseline measures were not significantly different between the 2 intervention groups'.				value. No specific reasons are given for dropout. However, the authors state that there were no major differences between those who completed follow-up visits and those who didn't. There was no difference in BMI. This suggests it might be unlikely to be related to the true value but the attrition is substantial and may introduce bias in the results.		
Kubik 2021	Some concerns	randomization was conducted by a trial statistician using a computer-generated randomization schedule, no details about concealment. Some difference in baseline: higher proportion of obese children in the control group but models are adjusted for baseline BMI.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were missing from 6% and 9% of the participants in the intervention and control group, respectively. No analysis to test difference between completer and non-completer is reported and there is no evidence that results were not biased due to missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Llargues 2012	Some concerns	randomization took place but no further information to determine if appropriate, or if allocation was concealed: the 16 schools were grouped into strata, depending on whether they were public or not, and they had the same number of classes of first primary course.	Low risk of bias	No information given about deviations from intended interventions but no reason to suspect these occurred. Modified intention-to-treat analysis used	Some concerns	No suggestion that any clusters (schools) dropped out. The authors say that 'Full anthropometric data were collected from 83.7% of the schoolchildren	Low risk of bias	Measurement of the outcome was appropriate and unlikely to differ across groups because same methods used and they say that 'In October 2010, the same nurses in

		Each school in the groups was randomly assigned to the control or intervention group. There were significant baseline imbalances between groups: 'At baseline, BMI was higher in the intervention as compared to the control group. In the intervention group, a greater proportion of parents had an upper educational level and a greater proportion of schoolchildren had lunch at the school.' However, it was a fairly small study, and there are multiple variables being measured with a few being significant, so these could be due to chance. . No participants flow chart is reported, but the text suggests that participants were recruited prior to randomization: the schools provided the names, sex and date of birth of the children, and the informed consent of the families to participate in the study was obtained. Each school in the groups was randomly assigned to the control or intervention group. There are baseline imbalances, e.g. with a significant difference in BMI between the control group and the intervention group (BMI higher in the intervention group). However, this doesn't necessarily suggest differential identification or recruitment of individuals between groups, as it could be due to chance.		excluding missing data.		participating in the study from whom data had been collected. Of these, 84.8% were in the control group and 82.7% in the intervention group. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, but it seems unlikely as they explain that 'Percent losses were high, but the proportion was similar to that reported by other school-based intervention studies, and losses were similar in both groups. The reasons included change in school, relocation, voluntary withdrawal of the schoolboy/girl, and non-attendance at school on the day of weight and height control.'		charge of the project went to each school to perform anthropometric measurements Outcome assessors knew the trial was taking place and were unlikely to be blinded to assignment because the article states - 'In October 2010, the same nurses in charge of the project went to each school to perform anthropometric measurements The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.
Lloyd 2018	Low risk of bias	randomization and allocation concealment were appropriate. Schools were assigned (1:1) using a computer-generated sequence to either intervention or control, stratified by the number of year-5 classes (one vs more than one) and the proportion of children eligible for free school meals'. The protocol states this was by a member of staff 'not involved with the trial immediately after all schools have been recruited'. There are no baseline differences to suggest a problem with randomization: 'The intervention and control groups had similar school-level and child-level baseline	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. The process evaluation paper notes the trial having high levels of engagement. It appears a modified intention-to-treat analysis was used.	Low risk of bias	No clusters dropped out of the trial. 93% of the participants were assessed in the intervention group and 96% in the control. No evidence of results not been biased buy missing data and levels of attrition are relatively small and consistent between groups.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ. The study protocol states that anthropometric measures at baseline and follow-up will be taken by assessors blind to group allocation.

		characteristics, including physical activity and food intake questionnaire scores. At baseline, although anthropometric measurements between the groups were largely similar, a greater proportion of children in the intervention group were overweight or obese than in the control group.'. Schools were recruited and immediately randomised, then all children within each recruited school were invited to participate. It is unlikely selection was affected as all children in the year 5 classes of the recruited schools were invited to participate and they were not told their allocation until after baseline measures were taken. There were no baseline imbalances to suggest differential identification or recruitment of individual participants between intervention groups.						
Magnusson 2012	High risk of bias	No details about the random component used in randomization and no mention of allocation concealment. Same number of schools in each group. All children attending second grade were invited to participate and to hand in a written parental consent form before the first measurement sessions. Based on the participant flowchart, recruitment occurred after randomization. No statistical differences were observed between intervention schools and control schools at baseline, except the intervention school children had on average lower zBMI scores than the children in the control schools, suggesting that there were some issue with the selection of participants into the study.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not explicitly reported that ITT analysis was conducted but according to the flowchart participants were analysed according to allocated group	High risk of bias	High and substantially different attrition in the intervention group (40%) and control group (55%) due to student that were absent or refused to be measured. There is potential for results to be biased as the missingness could be related to the outcome value.	Low risk of bias	Measurement of the outcome was appropriate. The outcome assessors were aware of the trial and were not blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Nemet 2011b	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat	High risk of bias	Reason for missing data is reported as due to the transition from kindergarten to elementary school involving redistribution of the children to several schools, however the attrition is high	Low risk of bias	No concerns over measurement of the outcome assessors were blinded to allocation

				analysis was conducted.		in both intervention (45%) and control (37%) group, therefore it is plausible that missingness depends on the value of the outcome at follow-up		
Safdie 2013	Some concerns	They state that randomization took place for both clusters and individuals within clusters, but there is no information about the random component used, nor about allocation concealment. Participants flow-chart shows that recruitment of schools took place prior to randomization. Individual participants were randomly selected to take part from those who had consented in the randomised schools. Unclear whether consent was given before or after randomization, but according to the participants flowchart it seems that recruitment occurred after randomization with a refusal rate of 20% overall (not reported per group); unclear if differential identification/recruitment of individual participants occurred. School characteristics did not vary across the three intervention groups and there appeared to be no major differences across the groups at baseline.	Some concerns	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. The authors stated that there were deviations from implementation the physical activity intervention (not implementing them all) but they put this down to real world context e.g. limited space and competing activities. The authors state an intention-to-treat analysis was employed using imputation for missing data.	Low risk of bias	One cluster from the 'plus' intervention arm did not contribute data at this time point as during the second year of intervention the school became a full-time school and was no long term termer eligible for inclusion in the study. Data from 84% and 73% of participants were available in the basic and plus intervention group and from 87% in the control group for anthropometry. The authors used imputation but no sensitivity analysis or other methods to show the result is not biased by missing data. The missing cluster is not due to the true value but there is some difference in attrition between groups and the levels of attrition in the plus group is substantial	Low risk of bias	Measurement of the outcome was appropriate. Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were or if they were blind to group assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.
Siegrist 2018	Some concerns	randomization method not reported but concealment was conducted by using sealed envelopes. No baseline differences due to the randomization process are reported. Participants were recruited after the schools were randomised to groups. All eligible children in schools invited and the proportion of children not consenting in each group	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Modified intention-to-treat used.	Some concerns	There is no suggestion that any clusters dropped out of the study. Data were available for 73% of intervention group and 74% of control group. There is no reported statistical analysis producing evidence to	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted 'by trained staff according to standard operating procedures.' Outcome assessors were

		was similar and all children in the classes were invited to participate. There were no baseline imbalances to suggest differential identification or recruitment of individual participants between intervention groups.				show result not biased by missing data. Missingness could depend on the true value. However, missing data is balanced across groups and the main reason for missing data was children leaving school.		likely aware a trial was taking place as they were trained staff. The protocol says 'the medical examiners are not aware of th group allocatio of the participating children.' The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.
Story 2012	Some concerns	No details on randomization method or allocation concealment. Same number of schools in each group. No participants flowchart reported but according to the text recruitment of the participants was conducted prior to randomization as schools were randomised to intervention and control conditions following baseline data collection. No differences in baseline characteristics, but number of participants in the intervention and control are quite different (263 vs 177) but this may be due to chance as schools may had different number of children enrolled.	Low risk of bias	The study was designed to follow principles of intention-to-treat so data for children were analysed according to the original assignments of study condition. However, the authors reported there were only 3 children whose families moved from intervention to control schools during the trial but given the small number any effects on results were negligible.	High risk of bias	No information about the numbers of clusters or children retained at follow-up. No details about whether missing data imputation was conducted or other method to test for attrition bias was used. The authors reported that the analysis for children who were lost to follow-up are described with the other statistical analyses but there are no further details.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically th recorded measures coul be influenced by knowledge of intervention, this is highly unlikely.

Risk of bias for analysis 3.4 zBMI short term

Study	Bias

	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of t outcome	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppor judgem
Baranowski 2011	High risk of bias	Two-arm randomised control design with a 1:2 control to treatment ratio; the method of randomization is not reported and no indication on whether the allocation was concealed; the author reported that despite randomization, there were differences in mean levels of fruit and vegetable, non-fat vegetables, total energy, MVPA, counts per minute, BMI percentile, and zBMI-score, by group at baseline. These baseline difference may be due to chance but can affect the effect of intervention on zBMI.	Low risk of bias	The nature of intervention did not allow for blindness of participants/people delivering the intervention. No information on whether there was any deviation from intended intervention, but we have no reason to suspect there was any. It is not reported whether data were analysed according to an intention to treat plan, but the CONSORT diagram suggests that data were analysed according to the participants allocated group.	Some concerns	Data at the 5 months follow-up were missing from 90% of the intervention group and from 80% of the control group; reason for missingness reported but doesn't seems related to the trial; the author reported that there were no differences in demographics or anthropometrics between participants with or without missing data; substantial difference in attrition between the two groups this may suggest that missingness was not at random and may introduce bias in the results.	Low risk of bias	Height wa measured twice usi PE-AIM- stadiome (from Perspect Enterpris Portage M and avera Weight w measured twice usi SECA AI 882 (from SECA Corporati Hamburg Germany averaged details or zBMI-sco was deriv from BMI Same instrumer and meth derive zB were use assess th groups. Assessor anthropo and 24-h dietary re were blin group assignme (Rochon protocol)
Bohnert 2013	High risk of bias	A random assignment procedure within each school was used in which girls with parental consent were assigned to the GIG or control group. Girls were not assigned to the control group if spaces in the program were still available. A random-number table was used to assign participants to a group. This suggests it was not an adequate randomization process and that allocation was not concealed as the people conducting the study were allocating people based on how full the intervention group was. There were 96 participants enrolled in the intervention group and 37 in the control. This is a large imbalance between the groups due to the investigators stating 'Girls were not assigned to the control group if	Low risk of bias	Participants, carers and people delivering the intervention were aware of participant's assigned intervention during the trial due to participants completing consent and being told their intervention and research assistants delivering the intervention. There is no evidence to suggest there were deviations from the intended intervention that arose because of the trial context. The article also states that implementation data suggest that curriculum was implemented very well across the five school sites and participant engagement was high on average. It appears a modified	High risk of bias	Data were not available for 58% participants in the intervention and 65% in the control group. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. However, the authors state that 'The most common reason for participants dropping out of the program was lack of availability due to schedule changes. Other reasons included transferring schools, poor attendance record (i.e., girls were dropped from the program after three consecutive unexcused absences), and loss of interest.' There were no major differences between	Low risk of bias	Height ar weight we measured appropria and zBM score wa produced appropria Measurer is unlikely have diffe between groups because were coll from GIG control participar trained personne the resea team and No inform is provide about wh outcome assessors aware of interventi received study participar The measurer of height weight by

		spaces in the program were stil available (i.e., filling program slots took priority over balancing sample sizes between GIG and control group). .		intention-to-treat analysis was used, excluding participants with missing data		participants who dropped out of the study and those who did not on demographic characteristics, but the level of attrition is high in both groups		researche using standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely
Brown 2013	Some concerns	No method of randomization or concealment reported. Baseline data only reported for participants that completed the study, so we are unable to assess whether there were any difference among the whole sample of randomised participants.	Low risk of bias	No indication of deviation from intended intervention or that an intention to treat analysis was implemented but according to the CONSORT flowchart participants were analysed according to their allocated group.	Some concerns	16% of the participants in each group did not complete the study and reasons for discontinuing the sessions/study included moving house, vacation, transportation problems and loss of interest in the program. Results table report that data were missing from one additional participant in the intervention group, but this is not mentioned in the text or flowchart. No analysis to assess for bias due to missing values is reported. Attrition is balanced between groups but substantial that there may be some bias in the results.	Low risk of bias	Measurer of the out was appropria Measurer of the out was unlik differ as it conducte trained research using standardi procedur There is r mention c researche being blir group allocation measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Choo 2020	High risk of bias	There is no information given about method of randomization or allocation concealment. Baseline data does not suggest an issue with the randomization process. Participants flow-chart suggests that enrolment took place after the randomization of the clusters. It is not clear who was aware of the intervention	Low risk of bias	Participants, carers and those delivering the intervention were aware of intervention assignment. Parents and children undertook new activities at the centre, and researchers developed the curriculum. There is no information given about deviations to intended	Some concerns	It seems like no clusters (community child centres) dropped out. 6% of children dropped out in the intervention and none in the control.	Low risk of bias	Measurer of the out was appropria There is r informati about out assessors it seems measurer would be unlikely t differ due using standardi protocols scales. Th paper doe

		assignment. Everyone in the child centre were invited to participate so knowledge of the intervention assigned to the cluster would not have affected being invited. However, it is possible that if those recruiting or if participants knew of intervention assignment this could have affected enrolment. There is no suggestion of baseline imbalances to suggest differential identification or recruitment. Three children and two parents in the intervention group did drop out after enrolment 'owning either to the children's refusal to attend educational sessions or their withdrawal from the community child centre'. This could be due to finding out they were in the intervention condition and led to having 49 children in the intervention and 55 in the control.		interventions due to the trial context, but no reason to suspect these occurred. Participants flowchart suggests that a modified intention-to-treat analysis was used.				provide informati about wh outcome assessors or if they the trial w taking pla but it see likely it w be not bli The measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Fairclough 2013	Some concerns	randomization was performed using a using a random number generator, it is unclear whether the allocation sequence was concealed. No evidence of baseline differences. According to the participants flow diagram parental consent was asked prior to randomization, thus selection/participation into the study was not affected by knowledge of the allocated intervention. Some baseline differences were reported, probably due to chance and regression models were adjusted for outcome measures at baseline.	Low risk of bias	There are no details regarding whether an intention to treat analysis was conducted but flow diagram suggests that participants data were analysed according to their allocated group.	High risk of bias	One intervention school withdrew from the study due to reasons external to the project, prohibiting collection of follow-up data at this school. According to the flow diagram, at follow-up, data were missing from 23% of the participants in the control group and 38% in the intervention, however, the final analysis only included 53% of the participants in the intervention group. No baseline differences between completer and non-completers were reported, however attrition is high and the difference in missing data between the groups is very large and it is possible that missingness in intervention group is associated with true value of outcome.	Low risk of bias	Measurer of the out was appropria Measurer of the out was unlik differ as it conducte trained research using standardi procedur There is r mention c researche being blir group allocation measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.

Griffin 2019	Low risk of bias	randomization was stratified by the father's ethnicity (white British or Irish/other ethnic group) and conducted using an automated online form developed by the University of Birmingham Clinical Trials Unit. Quote: "There were no significant differences between the groups in age, cardiorespiratory fitness, and body composition (all P>0.05) at baseline".	Low risk of bias	No details about any deviation but flowchart suggests that all participants were analysed according to their assigned group. An intention to treat analysis was used.	High risk of bias	Serious concerns over the high levels of attrition that is significantly higher in the intervention group (41% in the intervention and 29% in the control group). Some differences in ethnicity and deprivation index between completers and non-completers (completers more likely to be white and less deprived) suggesting that missingness may not be at random and related to the outcome value.	Low risk of bias	No report details bu were coll by resear presumab using standardi methods.
Haire-Joshu 2010	High risk of bias	randomization was computer generated, no details on concealment. No baseline imbalances are reported. Not clear if participants were recruited before or after randomization of sites. Higher number of participants in intervention group (418 vs 364) and some baseline differences suggesting that knowledge of the allocated intervention may had affected participation in the study.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Data were analysed according to a modified intention to treat: only participants with baseline and outcome data were included in the analysis	High risk of bias	Data were not available from 7% and 4% of the sites. The authors reported that analysis was limited to the cohort of 451 children (296 children at 69 PARADE sites and 155 children at 43 control sites) with pre and post data for child survey outcomes. Data were missing from 58% of the total participants. The number of participants/groups after randomization is not reported and assuming the number was balanced missingness appear to be higher in the control sites. No analysis was conducted to assess for bias due to missing data and their high level of attrition that is different between groups suggest that results may be biased.	Low risk of bias	Measurer of the out was appropria informati about wh outcome assessors aware of trial but it seems lik There is n informati given to suggest t outcome assessors blind to assignme The scho nurses we taking measurer anyway though. T measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Hull 2018	Low risk of bias	A computerized random number generator was used, and the allocation was concealed until after baseline assessments were completed. No baseline unbalances	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no	High risk of bias	Data were missing from 30% of the participants in the intervention group 33% in the control group. Reasons for missingness were mostly being	Low risk of bias	Accordin the study protocol, and weig were mea using standardi methods.

		between groups. Parental consent was obtained and eligibility of children was assessed prior to randomization. No baseline differences among children and parents in the two groups		reason to suspect these occurred. An intention to treat analysis was conducted.		unable contact, relocation, and conflict of schedule. The large proportion of missing data in both groups suggests that missingness could be related to the true value of the outcome		Outcome measures collected trained st staff. The interview were mas to group assignme and interventi staff did n collect measurer on partici after randomiz to reduce informati bias.
Kipping 2014	Some concerns	Random allocation to intervention or control school was concealed and done by one of the authors but there is not enough information to determine if randomization was appropriate. Baseline characteristics for those pupils included in the analysis were similar for those from the intervention and control schools, with the exception of the proportion walking or cycling to school, but differences could be due to chance. Recruitment happened prior to randomization. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Low risk of bias	There were some deviations, as they note that 'One school refused to deliver any of the intervention, and others did not deliver all of the lessons.' The school that did not deliver the intervention said they 'did not have the time or capacity to accommodate the intervention'. It is likely this is also the reason for deviation in terms of not delivering all the lessons. This is not due to trial context, but real-world context. Intention-to-treat analysis used: 'We used intention to treat analyses as our main analyses, with missing data at baseline dealt with by including an indicator variable for those with missing data'	Low risk of bias	No schools withdrew from study, so all randomised units are present at baseline and follow-up. Data were not available for all participants (83% in the intervention and 82% in the control). However, the authors reported that the sensitivity analyses that we did to explore assumptions about missing data produced results that were consistent with the main analyses.	Low risk of bias	Measurer of the out was appropria Measurer unlikely t differ acr groups as using standardi measures collected trained research at both ti points. Outcome assessors blinded t allocation
Kocken 2016	High risk of bias	randomization method not reported but schools were matched by socioeconomic status, educational level and area urbanization; no	High risk of bias	Serious concern over the selection of the schools into the study; twenty schools dropped out after randomization for	Some concerns	Some concerns over missing data from the intervention group only (8%) and no evidence that the results were not	Low risk of bias	Measurer of the out was appropria Measurer of the out was unlik differ as it

		details about concealment; similar number of clusters were included after randomization and after 20 classes dropped out from the study. Serious concern over the selection of the participants into the study; it is unclear if parent consent was asked for before or after randomization and less participants were included in the control group suggesting that knowledge of the allocated intervention may have affected participants to enrol in the study.		reason that may be related to the trial		biased by missing data		conducte 'trained examiner using the protocol. measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Levy 2012	Some concerns	No details about randomization method and it is unclear if the allocation sequence was concealed as author stated that blind cluster-randomised field trial was conducted with fifth grade school children. No baseline differences are reported. Students were randomly recruited after school randomization so possible that recruitment occurred with knowledge of allocated intervention. Most of the characteristics for children in the intervention and control groups at baseline were similar. While differences were found in consumption and physical activity variables, no significant differences were found in BMI differentiated by sex, or in the prevalence of overweight and obesity.	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat analysis was conducted.	Low risk of bias	No concerns over missing data as the loss to follow-up between the baseline and the final assessment was for 3.2% of the participants and it was evenly distributed between the groups	Low risk of bias	The measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Liu 2019	Some concerns	randomization method reported but no details regarding concealment: randomly assigned (1:1) to either the intervention or the control group using computer-generated randomization sequences. After randomization, schools were informed of their experimental group allocation and took	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	All 12 schools completed the trial. Measurements of weight and height were available for 97.2% of the participants. Potentially low risk of bias as only a small proportion of data are missing that is balanced between the two groups	Low risk of bias	Measurer of the out was appropria informati about wh outcome assessors aware of trial but it seems lik a trial like There is r informati given to suggest t

		baseline measures. Students were recruited prior to randomization. Baseline characteristics between the intervention and control groups were similar, except that children in the control group reported more frequent consumption of vegetables than in the intervention group						outcome assessors blind to assignme The measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce I Although theoretica the recor measures could be influence knowledg interventi this is hig unlikely.
Liu 2022	Low risk of bias	No concerns with the randomization process, randomization was centrally performed by a researcher and allocation sequence was concealed. The same number of schools with similar number of participants was randomised to each group. Recruitment of participants and baseline assessments were conducted before randomization. No differences in baseline characteristics were observed.	Low risk of bias	No concerns over deviations from intended intervention. The anlyses were conducted according to a modified intention to treat protocol excluding participant with data missing at follow-up.	Low risk of bias	All schools were retained at follow-up. Very little proportion of missing data in the intervention group (0.2%) and the control group (2.5%).	Low risk of bias	Outcome measures collected the traine outcome assessors using the device ar forms according the stand methods procedur The asse measurin children's height an weight we blinded to group allocation the schoo
Morgan 2011	Low risk of bias	Random allocation and allocation concealment were conducted. There were no major differences at baseline; there were more obese children in the control group but this could be due to chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were not available for 26% of the participants in the intervention groups and for 7.6% in the control group. There is no evidence that the result was not biased by missing data. Reasons provided for missing data included: having no contact, work commitments and relocating. It seems	Low risk of bias	Measurer and BMI calculatio was appropria and unlik differ acro groups. Outcome assessors not fully blinded, because some cas they foun assignme from participar

						missingness depending on the true value is unlikely. The authors states that there were no significant differences in baseline characteristics between those lost to follow-up and those retained at 6 months for weight or for any of the secondary outcomes in fathers and children. However, the difference in attrition between group is over 10% and we have concerns that the results may be biased.		However, did try to this to a minimum measurer of height weight by researche using standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely
Morgan 2014	Low risk of bias	randomization was appropriate and allocation was concealed. The random allocation sequence was generated using a computer-based random number-producing algorithm. To ensure concealment, the sequence was generated by an independent statistician who did not have any contact with participants and given to the project manager. There appears to be no major baseline differences to suggest a problem with randomization and groups were of similar size.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Measurements were obtained for 81% of the sample. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value. However, it did not differ across groups and the groups did not differ in baseline characteristics which suggests it may not have been related to BMI. Reasons for drop out included being unable to commit and too many questionnaires.	Low risk of bias	Measurer of the out was appropria see table Measurer unlikely t differ as t 'were tak an after-s setting by trained st using the instrumer each time point.' Assessor were blin for baseli assessme but there informati about foll assessme The measurer of height weight, u standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely
NCT02067728 2014	High risk of bias	No details on methods of randomization and concealment: the authors stated that practices were matched and	High risk of bias	There is no information regarding deviations from the intended intervention that	High risk of bias	High percent of missing data in both groups (48% and 53 %). The authors reported that the number of	Low risk of bias	Measurer of the out was appropria informati about wh

		randomly assigned. Baseline characteristics of the practices not reported but the authors stated that practices were paired and then randomised to assure similarity across intervention and usual care groups. Not explicitly reported but it seems that participants were recruited after randomization of the practices and the authors reported that subject recruitment will occur one month before implementation. No flowchart or baseline data reported.		arose due to the trial context, but no reason to suspect these occurred. Not reported if an intention to treat analysis was conducted.		participants analysed is low because returning for measurement checks was optional. According to the analysis plan, subjects who drop out or are lost to follow-up were compared to completed subjects in differences related to demographics, socioeconomic status, and BMI but no results of such analysis are reported.		outcome assessors aware of trial but it seems lik a trial like Outcome assessors not blind assignme The measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Nyberg 2015	Some concerns	No details on allocation concealment reported: each class was assigned a number which was drawn randomly from a basket by an independent person in the presence of the research team. Every other school class was assigned to the intervention group. All families who had children in these classes were invited to participate in the study. There were no differences in age and anthropometric measures at baseline between intervention and control groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Overall, 88% of the participants data were included in the analysis but no number for each group is reported. The author reported that ten children dropped out of the study (intervention: 4, control: 6). These children had weight status and parental education levels similar to the remaining sample. A sensitivity analysis was undertaken where baseline values were imputed for missing data, but data of this analysis are not reported.	Low risk of bias	Measurer of the out was appropria Measurer of the out was unlik differ as it conducte trained research using standardi procedur There is r mention c researche being blir group allocatior measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Nyberg 2016	Some concerns	No details on allocation concealment reported: each class was assigned a number which was	Low risk of bias	There is no information regarding deviations from the intended intervention that	Some concerns	Overall, 84% of the participants data were included in the analysis but no number for each group is reported.	Low risk of bias	Measurer of the out was appropria Measurer of the out

			drawn randomly from a basket by an independent person in the presence of the research team. Every other school class was assigned to the intervention group. All families who had children in these classes were invited to participate in the study. There were no major baseline differences between the groups, except for intake of ice-cream, chocolate and sweets and the proportion of parents born outside of the Nordic region being higher in the control group. However, parents were asked for consent prior to randomization and therefore these baseline unbalances may be due to chance.		arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		The author reported that ten children dropped out of the study (intervention: 4, control: 6). These children had weight status and parental education levels similar to the remaining sample. A sensitivity analysis was undertaken where baseline values were imputed for missing data, but data of this analysis are not reported.		was unlik differ as it conducte trained research using standardi procedur There is r mention researche being blir group allocatior measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
	O'Connor 2020	Some concerns	randomization was appropriate but it is not clear if allocation was concealed: family were randomised by a random number generator by principal investigator to the program or a waitlist control group. Baseline data does not suggest an issue with the randomization process. There was a significant difference in zBMI-score at baseline but his could be due to chance due to the small sample size. . Participants flowchart shows that participants recruitment took place prior to randomization. There were no baseline imbalances to suggest differential identification or recruitment of individual participants between intervention groups.	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. The tables in the appendix show that intention-to-treat analysis was used as they include the total number of randomised participants.	Some concerns	20 families were randomised to the intervention and 17 to the control. Then one family was disqualified from the intervention before it began as one of the fathers did not 'provide a medical clearance after reporting new symptoms that resulted in failing the exercise participation health screening'. As this family was randomised, it is a missing cluster. Data were available for 75% of the sample at follow-up 'Baseline data were collected on 100% of the sample and follow-up data on 75% of the sample'. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value. There is no information specifically about why children were missing. Figure 1 presents dropouts at the cluster level.	Low risk of bias	Measurer of the out was appropria Measurer is unlikely differ acro groups, because study and collectior conducte using standardi scales an measures unclear whether outcome assessors knew the was takin place - no informati about out assessors provided. There is r informati provided whether outcome assessors blinded to group assignme no inform about out assessors provided. measurer of height weight us standardi measures

						They do say that 'Fathers who never attended a session had a higher weight, BMI, and waist circumference than those who attended at least one session.' It is potentially likely that if the father did not attend, then the child did not attend either, and it is possible the reasons could be similar and therefore linked to the true value. Missingness is fairly even between intervention and control.		relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Pena 2021	High risk of bias	randomization and sequence allocation concealment adequate; schools were randomised at a two intervention to one control ratio; some of the schools were assigned to the control group by a non-randomised method but we have only included the data from intervention and control groups that were appropriately randomised, therefore there is no concern over the randomization method with regards to the results included in our analyses. All students in fifth and sixth grades were eligible to participate in the study, regardless of weight or health status at baseline. Some difference in percent of boys and of public schools both higher in the control group, but these differences are presumably due to chance. According to the flowchart, participants were enrolled after randomization and the response rate was higher in the intervention (74%) than in the control (48%) group, suggesting that knowledge of the allocated intervention may had affected the rate of enrolment.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were missing from 13% of the participants in the intervention and from 13% of the participants (randomised and non-randomised) in the whole control group. it is not reported how many students were randomly allocated to the control group as the flow-chart is for the whole study including the non-randomised control schools. The authors conducted both complete case and multiple imputations analysis and found that the results are very similar. Some concerns over the uncertainty on missing data	Low risk of bias	Measurer of the out was appropria Measurer of the out was unlik differ as it conducte trained research using standardi procedur There is r mention c researche being blir group allocatior measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Ramirez-Rivera 2021	Low risk of bias	randomization and concealment methods were conducted by blocks stratified by sex and zBMI using a random	Some concerns	The authors pointed out that there was a risk of contamination between the groups because	Some concerns	At follow-up 90% (19/21) and 95% (19/20) of the participants from intervention and control group were	Low risk of bias	Measurer of the out was appropria Measurer of the out

		number sequence generated by a randomization software. There was an adequate allocation concealment of participants, because the people who conducted the allocation did it at one point in time using the database without names, just with codes. No baseline differences reported.		children were from the same school classrooms. However, this possible contamination would be expected to reduce the difference between groups. The analyses were performed using intention to treat.		retained. Analysis conducted for the whole sample using missing data imputation were missing data were replaced by the baseline value (baseline observation carried forward). Reason for missingness are reported as not related to the trial (two students transferred to different school, and one student moved to a different city). Small differences in attrition between the two groups that may lead to some bias.		was unlik differ as it conducte trained research using standardi procedur There is r mention c researche being blir group allocatior measurer of height weight us standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
Rerksuppaphol 2017	Some concerns	randomization was appropriate, but there is no information about allocation concealment. Children were randomly assigned to the intervention group or the control group' ' using a computerized program to the intervention group and control group, respectively. Groups were similar in size and there were no significant differences in baseline age, weight, height, BMI, waist and hip circumference and nutritional status between the two groups.	Low risk of bias	There is no information about deviations due to the trial context, there is a possibility for contamination as children within schools were randomised individually, but no evidence to show deviations occurred. Modified intention-to-treat analysis used.	Low risk of bias	No concerns, all participants in the intervention group had data at follow-up and only one was lost-to-follow-up from the control group	Low risk of bias	Measurer of the out was appropria Measurer was unlik differ as it 'collecte trained research assistant There is r informati about wh outcome assessors aware of interventi received participar The measurer of height weight, u standardi measures relatively robust. Th height an weight measurer are used produce l Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely
Rosario 2012	Low risk of bias	randomization took place according to a	Low risk of bias	There is no information to	Some concerns	None of clusters dropped out.	Low risk of bias	Measurer of the out

		random number generator, no details about allocation concealment. There are some baseline differences, however these could be due to chance. . Participants flowchart shows that recruitment took place prior to randomization. There were no differences to suggest differential identification or recruitment of individual participants between intervention groups. There were differences in height and parents education level but this is not suggesting differential recruitment.		suggest deviations from intended interventions due to trial context took place. A brief process evaluation showed the intervention went as planned and there is no reason to suspect additional activities were sought in the control group. Participants flowchart shows a modified intention-to-treat analysis was used, excluding participants who were lost to follow up.		Attrition rates were high but did not differ between intervention and control group (35.2% and 38.1%, respectively). There was no statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, but it seems unlikely as it was even across groups and the authors explained that BMI and major sociodemographic characteristics did not differ significantly between the children who participated in the baseline and those not included in the final assessment. Additionally, reasons are provided that do not seem related to the true value (mostly school transfer, and a few due to parent refusal and absence from school).		was appropria each sch previousl trained pe performe anthropo evaluatio using standardi procedur Measurer unlikely t differ acr groups. Outcome assessors likely kne trial was t place due being trai 'In each school, previousl trained pe performe anthropo evaluatio using standardi procedur Outcome assessors blinded t group assignme
Rosenkranz 2010	Some concerns	randomization was conducted using a random number generator, no information about allocation concealment. At baseline there were no significant differences by condition for demographic variables. Participants flowchart shows that recruitment took place prior to randomization. There were no differences to suggest differential identification or recruitment of individual participants between intervention groups.	Low risk of bias	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. Flowchart of participants suggests modified intention-to-treat analysis was used.	Low risk of bias	None of the clusters dropped out. Participants with available data were 97% in the intervention and 93% in the control group.	Low risk of bias	Measurer of the out was appropria Measurer unlikely t differ acr groups as conducte researche using standardi methods. Outcome assessors likely kne trial was t place bec they were research assistant Outcome assessors blinded t assignme the begin of the stu
Spiegel 2006	High risk of bias	The methods of randomization and allocation concealment are unclear. They outline sampling methods but not how clusters were	Some concerns	There is no information given about deviations to intended interventions due to the trial context. Classrooms were	Some concerns	There is no information provided about whether all clusters (classrooms) contributed data, suggesting no	Low risk of bias	Measurer of the out was appropria Measurer unlikely t differ acr

		assigned to the intervention or the control. They recruited clusters by recruiting teachers 'via the local and state education officials' and 'the model for sampling was stratified at the district level to ensure a diverse and representative sample of a national population.' They say 'To reduce sample bias, participants in the intervention and comparison groups at each school were selected through random sampling techniques.' but do not specify what these were. Baseline BMI data were similar across groups. No information provided about other variables or demographics, so hard to determine baseline differences. No flow diagram presented. The order of recruitment and randomization is unclear. The study suggests teachers were recruited to take part in the study and researchers selected classrooms (clusters) at each site: 'The research team decided to select comparison and intervention classes at each site to minimise variances in socioeconomic and school environment'. The recruitment of individual participants and the order of this is unclear. There is no information about selection of the individual participants, so it is unclear whether those recruiting individuals were aware of allocation before recruitment. There are no baseline demographics presented at the individual level and BMI seems comparable at baseline between the intervention and control.		randomised within schools which may have introduced contamination, but there is no evidence of this presented. Though no information given about analysis type, we'd assume the participants are kept in their intervention groups because it is implemented within the school curriculum.		clusters dropped out. Data were not available for all participants. There was a 16.2% attrition rate in the comparison group and a 13.7% attrition rate in the intervention group. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value but there is no information about the reasons for missing data or how evenly split it was etc to determine if this is likely in this study.		groups as same measure methods used and conducte trained researche There is r suggestic they were to the tria There is r informati provided whether outcome assessors blind to g assignme The measure of height weight by researche using standardi measures relatively robust. Th height an weight measure are used produce Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely.
White 2019	Some concerns	randomization was appropriate as conducted by random number generator using a 1:2 control to treatment randomization to have more treatment than	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly	High risk of bias	Data are available for 71% of dyads in control and 83% in intervention group. There is no evidence that the result was not biased by missing	Low risk of bias	Measure of the out was appropria There is r informati about wh outcome

		control study participants in the Intervention Study, but no information is given about allocation concealment. There appears to be no major baseline differences to suggest a problem with randomization.		stated but seems like modified intention-to-treat likely used.		data. Missingness could depend on its true values there is some difference in the proportion o between intervention and control (>10%) and the authors note that 'adults were more likely not to complete the study if they were overweight. They do not state this for young people, but it seems likely to be consistent as they were caregiver-young person dyads.		assessors aware of interventi received participar The measurer of height weight, u standardi measures relatively robust. Th height an weight measurer are used produce Although theoretic the recor measures could be influence knowledg interventi this is hig unlikely

Risk of bias for analysis 3.5 zBMI medium term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Sele repo
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors judgeme
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns
Cao 2015	Some concerns	No details about the randomization	Low risk of bias	No deviation from the intended	Some concerns	Data were missing from 30% of students	Low risk of bias	Measurement of the outcome was	Some concerns

			method and concealment. Schools were stratified according to the economic level of the communities in which the schools were located and the condition of school sports fields and canteens and on obesity prevalence and divided into intervention and control groups randomly by sortation. Details of specific method are not reported and no details about sequence allocation concealment. No baseline differences that suggest problems with randomization.		intervention that arose because of the trial context was reported but the authors stated that although thy could not guarantee total isolation of intervention and control group students, the control schools were not likely to be seriously contaminated. A modified intention to treat analysis was conducted as only participants with outcome measure were included in the analysis.		in the intervention as well as 30% were missing in the control group. No statistical method to adjust for missing data was implemented but sensitivity analysis to control for the additional data (i.e. hose who were newcomers in the follow-up surveys) at follow-up was conducted and the conclusions remained unchanged. No reason for drop-out provided. Attrition is balanced between the two groups but substantial that missing data may introduce bias.		appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Crespo 2012	Some concerns	Article states randomization took place but no further information and no information about allocation concealment. There appeared to be no major baseline differences to suggest issues with randomization. Participants were assessed for eligibility and recruited from the schools that agreed to participate before randomization of clusters. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between	Low risk of bias	There were a few deviations from the intended intervention listed but it seems these are due to real world context (e.g. time constraints) rather than the trial context. An intention-to-treat analysis was used.	Some concerns	Data from all clusters were available and there was 84% retention for the Family-only group, 88 for the Family + community group, 90% for the community-only group and 90% for the control. Analyses were carried out to determine if baseline measures of outcomes were different between subjects who completed the study versus those who dropped out across the four groups of the 2×2 design. Mixed effects models were fitted for each baseline outcome measure with terms in the model for dropout status, group condition and dropout by group condition interaction. The	Low risk of bias	Measurement of the outcome was appropriate. Evaluation assistants measured height and weight using standardised measures, so it was unlikely to have differed across groups. Also inter-rater reliability was high. Evaluation assistants took the measurements so it seems likely they would have known about the trial. However, they were blinded to participants' study condition.	Some concerns

		groups. zBMI similar across groups. No information provided breaking it down per cluster.				interaction term would determine whether baseline levels across groups varied by dropout status. None of the models found significant interaction terms.			
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided data. Overall 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be dependent on the outcome true value.	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were. It is unclear if outcome assessors were blinded as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns
Fulkerson 2022	Some concerns	No concerns with the randomization procedures, the study statistician used a computer-generated randomization schedule; no details about concealment; there were no differences in baseline characteristics to suggests issues with the	Low risk of bias	No concerns over deviations from intended interventions and analysis were conducted according to an intention to treat plan	High risk of bias	Concerns regarding missing data with attrition being substantially higher in the control group (21% vs 7% in the intervention group); reason for missingness reported as families could not be reached for measurements, suggesting that missingness could depend on	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Some concerns

		randomization process.				the true value of the outcome and the results may be biased.		this is highly unlikely	
Kain 2014	High risk of bias	Some concern over the lack of details on randomization methods and allocation concealment. Unclear if children were recruited before or after randomization; lack of baseline characteristics by group make it difficult to assess if there was any difference between the groups due to randomization issues.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Concerns over lack of details of missing data in ach group. Of the participants in the original sample, 76.6% had follow-up data (numbers/groups are not reported); the authors reported that of those measured at follow-up, 214 children were new students who began the school year in March 2012, so they were not present when we measured at baseline. To test if the BMI of children lost to follow up was different from that of children included in the sample, they compared their mean zBMI at baseline and found no significant difference.	High risk of bias	Concern over the method for measuring hight and weight not being reported (it would be of serious concern if measurements were done differently in different schools/groups) or if the outcome was self-reported.	Some concerns
Keller 2009	Some concerns	Concerns over lack of details on randomization and concealment.	High risk of bias	Serious concerns over deviation from intended intervention, as the majority of the participants allocated to the intervention group not being interested in receiving the intervention. We analysed the data according to an intention to treat analysis with data from active and inactive (observer group) intervention combined in one group.	High risk of bias	Data were missing from 81% of the intervention and 75% of the control group; proportion of missing data at follow-up slightly is higher in the control group suggesting that missingness could be related to the true value of the outcome; no evidence that the result was not biased by missing outcome data is reported.	Low risk of bias	Paediatricians were not involved in the study therefore we have no reason to suspect that knowledge of the intervention allocation could have influenced the measurement of the outcome.	Some concerns
Kubik 2021	Some concerns	randomization was conducted by a trial statistician using a computer-generated randomization schedule, no details about	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but	Some concerns	Data were missing from 6% and 9% of the participants in the intervention and control group, respectively. No analysis to test difference	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained	Low risk o bias

		concealment. Some difference in baseline: higher proportion of obese children in the control group but models are adjusted for baseline BMI.		no reason to suspect these occurred. An intention to treat analysis was conducted.		between completer and non-completer is reported and there is no evidence that results were not biased due to missing data.		research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Li 2019	Low risk of bias	A trial statistician allocated schools to the intervention and control groups using a computer-generated sequence stratified on 2 school-level factors: school provision of midmorning snacks and availability of indoor activity space. No details regarding concealment but we have no reason to suspect that this was not conducted. No baseline differences reported. randomization took place after baseline measurements were obtained from participating children. No baseline differences were reported.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No schools dropped out of the trial. Missing and/or invalid data for the primary outcome was very low at both measurement points, with 3.3% missing in the intervention and 3.5% in the control arms. The authors found no differences between the 2 study groups in completeness of outcome measures.	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. The research staffs who conducted the measurement were blinded to the intervention assignment.	Low risk o bias
Lichtenstein 2011	High risk of bias	There is not enough information provided to determine if randomization and allocation concealment were	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial	Low risk of bias	There is no suggestion that any clusters dropped out of the study. Data were available from 91% and 96% of the participants.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the	Some concerns

			appropriately completed. The paper only says that the 'The schools were randomised and divided into 2 groups. No major baseline imbalances reported. No information provided about order of randomization and recruitment. No information regarding randomization or enrolment provided to know if recruitment was affected by knowledge of allocation. No major baseline imbalances but not much information provided. 249 children were in the intervention and 196 in the control which suggests imbalance, but this may be due to class size.		context, but no reason to suspect these occurred. Modified intention-to-treat analysis was used.		There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value but there are no reasons provided for missing data to assess this. However, the level of attrition is relatively low in the control group and not too dissimilar to the intervention group.		trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Liu 2019	Some concerns	randomization method reported but no details regarding concealment: randomly assigned (1:1) to either the intervention or the control group using computer-generated randomization sequences. After randomization, schools were informed of their experimental group allocation and took baseline measures. Students were recruited prior to randomization. Baseline characteristics between the intervention and control groups were similar, except	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	All 12 schools completed the trial. Measurements of weight and height were available for 97.4% of the participants. Potentially low risk of bias as only a small proportion of data are missing that is balanced between the two groups	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could	Some concerns

		that children in the control group reported more frequent consumption of vegetables than in the intervention group						be influenced by knowledge of intervention, this is highly unlikely.	
Liu 2022	Low risk of bias	No concerns with the randomization process, randomization was centrally performed by a researcher and allocation sequence was concealed. The same number of schools with similar number of participants was randomised to each group. Recruitment of participants and baseline assessments were conducted before randomization. No differences in baseline characteristics were observed.	Low risk of bias	No concerns over deviations from intended intervention. The analysis were conducted according to a modified intention to treat protocol excluding participant with data missing at follow-up.	Low risk of bias	All schools were retained at follow-up. Very little proportion of missing data in the intervention group (2.7%) and the control group (1.6%).	Low risk of bias	Outcome measures were collected by the trained outcome assessors using the same device and/or forms according to the standard methods and procedures. The assessors measuring children's height and weight were blinded to the group allocation of the schools.	Low risk o bias
Nyberg 2015	Some concerns	No details on allocation concealment reported: each class was assigned a number which was drawn randomly from a basket by an independent person in the presence of the research team. Every other school class was assigned to the intervention group. All families who had children in these classes were invited to participate in the study. There were no differences in age and anthropometric measures at baseline between intervention and control groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Overall, 88% of the participants data were included in the analysis but no number for each group is reported. The author reported that ten children dropped out of the study (intervention: 4, control: 6). These children had weight status and parental education levels similar to the remaining sample. A sensitivity analysis was undertaken where baseline values were imputed for missing data but data of this analysis are not reported.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could	Low risk o bias

								be influenced by knowledge of intervention, this is highly unlikely.	
Nyberg 2016	Some concerns	No details on allocation concealment reported: each class was assigned a number which was drawn randomly from a basket by an independent person in the presence of the research team. Every other school class was assigned to the intervention group. All families who had children in these classes were invited to participate in the study. There were no major baseline differences between the groups, except for intake of ice-cream, chocolate and sweets and the proportion of parents born outside of the Nordic region being higher in the control group. However, parents were asked for consent prior to randomization and therefore these baseline unbalances may be due to chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Overall, 84% of the participants data were included in the analysis but no number for each group is reported. The author reported that ten children dropped out of the study (intervention: 4, control: 6). These children had weight status and parental education levels similar to the remaining sample. A sensitivity analysis was undertaken where baseline values were imputed for missing data, but data of this analysis are not reported.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk o bias
Sahota 2001	Some concerns	randomization was conducted by the toss of a coin. There are no details on whether the allocation sequence was concealed. There are no details regarding the timing of selection of participants into the study in the text but participants flowchart suggests that recruitment occurred after randomization	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No information on whether an intention-to-treat analysis was used, the authors reported that the analysis was based on only those	Some concerns	zBMI data at follow-up were available from 93% and 94% of the participants. The author reported that over the year 42 children left and 40 new children joined, thus uit is unclear how many participants were lost-to follow up in each group.	Low risk of bias	The measurement of height and weight using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Outcome assessors were not blinded to allocated intervention. Although theoretically the recorded measures could be influenced	Some concerns

		with 96-97% of participants in each group having baseline data, thus suggesting that recruitment was similar between groups and selective recruitment occurred		children measured both at baseline and at one year, suggesting that a modified intention to treat analysis was conducted.				by knowledge of intervention, this is highly unlikely.	
Santos 2014	Low risk of bias	Schools were randomised in a computer-generated random selection process and blocked to ensure equal representation from rural and First Nations (ie, indigenous) schools in both intervention and control arms. randomization was performed by an investigator who was not involved in data collection. No major baseline differences to suggest a problem with the randomization process. All participants were recruited before randomization of clusters. There were no baseline imbalances to suggest differential identification or recruitment of individuals between intervention group.	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. Intention-to-treat analysis was used. All data were analysed in an intention-to-treat analysis, with the last value carried forward' (modified ITT)	Some concerns	One cluster (1 school of 40 students) withdrew from the study in the control arm. 91% completed the trial in the intervention arm, and 89%) in the control arm (this is excluding the missing cluster of 40 participants accounted for in Domain 2). They used last value carried forward in analysis but conducted no sensitivity analysis to show result not biased by missing data. Missingness could depend on the true value, but it seems unlikely. Aside from the missing cluster in the control group (likely due to being unhappy with getting the control allocation), missing participants were quoted as being missing to be being 'absent from class on data collection day'. These were evenly missing across the intervention and control.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ across groups as conducted by researchers using standardised methods. Outcome assessors likely knew the trial was taking place because they were research assistants. Outcome assessors were blind to assignment 'Research assistants were blinded to study assignment.'	Some concerns
Sekhavat 2014	Some concerns	randomization was appropriate but not clear if allocation was concealed: participants were allocated to test and control groups using a computer generated randomization table in Microsoft Excel software	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is	Some concerns	Data were missing from 39% and 34% of the intervention and control group, respectively. There is no evidence that the result was not biased by missing data. Reasons for missingness were participants not turning up for the	Low risk of bias	Measurement of the outcome was appropriate - 'An accurate electronic scale (Model 500KL, Health O meter®, USA) was used to weigh the participants in the study' and a stadiometer was used for height. Measurements unlikely to differ	Some concerns

			and stratified according to age (6 to 8 years) old; 9 to 11 years old) and gender into 4 sub-groups. This technique helped balance the assignment of treatments in each stratum and yielded a balance in each treatment group. Therefore, participants according to the date of their appointment in the clinic were allocated from the beginning of the randomization table to test or control groups by the student research investigator. No baseline differences to suggest issues with randomization.		unlikely that participants switched study arms.		follow-up appointment (no further details). Missingness was high but similar in the intervention and control suggesting it might not be likely to be related to true value.		as conducted by researchers using the same protocols. Also 'The range of differences between the two examiners for height was only 0-0.5 cm and for weight was only 0-0.1 kg, which verifies the inter-examiner reliability (Table 1).' Researchers were not blinded 'blinding of the participants and the student research investigator (A.S.) to the intervention (short term counselling) was not possible.' The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Sherwood 2019	Low risk of bias	randomization and allocation concealment were appropriate: after baseline measures and well child visit completion, participants were randomised into treatment group using a 1:1 randomization schedule in blocks or sets of 10 to ensure research staff could not influence randomization by adjusting enrolment order. No baseline differences to suggest issues	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is unlikely that participants switched study arms.	Some concerns	Of the children randomised 86.2% were retained and attrition rates did not differ by treatment arm. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value, however it seems unlikely.	Low risk of bias	Measurement of the outcome was appropriate. Measurements unlikely to differ as conducted by 'by trained and certified data collectors' using standard protocols. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The	Low risk o bias

		with randomization.						height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Siegrist 2013	Some concerns	The article states randomization took place but there is no information presented about the random component used. There is also no information given about allocation concealment. Baseline data were similar between groups. Participants were recruited before randomization of clusters. There were no baseline imbalances to suggest differential identification or recruitment of individuals between intervention groups, proportions of participants that were overweight or obese were similar across groups.	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. Participants flowchart and results table suggest a modified intention-to-treat analysis was conducted, excluding missing data.	Some concerns	Data were available from all clusters (all 8 schools). BMI data were available at follow-up for 87% of the children in the intervention and in the control. No statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, however it seems unlikely because missingness was comparable in both groups and they note that the reasons were that 'children were ill or absent at the first or second examination date, or had left the school'.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ as completed by the same researchers who had been trained in using the measurement methods. It seems likely that the outcome assessors knew the trial was taking place as they are referred to as 'trained investigators'. There is no information provided about whether outcome assessors were blind to group assignment. The measurement of height and weight by researchers using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if they were appropriate:	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it only for individuals. The abstract mentions 16 clusters, whereas the	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff measuring the outcomes could not be	Some concerns

		'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control half size of intervention) but likely due to allocation ratio in randomization.		suspect these occurred. A modified intention to treat analysis with completers and imputation of missing data was conducted but participants remained in the groups they had been randomised to.		results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper states. No reasons for missing data are given.		blinded due to the randomization by practice due to the location of the measurement visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Wang 2012	High risk of bias	There is insufficient information about the sequence generation process and allocation concealment; no baseline differences were reported on gender, age, and nutritional status, and the author stated that the two groups are well balanced. There is no information provided to determine the sequence of enrolment and randomization.	Some concerns	No information regarding deviation from intended intervention and whether an intention to treat analysis was conducted	Some concerns	Some participants were missing due to withdrawals (5.6% in intervention group and 8.5% in control group) and no reason for withdrawals was reported in the paper.	High risk of bias	No information regarding the method that was used to measure BMI but they mentioned that surveyors collected the measurements. Unclear if they themselves performed the measurements or they collected the data from self-reported measurements.	Some concerns

White 2019	Some concerns	randomization was appropriate as conducted by random number generator using a 1:2 control to treatment randomization to have more treatment than control study participants in the Intervention Study, but no information is given about allocation concealment. There appears to be no major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used.	High risk of bias	Data are available for 64% of dyads in control and 70% in intervention group. There is no evidence that the result was not biased by missing data. Missingness could depend on its true values there is substantial difference in th proportion of missing data between intervention and control (>10%) and the authors note that 'adults were more likely not to complete the study if they were overweight. They do not state this for young people, but it seems likely to be consistent as they were caregiver-young person dyads.	Low risk of bias	Measurement of the outcome was appropriate. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns
Xu 2015	Some concerns	randomization was conducted by computer generated sequence, no details regarding concealment, no baseline differences among clusters or participants groups. Students were recruited prior to randomization	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	No concerns, attrition in both group (5% in the intervention and 7.5% in the control group). The main reasons for those lost to follow-up survey were that they were due to sickness or having other scheduled events on the survey day, which was evenly distributed in intervention and control groups. There were no significant differences in the percentage of children lost to follow-up between treatment groups or between the baseline BMI of those followed-up and not followed-up.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Low risk o bias

								this is highly unlikely.	
Xu 2017 (5 other cities)	Some concerns	Two-step cluster sampling method was used for subjects' selection, 6 schools from each other city were randomly chosen into the trial and then from each school, 2 classes from each grade were selected randomly in every school. No further details on the method of randomization and concealment. No baseline difference, six schools from each of the five cities were included in the study and the number of schools and classrooms in each arm is the same. Based on participants flowchart, students were asked for consent after randomization. A higher number of students in the control group declined to participate compared to the control group (7.6% vs 1.9%). This difference could be related to knowledge of the allocated intervention with less children interested in participating as control group. Baseline zBMI was higher in the treatment group suggesting that participants with a higher zBMI in the control group may have declined to participate when told they were allocated to the control	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Low risk of bias	All schools and classrooms were retained at follow-up. Only less than 5% of the data were missing from both groups due to loss to follow-up or discontinuation of the intervention and less than 2% of the outcome data were illogical missing and were not included in the analyses	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns

		group. However, this should not be introducing serious risk of bias as analysis was adjusted for baseline value of the outcome							

Risk of bias for analysis 3.6 zBMI long term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		S r
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Auth judge
Adab 2018	Low risk of bias	randomization was conducted using a 'block balancing algorithm' by trial statistician (not involved in recruitment). Sessional researchers were blind to arm allocation. There were baseline imbalances between groups at the individual level, however these could be due to chance rather than issues with randomization. Recruitment of participants occurred before randomization and 'to ensure concealment of allocation we caried out randomization after baseline measurements'. Baseline imbalances did not suggest differential identification or recruitment of individual participants between intervention groups.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Analyses of all outcomes were conducted according to an intention to treat plan.	Some concerns	One intervention school was lost to follow-up, but no control schools dropped out at this point. At 30 months follow-up data were missing from 14% of the intervention pupils and 10% control pupils. The author stated that sensitivity analyses were consistent with the main analyses and did not change any conclusions but results not shown are not shown and the level of attrition is substantial.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low ri bias
Cao 2015	Some concerns	No details about the randomization method and concealment. Schools were stratified according to the economic level of the communities in which the schools were located and the condition of school sports fields and canteens and on obesity	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported but the authors stated that although thy could not guarantee total isolation of intervention and control group students, the control schools	Some concerns	Data were missing from 23% of students in the intervention as well as 28% were missing in the control group. No statistical method to adjust for missing data was implemented but sensitivity analysis to	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers	Some conce

		prevalence and divided into intervention and control groups randomly by sortation. Details of specific method are not reported and no details about sequence allocation concealment. No baseline differences that suggest problems with randomization.		were not likely to be seriously contaminated. A modified intention to treat analysis was conducted as only participants with outcome measure were included in the analysis.		control for the additional data (i.e. hose who were newcomers in the follow-up surveys) at follow-up was conducted and the conclusions remained unchanged. No reason for drop-out provided. Attrition is balanced between the two groups but substantial that missing data may introduce bias.		being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Crespo 2012	Some concerns	Article states randomization took place but no further information and no information about allocation concealment. There appeared to be no major baseline differences to suggest issues with randomization. Participants were assessed for eligibility and recruited from the schools that agreed to participate before randomization of clusters. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. zBMI similar across groups. No information provided breaking it down per cluster.	Low risk of bias	There were a few deviations from the intended intervention listed but it seems these are due to real world context (e.g. time constraints) rather than the trial context. An intention-to-treat analysis was used.	High risk of bias	Data from all clusters were available and there was 48% retention for the Family-only group intervention, 59% for the Community-only group, 50% for the Family + Community group and 59% for the control. Analyses were carried out to determine if baseline measures of outcomes were different between subjects who completed the study versus those who dropped out across the four groups of the 2×2 design. Mixed effects models were fitted for each baseline outcome measure with terms in the model for dropout status, group condition and dropout by group condition interaction. The interaction term would determine whether baseline levels across groups varied by dropout status. None of the models found significant	Low risk of bias	Measurement of the outcome was appropriate. Evaluation assistants measured height and weight using standardised measures, so it was unlikely to have differed across groups. Also inter-rater reliability was high. Evaluation assistants took the measurements so it seems likely they would have known about the trial. However, they were blinded to participants' study condition.	Some conce

						interaction terms, however there is serius concern over the high level of attrition in both groups.			
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided data. Overall, 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be dependent on the outcome true value.	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were. It is unclear if outcome assessors were blinded as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some conce
Foster 2008	High risk of bias	No information regarding randomization method and concealment only that schools were first organized into 5 clusters of 4 to 7 schools each, based on school size and type of food service, schools within each cluster were approached to participate in a predetermined, random order. When 2 schools in each cluster agreed to	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not explicitly reported, but use of a modified intention to treat analysis was mentioned when describing imputation data methods	High risk of bias	Attrition rates did not differ between intervention and control schools (31.9% vs 31.5%). The reasons for attrition a were transfer, repeated absences and refusals. The analyses that accounted for attrition (multiple imputation, baseline carried forward, and	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. The researchers were not blind to group allocation. The measurement of height and	Some conce

		participate, the schools were randomly assigned as intervention or control schools. It is unclear if parental consent was asked prior to randomization; the authors reported that the consent rate across the 10 schools was similar between control (67.7%) and intervention (71.4%) schools. However, knowledge of the allocated intervention may have affected participation into the study. Some difference in ethnicity and proportion of overweight and obese (higher in intervention group) are reported, suggesting that selection bias may have occurred. To account for these differences at baseline, race/ethnicity was controlled for in subsequent analyses.				last observation carried forward) did not differ from the analyses using complete data. Thus, the results obtained from participants whose data we had at the relevant assessment points. Some concern over the high level of attrition.		weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Grydeland 2014	Some concerns	Not enough information to determine if randomly allocated appropriately and no information given about allocation concealment. The baseline data is not presented for the whole sample but only for completers making it difficult to assess baseline differences. Participants were recruited before randomization of the clusters. Baseline data is not presented for the whole sample, only completers.	High risk of bias	There is no information to suggest there were deviations due to trial context. Full schools were randomised which might make this more unlikely (i.e. not classrooms within schools). The authors note the following but give no evidence to suggest anything took place. Per-protocol analysis used: 'A total of 1324 children provided data at both time points which constitute the analysed sample in this paper. A priori, per protocol and drop-out analyses were chosen over intention-to-treat'. Participants flowchart shows	Some concerns	No suggestion that any clusters dropped out. 86% and 90% of participants that consented gave anthropometric data at follow-up in the intervention and in the control, respectively. Figures are slightly higher when calculated from the number of participants who gave baseline anthropometric measurements (93% vs 90%). Dropout analyses found that 4% of the participants lost to follow-up weighed more and had a higher BMI and zBMI than the	Low risk of bias	Measurement of the outcome was appropriate, and it would have been unlikely to differ across groups because it was conducted by trained staff and the same measurement techniques were used. It is likely outcome assessors were aware a trial was taking place due to receiving training from the research team. The article states 'Neither participants nor investigators were blinded for condition.' The measurement of height and weight by	Some conce

					that intervention group 491 gave anthropometrics, but Table 3 shows only 465 included in analysis. Control 870 gave anthropometrics, but only 859 included in analysis. This has the potential to affect the result.		investigated sample. This suggest missingness of these participants is possibly likely to be related to the true value.		researchers, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
HEALTHY Study Group 2010	Some concerns	No information regarding concealment or method of randomization but the study protocol stated that the coordinating center developed a stratified randomization scheme by 6th field center and grade size in order to assign comparable within cluster (school) sample sizes across treatment arms at each field center. The randomization scheme resulted in equitable distribution in size of school, size of sixth grade, percentage enrolled, percentage of students qualified for free/reduced meals and percentage either Hispanic or Black race/ethnicity.. Students and parents were blinded to their school's randomization assignment during recruitment and health screening, and the intervention was not implemented until after the completion of baseline data collection. No significant differences at baseline between the intervention and control school participating	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted. There were 53 students in control schools and 71 students in intervention schools who transferred to one of the other 41 study schools during the study. These students attended an end-of-study screening at the school to which they had transferred but were assigned to the condition (intervention or control) of their original school for data analysis.	Some concerns	All schools were retained at follow-up. Among the students assessed at the beginning of 6th grade, 72.4% were reassessed when they were in 8th grade and valid measurements were obtained; these students constituted the HEALTHY cohort. data were missing from 30% of the participants in both intervention and control group. Among the students who were not included in the cohort, 97.2% had transferred to a non-study school, 2.4% were still in school but were not assessed, and 0.4% were assessed but the data could not be used. A missing data analysis was planned but it is not reported in the final study report and we have no evidence that results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low ri bias

		students for any of the characteristics or measurements available.							
Habib-Mourad 2020	High risk of bias	Method of randomization not reported but randomization was stratified therefore it is plausible to assume that an appropriate method of randomization was used. Details on concealment are not reported. Same number of public and private schools in each arm; higher number of participants in the intervention group due to higher number of participants in both public and private schools. Unclear if this is due to problem with randomization or selection into the study as number of randomised prior to consent requirement is not reported. Consent from parents and students was requested after randomization and prior to baseline collection. A higher number of participants enrolled in the intervention group, potentially due to being allocated to an active intervention. Higher number of participants in the intervention group and slightly higher proportion of children with obesity and overweight	Low risk of bias	Authors reported that the implementation of the intervention was less successful in public vs private schools but reason for this was not related to the trial. Not specifically reported that an intention to treat was used but based on the CONSORT flowchart participants were analysed according to their allocated intervention.	High risk of bias	Serious concern over the high proportion of missing data (34% and 36%). Reason for missingness are given as school drop and change of school; it is possible that students drop from school was due to health conditions related to the true value of the outcome.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial, but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some conce
Hull 2018	Low risk of bias	A computerized random number generator was used, and the allocation was concealed until after baseline assessments were completed. No baseline unbalances between groups. Parental consent was obtained and eligibility of children was	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Data were missing from 47% of the participants in the intervention and in the control group. Reasons for missingness were mostly being unable contact, relocation, and conflict of schedule. The large	Low risk of bias	According to the study protocol, hight and weight were measured using standardized methods. Outcome measures were collected by trained study staff. The interviewers were masked to group	Low ri bias

		assessed prior to randomization. No baseline differences among children and parents in the two groups				proportion of missing data in both groups suggests that missingness could be related to the true value of the outcome		assignment, and intervention staff did not collect measurements on participants after randomization to reduce information bias.	
Kipping 2014	Some concerns	Random allocation to intervention or control school was concealed and done by one of the authors but there is not enough information to determine if randomization was appropriate. Baseline characteristics for those pupils included in the analysis were similar for those from the intervention and control schools, with the exception of the proportion walking or cycling to school, but differences could be due to chance. Recruitment happened prior to randomization. No baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups.	Low risk of bias	There were some deviations, as they note that 'One school refused to deliver any of the intervention, and others did not deliver all of the lessons.' The school that did not deliver the intervention said they 'did not have the time or capacity to accommodate the intervention'. It is likely this is also the reason for deviation in terms of not delivering all the lessons. This is not due to trial context, but real-world context. Intention-to-treat analysis used: 'We used intention to treat analyses as our main analyses, with missing data at baseline dealt with by including an indicator variable for those with missing data'	Low risk of bias	No schools withdrew from study, so all randomised units are present at baseline and follow-up. Data were not available for all participants (83% in the intervention and 82% in the control). However, the authors reported that the sensitivity analyses that we did to explore assumptions about missing data produced results that were consistent with the main analyses.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ across groups as using standardised measures and collected by trained research staff at both time points. Outcome assessors were blinded to allocation	Low ri bias
Kocken 2016	High risk of bias	randomization method not reported but schools were matched by socioeconomic status, educational level and area urbanization; no details about concealment; similar number of clusters were included after randomization	High risk of bias	Serious concern over the selection of the schools into the study; twenty schools dropped out after randomization for reason that may be related to the trial	High risk of bias	Serious concerns over missing data from the intervention group only (60%) and no evidence that the results were not biased by missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by 'trained examiners' using the same protocol. The measurement of height and weight using	Some conce

		and after 20 classes dropped out from the study. Serious concern over the selection of the participants into the study; it is unclear if parent consent was asked for before or after randomization and less participants were included in the control group suggesting that knowledge of the allocated intervention may have affected participants to enrol in the study.						standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Kubik 2021	Some concerns	randomization was conducted by a trial statistician using a computer-generated randomization schedule, no details about concealment. Some difference in baseline: higher proportion of obese children in the control group but models are adjusted for baseline BMI.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	Some concerns	Data were missing from 6% and 9% of the participants in the intervention and control group, respectively. No analysis to test difference between completer and non-completer is reported and there is no evidence that results were not biased due to missing data.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low ri bias
Lichtenstein 2011	High risk of bias	There is not enough information provided to determine if randomization and allocation concealment were appropriately completed. The paper only says that the 'The schools were randomised and	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Modified intention-to-treat analysis was used.	Some concerns	There is no suggestion that any clusters dropped out of the study. Data were available from 71% and 77% of the participants. There is no reported statistical analysis producing evidence to	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to	Some conce

			divided into 2 groups. No major baseline imbalances reported. No information provided about order of randomization and recruitment. No information regarding randomization or enrolment provided to know if recruitment was affected by knowledge of allocation. No major baseline imbalances but not much information provided. 249 children were in the intervention and 196 in the control which suggests imbalance, but this may be due to class size.				show result not biased by missing data. Missingness could depend on the true value but there are no reasons provided for missing data to assess this. However, the level of attrition is similar in both groups.		suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Lloyd 2018	Low risk of bias	randomization and allocation concealment were appropriate. Schools were assigned (1:1) using a computer-generated sequence to either intervention or control, stratified by the number of year-5 classes (one vs more than one) and the proportion of children eligible for free school meals'. The protocol states this was by a member of staff 'not involved with the trial immediately after all schools have been recruited'. There are no baseline differences to suggest a problem with randomization: 'The intervention and control groups had similar school-level and child-level baseline characteristics, including physical activity and food intake questionnaire scores. At baseline, although anthropometric measurements	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. The process evaluation paper notes the trial having high levels of engagement. It appears a modified intention-to-treat analysis was used.	Low risk of bias	No clusters dropped out of the trial. 93% of the participants were assessed in the intervention group and 96% in the control. No evidence of results not been biased buy missing data and levels of attrition are relatively small and consistent between groups.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ. The study protocol states that anthropometric measures at baseline and follow-up will be taken by assessors blind to group allocation.	Low ri bias

			between the groups were largely similar, a greater proportion of children in the intervention group were overweight or obese than in the control group.'. Schools were recruited and immediately randomised, then all children within each recruited school were invited to participate. It is unlikely selection was affected as all children in the year 5 classes of the recruited schools were invited to participate and they were not told their allocation until after baseline measures were taken. There were no baseline imbalances to suggest differential identification or recruitment of individual participants between intervention groups.								
Marcus 2009	High risk of bias	No details about the random component used in randomization and no mention of allocation concealment. Same number of schools in each group. Children were asked for consent after randomization and additional children entered the study in following years. Baseline characteristics not reported but the intervention groups had higher proportion of participants that were overweight or obese than the control group (20% vs 16%)	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not specified but according to the CONSORT flowchart is seems like all participants were analysed according to their allocated arm.	Some concerns	Some concerns over missing data (8% in the intervention group and 11% in the control group) and lack of statistical evidence that results were not biased	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be	Some conce

								influenced by knowledge of intervention, this is highly unlikely.	
Rush 2012	High risk of bias	randomization was conducted by an electronic random number generator. Intervention schools within any stratum were selected from highest to lowest random number, and control schools from lowest to highest. Where a school declined involvement, the next randomised school was approached. No details regarding concealment of the sequence allocation. randomization to control or programme occurred within three types of school, with consideration of ethnicity, location and size. The authors reported that in the rural schools, funding was not continued for that trial and the intervention was not rolled out in a randomised format. No baseline differences in the clusters were reported. After randomization, schools were approached for inclusion in the study without knowledge of whether they would be intervention or control schools. Where a school declined involvement, the next randomised school was approached. Schools were told the assigned intervention after randomization. there are no details regarding the time of recruitment of the participants, whether the consent form was sent prior to randomization, and response rate	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details of whether an ITT analysis was conducted, and there is no flowchart nor details of number in each group at follow-up to assess whether the analysis were appropriate.	High risk of bias	High attrition in participants in all groups in both age groups: 38% in the intervention and 39% in the control were missing data in age group 5-7 years; 65% in the intervention and 77% in the control were missing data in age group 10-12 years; no evidence of results not being biased by missing data	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low ri bias

		was low in both groups (51% and 43%). The is the risk that participants knowledge of their allocated group may had affected their choice of taking part in the study.							
Sahota 2019	Some concerns	randomization was appropriate but it is not clear if allocation was concealed: 'randomization was carried out by a senior statistician at York Trials Unit, University of York. A minimisation algorithm was used to allocate schools to the intervention or control arm in a 1:1 ratio. There were no baseline differences to suggest problems with randomization. Participants flowchart shows that recruitment took place prior to randomization. There were no major baseline differences suggesting differential identification or recruitment. School characteristics were well-balanced across intervention and control group but there were differences in percentage of pupils eligible for free school meals between intervention and control groups suggesting free school meal eligibility a poor stratification variable. More of the control schools had greater than 17% of pupils eligible for free school meals and more children categorised as overweight/obese'	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Participants flowchart suggests modified intention-to-treat analysis was used.	Some concerns	None of clusters dropped out of the study. 89% and 84% of the participants in the in the intervention and control group, respectively, provided data. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value, but this is not likely as the main paper states that the reason was due to leaving school. Missingness was also similar in both groups.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by 'researchers' using the same protocol. The processes for data collection were identical in the intervention and control schools. Researchers took outcome measurements so they would have known about the trial. Outcome assessors were not informed about group allocation.	Some conce
Sherwood 2019	Low risk of bias	randomization and allocation concealment were appropriate: after baseline measures and well child visit	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to	Some concerns	Of the children randomised 87.2% were retained at follow-up and attrition rates did not differ by	Low risk of bias	Measurement of the outcome was appropriate. Measurements unlikely to differ as	Low ri bias

		completion, participants were randomised into treatment group using a 1:1 randomization schedule in blocks or sets of 10 to ensure research staff could not influence randomization by adjusting enrolment order. No baseline differences to suggest issues with randomization.		the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is unlikely that participants switched study arms.		treatment arm. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value, however it seems unlikely.		conducted by 'by trained and certified data collectors' using standard protocols. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Story 2012	Some concerns	No details on randomization method or allocation concealment. Same number of schools in each group. No participants flowchart reported but according to the text recruitment of the participants was conducted prior to randomization as schools were randomised to intervention and control conditions following baseline data collection. No differences in baseline characteristics, but number of participants in the intervention and control are quite different (263 vs 177) but this may be due to chance as schools may had different number of children enrolled.	Low risk of bias	The study was designed to follow principles of intention-to-treat so data for children were analysed according to the original assignments of study condition. However, the authors reported there were only 3 children whose families moved from intervention to control schools during the trial but given the small number any effects on results were negligible.	High risk of bias	No information about the numbers of clusters or children retained at follow-up. No details about whether missing data imputation was conducted or other method to test for attrition bias was used. The authors reported that the analysis for children who were lost to follow-up are described with the other statistical analyses but there are no further details.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some conce

Topham 2021	High risk of bias	randomization was conducted by a random number table and electronic coin flips but no information about allocation concealment. No baseline differences that suggest a problem with randomization. . randomization took place before recruitment of participants. It is not clear whether students/parents knew which arm the school had been randomised. There were no baseline imbalances that suggest differential identification or recruitment of individual participants between the intervention groups. However, of the randomised sample assessed for eligibility, 52% of the participants were not included and one of the reason was that they declined to participate, suggesting that knowledge of the allocated intervention could have affected decision of participants to take part in the study.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but a high number of participants did not receive the intervention because they never attended the sessions (assessed in the missing data domain). An intention to treat analysis that included all participants that were allocated to the intervention was conducted.	High risk of bias	No suggestion any sites dropped out of the study. Data were missing from 77% of the participants in intervention group as they never attended a session. There is no reported statistical analysis producing evidence to show that results were not biased by missing data. No reasons given for not attending the sessions, thus missing data could be due to the true value of the outcome.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome unlikely to differ as the same processes used. No mention that outcome assessors were blinded to the trial. No mention that outcome assessors were blind to allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	High ri bias
White 2019	Some concerns	randomization was appropriate as conducted by random number generator using a 1:2 control to treatment randomization to have more treatment than control study participants in the Intervention Study, but no information is given about allocation concealment. There appears to be no major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used.	High risk of bias	Data available for 45% dyads in control and 60% in intervention. There is no evidence that the result was not biased by missing data. Missingness could depend on its true values there is substantial difference in the proportion of missing data between intervention and control (>10%) and the authors note that 'adults were more likely not to complete the study if they	Low risk of bias	Measurement of the outcome was appropriate. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically	Some conce

						were overweight. They do not state this for young people, but it seems likely to be consistent as they were caregiver-young person dyads.		the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	
Williamson 2012	Some concerns	The study documents refer to the study being randomised but they do not detail the random component used or mention allocation concealment. Whether there were significant differences at baseline is not outlined in the text, but it looks like there were some differences between groups in race and BMI percentages. It seems possible these could be due to chance rather than a problem with randomization. . Participants were recruited before randomization of clusters. There were no baseline imbalances that suggest differential identification or recruitment of individual participants between the intervention groups.	Low risk of bias	There is no information given about deviations to intended interventions due to the trial context, but no reason to suspect these occurred. They conducted two analyses including intention-to-treat analysis.	Some concerns	No attrition at the level of school or school cluster occurred. Data available for 69% randomised in primary intervention and 67% randomised in control. They compared an analysis of participants with at least one of two follow-up measurements with the results from last observation carried forward intent-to-treat approach and found the same results: 'A single-stage, mixed model statistical strategy was used to analyse the findings for students with baseline measurement and at least one (of two) follow-up measurements. This approach excluded children who were only available for baseline measurement (17.5% of the baseline cohort were unavailable for measurement primarily due to movement by the family out of the school district). The results were compared with results from a last observation carried forward (LOCF) intent-to-treat approach to evaluate the reliability of the	Low risk of bias	Measurement of the outcome was appropriate. Measurement is unlikely to differ across groups as it was conducted by two specifics assessment teams' using the standardised measures described: 'Assessments were scheduled for two school clusters per week and measurements were conducted by two independent assessment teams who travelled together'. It is unclear whether outcome assessors knew the trial was taking place, but they are described as 'independent' suggesting they would not have known allocation.	Low ri bias

						findings and the same results were found'			

Risk of bias for analysis 3.7 Percentile short term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		S re
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Auth judge
Baranowski 2011	High risk of bias	Two-arm randomised control design with a 1:2 control to treatment ratio; the method of randomization is not reported and no indication on whether the allocation was concealed; the author reported that despite randomization, there were differences in mean levels of fruit and vegetable, non-fat vegetables, total energy, MVPA, counts per minute, BMI percentile, and zBMI-score, by group at baseline. These baseline difference may be due to chance but can affect the effect of intervention on zBMI.	Low risk of bias	The nature of intervention did not allow for blindness of participants/people delivering the intervention. No information on whether there was any deviation from intended intervention, but we have no reason to suspect there was any. It is not reported whether data were analysed according to an intention to treat plan, but the CONSORT diagram suggests that data were analysed according to the participants allocated group.	Some concerns	Data at the 5 months follow-up were missing from 90% of the intervention group and from 80% of the control group; reason for missingness reported but doesn't seems related to the trial; the author reported that there were no differences in demographics or anthropometrics between participants with or without missing data; substantial difference in attrition between the two groups this may suggest that missingness was not at random and may introduce bias in the results.	Low risk of bias	Height was measured twice using a PE-AIM-101 stadiometer (from Perspective Enterprises, Portage MI) and averaged. Weight was measured twice using SECA Alpha 882 (from the SECA Corporation, Hamburg, Germany) and averaged. No details on how zBMI-score was derived from BMI. Same instruments and methods to derive zBMI were used to assess the two groups. Assessors of anthropometric and 24-h dietary recall were blinded to group assignment (Rochon protocol).	Some concer
Brown 2013	Some concerns	No method of randomization or concealment reported. Baseline data only reported for participants that completed the study, so we are unable to assess whether there were any difference among the whole sample of randomised participants.	Low risk of bias	No indication of deviation from intended intervention or that an intention to treat analysis was implemented but according to the CONSORT flowchart participants were analysed according to their allocated group.	Some concerns	16% of the participants in each group did not complete the study and reasons for discontinuing the sessions/study included moving house, vacation, transportation problems and loss of interest in the program. Results table report that data were missing from one additional participant in the intervention group, but this is	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised	Some concer

						not mentioned in the text or flowchart. No analysis to assess for bias due to missing values is reported. Attrition is balanced between groups but substantial that there may be some bias in the results.		measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
De Heer 2011	Some concerns	No details regarding randomization and concealment. No information provided about order of randomization of schools and recruitment of individuals. It is unlikely selection was affected as all students were invited to participate from the grades involved - nothing to suggest they were aware of assigned group. No baseline imbalances suggesting differential identification or recruitment and all students were invited to participate.	Low risk of bias	Not explicitly reported but according to participants flowchart, participants data were analysed according to their allocation group	Low risk of bias	Data were missing from 17% of the intervention group participants, from 8% of the control group and from 6 % of the spillover group. To assess whether certain characteristics were associated with increased likelihood of dropping out, the authors compared afterschool participants who did not participate with those who did participate in the follow-up. In bivariate analyses, they detected no significant baseline differences in demographic characteristics or any of the dependent variables between dropouts and those who completed both baseline and follow-up measurements.	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by trained research staff using standardised procedures. There is no mention of the researchers being blind to group allocation. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concer
Hendy 2011	Some concerns	Some concern over no information regarding the randomization method and whether the allocation sequence was concealed. Baseline characteristics are not reported so we are unable to assess whether there was any	Some concerns	No information regarding deviation from intended intervention and whether data were analysed according to an intention to treat analysis, but the number of participants included in the analysis at follow-up suggests that participants were analysed according to their allocated group.	Low risk of bias	Data were available form 92% of the participants in the intervention and 94% of the control group. Reason for missingness is not reported and no statistical test was conducted to assess for attrition bias; the attrition is relatively low and balanced	Low risk of bias	School nurses blinded to allocated intervention measured heigh and weight using standardised methods	Some concer

		problem with the randomization.				between groups so we don't think the results will be biased.			
Rosenkranz 2010	Some concerns	randomization was conducted using a random number generator, no information about allocation concealment. At baseline there were no significant differences by condition for demographic variables. Participants flowchart shows that recruitment took place prior to randomization. There were no differences to suggest differential identification or recruitment of individual participants between intervention groups.	Low risk of bias	No information to suggest deviations from intended interventions due to trial context took place and no reason to suspect they did. Flowchart of participants suggests modified intention-to-treat analysis was used.	Low risk of bias	None of the clusters dropped out. Participants with available data were 97% in the intervention and 93% in the control group.	Low risk of bias	Measurement of the outcome was appropriate. Measurement unlikely to differ across groups as conducted by researchers using standardised methods. Outcome assessors likely knew the trial was taking place because they were research assistants. Outcome assessors were blinded to assignment at the beginning of the study.	Some concer

Risk of bias for analysis 3.8 Percentile medium term

Study	Bias								
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selecti reporte
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement
Annesi 2016	High risk of bias	There are no details about the randomization process or allocation concealment. The control group had 15 participants classed as overweight/ obese, whilst the intervention group at 28, however there was no significant difference between the groups on BMI or BMI percentile. No information provided about order of recruitment of participants and randomization.	Low risk of bias	Participants knew they were in a trial - written consent from parents and verbal assent from children. It is likely participants, carers and those delivering the intervention knew about the trial due to the nature of it (enhanced activities and letters home in the experimental group). Participants and parents signed informed consent and staff were trained. However, they do say that	Some concerns	No suggestion any sites dropped out of the study. No information about participant numbers or missing data throughout the study. There is no reported statistical analysis producing evidence to show result not biased by missing data. No information about missing data but they do say that participants who were missing any data did not significantly differ from the sample as a whole on any	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome unlikely to differ as conducted by trained staff members 'in an identical manner' and 'structured fidelity checks' were undertaken. No mention that outcome assessors were blinded to the trial. No mention that outcome assessors were blind to allocation. The measurement of height and weight using	Some concerns

		Details of characteristics not provided per site so unable to tell if likely differences in recruitment.		participants and parents were blinded to assignment and the goals of the research. There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No information given about whether intention to treat was used, no note of participant numbers throughout the study, however it seems likely that participants would not have crossed over due to sites being the unit of randomization.		demographic or study measure, suggesting any missing data was not related to the true value of the outcome.		standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Crespo 2012	Some concerns	Article states randomization took place but no further information and no information about allocation concealment. There appeared to be no major baseline differences to suggest issues with randomization. Participants were assessed for eligibility and recruited from the schools that agreed to participate before randomization of clusters. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. zBMI	Low risk of bias	There were a few deviations from the intended intervention listed but it seems these are due to real world context (e.g. time constraints) rather than the trial context. An intention-to-treat analysis was used.	Some concerns	Data from all clusters were available and there was 84% retention for the Family-only group, 88 for the Family + community group, 90% for the community-only group and 90% for the control. Analyses were carried out to determine if baseline measures of outcomes were different between subjects who completed the study versus those who dropped out across the four groups of the 2×2 design. Mixed effects models were fitted for each baseline outcome measure with terms in the model for dropout status, group condition and dropout by group	Low risk of bias	Measurement of the outcome was appropriate. Evaluation assistants measured height and weight using standardised measures, so it was unlikely to have differed across groups. Also inter-rater reliability was high. Evaluation assistants took the measurements so it seems likely they would have known about the trial. However, they were blinded to participants' study condition.	Some concerns

		similar across groups. No information provided breaking it down per cluster.				condition interaction. The interaction term would determine whether baseline levels across groups varied by dropout status. None of the models found significant interaction terms.			
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided data. Overall, 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be depend on the outcome true value.	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement of the outcome could have differed across groups. There is no information about who outcome assessors were. It is unclear if outcome assessors were blinded as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns
Kobel 2017	Some concerns	There is not enough information provided about randomization and allocation concealment to determine if the methods used were appropriate. The protocol	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. Not	High risk of bias	Two schools dropped out of the intervention group and five dropped out of the control group. 88% participants had anthropometric measures	Low risk of bias	Measurement of the outcome was appropriate. Measurement of the outcome was unlikely to differ as it was conducted by 'trained examiners'	Some concerns

			details that stratification was used but does not outline the random component used or whether allocation was concealed 'stratification according to number of classes and grade level (grade) was realized for the randomization process'. There were no baseline differences to suggest problems with randomization. It is not clear from the protocol or main paper in what order the schools were randomised and individuals were recruited (see protocol Figure 2). All pupils from the specified grades were invited to participate. The paper does suggest they would have known about their group allocation as it says it is not possible to blind it. This could have led to differential acceptance but not enough information to tell as Figure 2 in the protocol does not show consent rates at participant level. Table 1 in Kobel 2014 suggests no baseline imbalances suggesting differential identification or recruitment.		specifically stated by authors but seems like modified intention-to-treat analysis used.		completed at both baseline and follow-up. There is no reported statistical analysis producing evidence to show result not biased by missing data. Missingness could depend on the true value. 1 school dropped out after randomization with a teacher withdrawing consent stating it was 'too much effort'. Another school dropped out because of request of parents. The authors reported that missingness at the individual level was due to 'family relocation, grade repetition, and sick leave. It says 'there were no differences between the intervention and control group in the numbers of losses to follow-up and missing data'. However, it also says 'children with missing values were more frequently overweight, obese and abdominally obese'. This suggests missingness may be related to the outcome BMI.		using the same protocol. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	
Nemet 2011a	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to	Low risk of bias	No concerns over missing data as missingness is relatively low (8% and 10%) and balanced between the two group. Reason for	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	Some concerns

		timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported		suspect these occurred. No details to inform whether an intention to treat analysis was conducted.		missingness is reported as being absent on day of measurement.			
Nemet 2011b	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat analysis was conducted.	Some concerns	Some concerns over missing data low although missingness is balanced between the two group (13% in both groups). Reason for missingness is reported as being absent on day of measurement, but there is not statistical evidence that the results were not biased.	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	Some concerns
Sherwood 2019	Low risk of bias	randomization and allocation concealment were appropriate: after baseline measures and well child visit completion, participants were randomised into treatment group using a 1:1 randomization schedule in blocks or sets of 10 to ensure research staff could not influence randomization by adjusting enrolment order. No baseline differences to suggest issues with randomization.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is unlikely that participants switched study arms.	Some concerns	Of the children randomised 86.2% were retained and attrition rates did not differ by treatment arm. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value, however it seems unlikely.	Low risk of bias	Measurement of the outcome was appropriate. Measurements unlikely to differ as conducted by 'by trained and certified data collectors' using standard protocols. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Low risk of bias
van de Berg	High risk of bias	Four schools in each	Some concerns	No deviations have been	High risk of bias	No information regarding	Low risk of bias	Measurement of the	Low risk of bias

2020		geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to each group. It is unclear if participants were recruited before or after the schools randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition were seen across treatment conditions suggesting that knowledge of assigned intervention could have affected selection or participation of the dyads into the study.		reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in the results table but the schools data were analysed according to their allocated group.		missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)		outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	

Risk of bias for analysis 3.9 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selectio reported	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	S j
Crespo 2012	Some concerns	Article states randomization took place but no further information and no information about	Low risk of bias	There were a few deviations from the intended intervention	High risk of bias	Data from all clusters were available and there was 48% retention for	Low risk of bias	Measurement of the outcome was appropriate. Evaluation assistants	Some concerns	No sp st ar pr av

		allocation concealment. There appeared to be no major baseline differences to suggest issues with randomization. Participants were assessed for eligibility and recruited from the schools that agreed to participate before randomization of clusters. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. zBMI similar across groups. No information provided breaking it down per cluster.		listed but it seems these are due to real world context (e.g. time constraints) rather than the trial context. An intention-to-treat analysis was used.		the Family-only group intervention, 59% for the Community-only group, 50% for the Family + Community group and 59% for the control. Analyses were carried out to determine if baseline measures of outcomes were different between subjects who completed the study versus those who dropped out across the four groups of the 2×2 design. Mixed effects models were fitted for each baseline outcome measure with terms in the model for dropout status, group condition and dropout by group condition interaction. The interaction term would determine whether baseline levels across groups varied by dropout status. None of the models found significant interaction terms, however there is serious concern over the high level of attrition in both groups.		measured height and weight using standardised measures, so it was unlikely to have differed across groups. Also inter-rater reliability was high. Evaluation assistants took the measurements so it seems likely they would have known about the trial. However, they were blinded to participants' study condition.		ev su se re re pl m pr st ar av co
Elder 2014	Some concerns	The article does not detail the random component used in randomization or information about allocation concealment. There were no significant anthropometric or demographic	Low risk of bias	Deviations from the intended intervention did occur in that 'participant attendance at the family workshops was somewhat	Some concerns	Missing data not provided per cluster, but per intervention or control group, so cannot determine whether all clusters provided	Low risk of bias	Though measurement techniques were appropriate, as there is no information about outcome assessors, it is hard to know if measurement	Some concerns	No sp st ar pr av ev su se re re pl

		differences between intervention and control condition parents and children at baseline. Recruitment took place prior to randomization. No evidence to suggest baseline imbalances between the intervention and control groups to suggest differential identification or recruitment of individuals between groups. BMI similar across groups.		low' etc, however this is likely to be due to real-world context that would have happened outside of the trial. All analyses were based on the intention to treat approach.		data. Overall, 93% and 83% of participants provided body composition information at 1-year follow up in the control and in the intervention group, respectively. There is no evidence that the result was not biased by missing data. Missingness could depend on the true value. Reasons are not given for why people dropped out or did not provide data and a higher proportion was missing in the control group suggesting that missingness may be dependent on the outcome true value.		of the outcome could have differed across groups. There is no information about who outcome assessors were. It is unclear if outcome assessors were blinded as there is no information about who outcome assessors were. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		m M ar co ur we pl pl co
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore participant ay have been aware of their allocated group, however,	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an intervention group based on sixth	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were missing completely at random or	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to	Some concerns	N sp st ar av su re se m ar nc sp to

		the authors reported that participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.		grade school.		missing at random.		produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		
Nemet 2011b	Some concerns	Some concern over the lack of concealment of the allocation sequence. Some concern over lack of information about the timing of recruitment of the participants. No baseline difference suggesting issues with the randomization process were reported	Some concerns	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. No details to inform whether an intention to treat analysis was conducted.	High risk of bias	Reason for missing data is reported as due to the transition from kindergarten to elementary school involving redistribution of the children to several schools, however the attrition is high in both intervention (45%) and control (37%) group, therefore it is plausible that missingness depends on the value of the outcome at follow-up	Low risk of bias	No concerns over measurement of the outcome, assessors were blinded to allocation	Some concerns	No sp st ar av su re se m ar no sp to
Sherwood 2019	Low risk of bias	randomization and allocation concealment were appropriate: after baseline measures and well child visit completion, participants were randomised into treatment group using a 1:1 randomization schedule in blocks or sets of 10 to ensure research staff could not influence randomization by adjusting enrolment order. No baseline differences to suggest issues with randomization.	Low risk of bias	There is no information about deviations but no reason to suspect deviations occurred due to the trial context. It is not explicitly stated but seems like modified intention-to-treat likely used and it is unlikely that participants switched study arms.	Some concerns	Of the children randomised 87.2% were retained at follow-up and attrition rates did not differ by treatment arm. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value, however it seems unlikely.	Low risk of bias	Measurement of the outcome was appropriate. Measurements unlikely to differ as conducted by 'by trained and certified data collectors' using standard protocols. There is no information about whether outcome assessors were aware of the intervention received by participants. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although	Low risk of bias	Pr ar Sh 20 No su se m ou m No th se m ar

								theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		

Risk of bias for analysis 4.1 BMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppo judger
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	There is pre-spec analysis to asses whether data tha produce result we analysed planned, whether results w selected multiple eligible outcome measure and eligi analyses data.
Meng 2013 (Beijing)	High risk of bias	No details regarding the randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat	High risk of bias	Not reported if and how many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups,	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors	Some concerns	No pre-specifie statistica analysis available suggesti result wa selected multiple analyses no pre-specifie to comp

		randomization. Some baseline differences in BMI and zBMI between groups.		analysis was conducted.		therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced between the groups		were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 4.2 zBMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppo judger
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	There is pre-spec analysis to asses whether data tha produce result we analysed planned, whether results w selected multiple eligible outcome measure and eligi analyses data.
Meng 2013	High risk of bias	No details regarding the	Low risk of bias	There is no information	High risk of bias	Not reported if and how	Low risk of bias	Measurement of the	Some concerns	No pre-specifiec

(Beijing)		randomization method and allocation concealment. Concerns over lack of information about the recruitment of the participants into the study, whether consent was obtained before or after randomization. Some baseline differences in BMI and zBMI between groups.		regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.		many students dropped out from the Beijing group in each treatment group. No information about missing data specific to the Beijing groups, therefore there is potential for the results to be biased, if the level of attrition was high and unbalanced between the groups		outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely in a trial like this. There is no information given to suggest that outcome assessors were blind to assignment. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		statistica analysis available suggesti result wa selected multiple analyses no pre-specifie to compa

Risk of bias for analysis 4.3 Percentile medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Supp fo judger
van de Berg 2020	High risk of bias	Four schools in each geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to	Some concerns	No deviations have been reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in	High risk of bias	No information regarding missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised	Low risk of bias	Analysi the res was conduc accord a pre-specifie analysi plan reporte the stu protoc that wa publish prior to data analyse

		each group. It is unclear if participants were recruited before or after the schools randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition were seen across treatment conditions suggesting that knowledge of assigned intervention could have affected selection or participation of the dyads into the study.		the results table but the schools data were analysed according to their allocated group.				measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 4.4 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of reported res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su judg
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The	Some concerns	No p spe stat ana plar avai No sug the was sele fron mul ana but spe plar com

		participant ay have been aware of their allocated group, however, the authors reported that participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.		intervention group based on sixth grade school.		missing completely at random or missing at random.		height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 5.1 BMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of the reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppor judgem
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	There is r specified analysis p assess wh the data t produced result wer analysed planned, whether t results we selected multiple eligible outcome measurer and eligib analyses data.
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff	Some concerns	No pre-specified statistical analysis p available protocol found). N evidence suggest

		they were appropriate: 'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control half size of intervention) but likely due to allocation ratio in randomization.		trial context, but no reason to suspect these occurred. A modified intention to treat analysis with completers and imputation of missing data was conducted but participants remained in the groups they had been randomised to.		only for individuals. The abstract mentions 16 clusters, whereas the results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper states. No reasons for missing data are given.		measuring the outcomes could not be blinded due to the randomization by practice due to the location of the measurement visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		numerica result like have bee selected basis of re from mult eligible outcome measurer No sugge that nume result has selected multiple analysis d data but r statistical analysis t compare

Risk of bias for analysis 5.2 zBMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of the reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppor judgem
Barnes 2021	Low risk of bias	randomization performed by	Low risk of bias	No deviation from the	Low risk of bias	No concerns	Low risk of bias	Measurement of the	Some concerns	There is r specified

		an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported		intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.		over missing data, data were available for nearly all participants in the intervention and control groups		outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely		analysis p assess wh the data t produced result wer analysed planned, whether t results we selected multiple eligible outcome measurer and eligib analyses data.
Stettler 2015	Some concerns	There is not enough information about randomization and allocation concealment methods to determine if they were appropriate: 'randomization was at the practice level to decrease the risk of intervention contamination and stratified by characteristics of the practice patient population. There does not seem to be baseline imbalances to suggest a problem with randomization. randomization took place before recruitment of participants but to decrease the risk of recruitment bias, study	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. A modified intention to treat analysis with completers and imputation of missing data was conducted but participants remained in the groups they had been randomised to.	Some concerns	It is not clear whether clusters were lost - the CONSORT diagram reports it only for individuals. The abstract mentions 16 clusters, whereas the results mention 15 clusters, but this discrepancy is not explained. 34% of the participants left the study in the beverage only intervention group and 27% left in the multiple behaviour and in the control group. There is not evidence the result was not	Low risk of bias	Measurement of the outcome was appropriate. Outcome assessors were not blinded 'The study staff measuring the outcomes could not be blinded due to the randomization by practice due to the location of the measurement visits'. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Some concerns	No pre-specified statistical analysis p available protocol found). N evidence suggest numerica result like have beer selected basis of re from mult eligible outcome measurer No sugge that nume result has selected multiple analysis d data but r statistical analysis t compare

		staff was masked to which practice the subjects they called were part of. There were no major baseline differences suggesting differential identification or recruitment. The group sizes differed (control half size of intervention) but likely due to allocation ratio in randomization.				biased by missing outcome data for BMI. They did an analysis for completers only and using imputations and found that changes in BMI were significant in the analyses of completers, but not after multiple imputations. Missingness could depend on the true value, but this is not likely as the main paper states. No reasons for missing data are given.		this is highly unlikely.		

Risk of bias for analysis 5.3 Percentile medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Supp fo judger
van de Berg 2020	High risk of bias	Four schools in each geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to each group. It is unclear if participants were recruited before or after the schools	Some concerns	No deviations have been reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in the results table but the schools data were analysed according to	High risk of bias	No information regarding missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements	Low risk of bias	Analysi the res was conduc accord a pre- specifie analysi plan reporte the stu protoc that wa publish prior to data analyse

		randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition were seen across treatment conditions suggesting that knowledge of assigned intervention could have affected selection or participation of the dyads into the study.		their allocated group.				are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 5.4 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of reported res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su judg
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore participant ay have been aware of their allocated group, however, the authors reported that	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an intervention group based on sixth grade school.	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were missing completely at random or missing at random.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although	Some concerns	No p spe stat ana plan avai No sug the was sele from mul ana but spe plan com

		participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.						theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.		

Risk of bias for analysis 6.1 BMI short term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of t reported resu	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Supp judge
Jones 2015	Low risk of bias	The method of randomization was adequate and allocation sequence was concealed. Children were randomised following consent and baseline measurements. Children were stratified by sex and randomised using a computer-based random number-producing algorithm and the biased-coin method to either PA or HL groups. To ensure concealment, the random sequence was generated by one researcher, who assigned participants to their groups and informed another member of the research team of group allocation.' There appears to be no major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no reason to suspect deviations occurred due to the trial context. All of the sessions for both girls and boys were implemented as planned. A modified intention-to-treat analysis was used as they say 'Primary outcomes were analysed using intention to-treat principles and last observation carried forward.'	Low risk of bias	Data from 94% in the intervention and the control group were available at follow-up. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value. However, it seems unlikely as the reasons for missing data included child being on overseas holiday, expecting something else, family issues, moving overseas.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to being conducted at the intervention site by trained assessors blind to group allocation.	Some concerns	No pre-specifie statistic analysi availab reason sugges selecte multipl outcom measu No sug the res selecte multipl analyse no pre-specifie to com
Robinson 2003	Low risk of bias	randomization was stratified by field center, and an urn randomization procedure was used to generate the	Low risk of bias	There is no information regarding deviations from the intended intervention that arose	Low risk of bias	No concern - data at follow-up were available from all participants	Low risk of bias	No concern - outcome measured appropriately	Some concerns	Statisti analysi include Rochon protoco 2003, b unclea was fin

		treatment al location sequences. The different sequences were stored on a computer at the study center and accessed using an interactive voice-response telephone system. The comparison group included slightly younger girls and older caregivers, with a lower proportion of female-headed households; however, only the caregiver age reflected a significant difference.		due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.						before unblinc outcom were av for ana Outcor reporte outline protoc the me the jou article. timepo measu metho BMI. A consist plans.

Risk of bias for analysis 6.2 BMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported resul	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppo judge
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention,	Some concerns	There is specifie analysis assess w the data produce result we analyse planned whether results w selecte multiple eligible outcom measur and eligi analyses data.

								this is highly unlikely		
Jones 2015	Low risk of bias	The method of randomization was adequate and allocation sequence was concealed. Children were randomised following consent and baseline measurements. Children were stratified by sex and randomised using a computer-based random number-producing algorithm and the biased-coin method to either PA or HL groups. To ensure concealment, the random sequence was generated by one researcher, who assigned participants to their groups and informed another member of the research team of group allocation.' There appears to be no major baseline differences to suggest a problem with randomization.	Low risk of bias	There is no reason to suspect deviations occurred due to the trial context. All of the sessions for both girls and boys were implemented as planned. A modified intention-to-treat analysis was used as they say 'Primary outcomes were analysed using intention to-treat principles and last observation carried forward.'	Some concerns	Data from 83% and 84% in the intervention and the control group were available at follow-up. There is no evidence that the result was not biased by missing data and level of attrition are relatively high in both groups. Missingness could depend on its true value. However, it seems unlikely as the reasons for missing data included child being on overseas holiday, expecting something else, family issues, moving overseas.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to being conducted at the intervention site by trained assessors blind to group allocation.	Some concerns	No pre-specifie statistica analysis available reason t suggest selected multiple outcome measure No sugg the resu selected multiple analyses no pre-specifie to comp

Risk of bias for analysis 6.3 BMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection o reported re	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	S jud
Robinson 2010	Some concerns	randomization was conducted using a computerized randomization method to produce similar sample sizes in each group but not details about concealment. In families/households with more than one eligible girl, one girl was randomly chosen for the analysis sample of 261 girls. No baseline differences were reported.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat	High risk of bias	Results are extracted from a measure of change/year therefore we are taking into consideration the number of participants missing at each follow-up time. There was a higher attrition at	Low risk of bias	Outcome assessment conducted using appropriate methods. The research assistants were blinded to experimental assignment	Low risk of bias	Pre spe ana pla rep Ro 201 spe ana sta onl cha traj we ana but abs cha

		Eligibility and baseline measurements were assessed prior to randomization. randomization successfully produced comparable experimental groups, with only a few statistically significant differences at baseline, about as many as one would expect by chance.		analysis was conducted.		follow-up 2 and 3 due to personnel difficulties: missing data were 24%, 46%, 57% and 12% and 21%, 43%, 39% and 16% in the intervention group in the control group, over the four follow-up times. Some differences in attrition between groups suggesting that missingness may also be associated with the true value of the outcome.				bet tim me

Risk of bias for analysis 6.4 zBMI short term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of the reported results	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support judgem
Jones 2015	Low risk of bias	The method of randomization was adequate and allocation sequence was concealed. Children were randomised following consent and baseline measurements. Children were stratified by sex and randomised using a computer-based random number-producing algorithm and the biased-coin method to either PA or HL groups. To ensure concealment, the random sequence was generated by one researcher, who assigned participants to their groups and informed another member of the	Low risk of bias	There is no reason to suspect deviations occurred due to the trial context. All of the sessions for both girls and boys were implemented as planned. A modified intention-to-treat analysis was used as they say 'Primary outcomes were analysed using intention to-treat principles and last observation carried forward.'	Low risk of bias	Data from 94% in the intervention and the control group were available at follow-up. There is no evidence that the result was not biased by missing data. Missingness could depend on its true value. However, it seems unlikely as the reasons for missing data included child being on overseas holiday, expecting something else, family issues, moving overseas.	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to being conducted at the intervention site by trained assessors blind to group allocation.	Some concerns	No pre-specified statistical analysis p available. reason to suggest re selected f multiple outcome measurem No sugges the result selected f multiple analyses, no pre-specified p to compar

		research team of group allocation.' There appears to be no major baseline differences to suggest a problem with randomization.								

Risk of bias for analysis 6.5 zBMI medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported resul	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Suppo judge
Barnes 2021	Low risk of bias	randomization performed by an independent statistician using a computerized random number function and allocations sequence concealment was adequate. Individual participants identified and recruited prior to randomization and no differences in baseline characteristics were reported	Low risk of bias	No deviation from the intended intervention that arose because of the trial context was reported. Analysis was conducted according to intention to treat principles.	Low risk of bias	No concerns over missing data, data were available for nearly all participants in the intervention and control groups	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to the standardised protocols used. The paper mentions that researchers were blinded at baseline assessment and at follow-up. The measurement of height and weight, using standardised measures, is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely	Some concerns	There is specifie analysis assess w the data produce result we analyse planned whether results w selecte multiple eligible outcome measure and eligi analyses data.
Jones 2015	Low risk of bias	The method of randomization was adequate and allocation sequence was concealed. Children were randomised following consent and baseline measurements. Children were stratified by sex and randomised using a	Low risk of bias	There is no reason to suspect deviations occurred due to the trial context. All of the sessions for both girls and boys were implemented as planned. A modified intention-to-treat analysis	Some concerns	Data from 83% and 84% in the intervention and the control group were available at follow-up. There is no evidence that the result was not biased by missing data and level of	Low risk of bias	Measurement of the outcome was appropriate. Measurement was unlikely to have differed across groups due to being conducted at the intervention site by trained assessors blind to group allocation.	Some concerns	No pre-specifie statistic analysis available reason t suggest selecte multiple outcome measure No sugg the resu selecte multiple analyses no pre-

		computer-based random number-producing algorithm and the biased-coin method to either PA or HL groups. To ensure concealment, the random sequence was generated by one researcher, who assigned participants to their groups and informed another member of the research team of group allocation.' There appears to be no major baseline differences to suggest a problem with randomization.		was used as they say 'Primary outcomes were analysed using intention to-treat principles and last observation carried forward.'		attrition are relatively high in both groups. Missingness could depend on its true value. However, it seems unlikely as the reasons for missing data included child being on overseas holiday, expecting something else, family issues, moving overseas.				specifie to comp

Risk of bias for analysis 6.6 zBMI long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection o reported re	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	S jud
Robinson 2010	Some concerns	randomization was conducted using a computerized randomization method to produce similar sample sizes in each group but not details about concealment. In families/households with more than one eligible girl, one girl was randomly chosen for the analysis sample of 261 girls. No baseline differences were reported. Eligibility and baseline measurements were assessed prior to randomization. randomization successfully produced comparable experimental groups, with only a few statistically significant differences at baseline, about as many as one would expect by chance.	Low risk of bias	There is no information regarding deviations from the intended intervention that arose due to the trial context, but no reason to suspect these occurred. An intention to treat analysis was conducted.	High risk of bias	Results are extracted from a measure of change/year therefore we are taking into consideration the number of participants missing at each follow-up time. There was a higher attrition at follow-up 2 and 3 due to personnel difficulties: missing data were 24%, 46%, 57% and 12% and 21%, 43%, 39% and 16% in the intervention group in the control group, over the four follow-up times. Some differences in	Low risk of bias	Outcome assessment conducted using appropriate methods. The research assistants were blinded to experimental assignment	Low risk of bias	Pre spe ana pla rep Ro 20 spe ana sta onl cha traj we ana but abs cha bet foll tim me

						attrition between groups suggesting that missingness may also be associated with the true value of the outcome.				

Risk of bias for analysis 6.7 Percentile medium term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of th reported result	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Supp fo judger
van de Berg 2020	High risk of bias	Four schools in each geographic region or county site were randomised to treatment by the project PI listing the elementary school name on an index card and folding the card to conceal the school name. Treatments were then assigned through a blind drawing by a non-research staff member. The same number of schools were assigned to each group. It is unclear if participants were recruited before or after the schools randomization. Participation rates varied by school with student participation ranging 24% to 90% with a mean participation rate of 56%. Small but significant differences in age and ethnic composition were seen across treatment conditions suggesting that knowledge of assigned	Some concerns	No deviations have been reported but the authors pointed out that some variations in implementation fidelity may have been occurred as lessons were implemented by teachers and not by the study staff. No information if an intention to treat analysis was conducted, there is not participants flowchart to assess this. Number of participants at follow-up are not reported in the results table but the schools data were analysed according to their allocated group.	High risk of bias	No information regarding missing data and the number of school reported in the study protocol flowchart (n=28) do not match the number of schools reported in the results table in the main article (n=32)	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Low risk of bias	Analysi the res was conduc accord a pre- specifie analysi plan reporte the stu protoc that wa publish prior to data analyse

		intervention could have affected selection or participation of the dyads into the study.									

Risk of bias for analysis 6.8 Percentile long term

Study	Bias									
	Randomisation process		Deviations from intended interventions		Missing outcome data		Measurement of the outcome		Selection of reported res	
	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Support for judgement	Authors' judgement	Su judg
Ickovics 2019	Some concerns	randomization method is not reported but the study design was a 2x2 factorial therefore presumably randomization was conducted using an appropriate method. No information is reported abut allocation sequence concealment. No major baseline difference reported beside some unbalance in race/ethnicity between groups that may be due to chance. All students were invite to participate in the study but consent was asked after randomization, therefore participant ay have been aware of their allocated group, however, the authors reported that participation rate was high (92%) and there were no differences in sociodemographic or health indicators between students who completed baseline assessments and those who did not.	Low risk of bias	Data analyses were conducted using prespecified hypotheses and intention-to-treat principles, whereby students were assigned to an intervention group based on school of enrolment in fifth grade. Students who transferred from a no study school to a study school in sixth grade (n=62) were assigned to an intervention group based on sixth grade school.	High risk of bias	High level of missing data in all groups (dietary: 33%; activity: 50%; dietary and activity: 50% and control: 39%) and some differences between interventions and control group suggests that missingness may be related to the outcome value. Maximum likelihood approach was used to handle missing observations, with the assumption that any data missing were missing completely at random or missing at random.	Low risk of bias	Measurement of the outcome was appropriate. No information about whether outcome assessors were aware of the trial but it seems likely. There is no information given to suggest that outcome assessors were blind to assignment. The school nurses were taking measurements anyway though. The measurement of height and weight using standardised measures is relatively robust. The height and weight measurements are used to produce BMI. Although theoretically the recorded measures could be influenced by knowledge of intervention, this is highly unlikely.	Some concerns	No p spe stat ana plar ava No sug the was sele fron mul ana but spe plar com

Appendices

Appendix 1. Criteria for judging certainty in the evidence

We evaluated the five GRADE domains for assessing certainty in our results using the following criteria.

Domain	Explanation

Risk of bias	Based on results of our risk of bias assessments, we downgraded confidence in the evidence base if most evidence was from studies that we judged at high risk of bias, according to the following rules: - No serious concerns (no downgrade): contributing weight of evidence at high risk ≤ 30%. - Serious concerns (one point down): contributing weight of evidence of high risk of bias > 30%. - Very serious concerns (two points down): contributing weight of evidence of high risk of bias > 60%.
Imprecision	We downgraded confidence in the evidence base if the estimate of the effect size from a meta-analysis was not precise, according to the following rules: - No serious concerns (no downgrade): >3000 participants or clear evidence of an effect larger than ± 1/5 of a typical standard deviation (which corresponds to 0.5 for BMI, 0.2 for zBMI or 6 for BMI percentile). - Serious concerns (one point down): <3000 participants without clear evidence of an effect larger than ± 1/5 of a typical standard deviation. - Very serious concerns (two points down): not applied.
Inconsistency	We downgraded confidence in the evidence base if there was unexplained heterogeneity or variability in results across studies, according to the following rules: - No serious concerns (no downgrade): estimated heterogeneity variance (tau) = 0 or results all in the same direction. - Serious concerns (one point down): estimated heterogeneity variance (tau) is high and the direction of the results is inconsistent. - Very serious concerns (two points down): not applied.
Indirectness	We downgraded confidence in the evidence base if we had concerns that the population was highly specific and reducing the generalisability of the results, according to the following rules: - No serious concerns (no downgrade): no study populations of concern, or contributing weight of studies in highly specific populations <30%. - Serious concerns (one point down): contributing weight of studies in highly specific populations >30%. - Very serious concerns (two points down): not applied.
Non-reporting bias	We downgraded our confidence in the evidence base due to within-study non-reporting if there was (i) evidence of outcome measurement and (ii) indication of unreported non-statistically-significant result(s) and (iii) potential for the missing result(s) to impact on the meta-analysis, according to the following rules: - No serious concerns (no downgrade): no missing outcome data, or studies with missing outcome data were not large enough to impact on meta-analyses. - Serious concerns (one point down): we had evidence of measured outcomes being missing and an indication that missing results were not statistically significant and able to affect the meta-analyses result. - Very serious concerns (two points down): not applied. We considered that any wholly missing studies were likely to be small, whereas many included studies are large. We therefore did not have strong reason to rate down for publication bias in addition to selective non-reporting within studies.

Appendix 2. Search Strategies

2.1 Rolling Search (2021 update)

Ovid MEDLINE(R) ALL <1946 to September 24, 2021>

Date Limited: Mar-Sept 2021

1 exp overweight/ 238864

2 exp body weight changes/ 76584

3 body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ 198957

4 Body mass index/ or adiposity/ 146076

5 (obes* or adipos*).mp. 500168

6 (weight gain or weight loss).mp. 181416

7 (overweight or over weight or overeat* or over eat*).mp. 85000

8 weight change*.mp. 12443

9 ((bmi or body mass index) adj2 (alter* or measur* or gain or loss or change)).mp. 12092

10 or/1-9 830029

11 exp Behavior Therapy/ 81430

12 social support/ 74861

13 exp Psychotherapy, Group/ 27306

14 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).mp. 85774

15 (group therapy or family therapy or cognitive therapy).mp. 17855

16 ((lifestyle or life style) adj (chang* or intervention*)).mp. 17670

17 counsel?ing.mp. 129697

18 social support.mp. 96918

19 (peer adj2 support).mp. 5992

20 (children adj3 parent* adj3 therapy).mp. 133

21 or/11-20 366576

22 exp Obesity/dh [Diet Therapy] 8132
23 exp Diet Therapy/ 58036
24 Fasting/ 36683
25 (diets or diet or dieting).mp. 527093
26 (diet* adj (modif* or therapy or intervention* or strateg*)).mp. 77944
27 (low calorie or calorie control* or healthy eating).mp. 12044
28 (fasting or modified fast*).mp. 130206
29 exp Dietary Fats/ 93688
30 (fruit or vegetable*).mp. 147052
31 (high fat* or low fat* or fatty food*).mp. 59146
32 formula diet*.mp. 700
33 or/22-32 807308
34 exp Exercise/ 217427
35 exp Exercise Therapy/ 56426
36 exercis*.mp. 417380
37 (aerobics or physical therapy or physical activity or physical inactivity).mp. 183405
38 (fitness adj (class* or regime* or program*)).mp. 977
39 (aerobics or physical therapy or physical training or physical education).mp. 76087
40 dance therapy.mp. 473
41 sedentary behavio?r.mp. 14736
42 or/34-41 591641
43 exp Complementary Therapies/ 239044
44 (alternative medicine or complementary therap* or complementary medicine).mp. 27279
45 (hypnotism or hypnosis or hypnotherapy).mp. 12696
46 (acupuncture or homeopathy or homoeopathy).mp. 36037
47 (chinese medicine or indian medicine or herbal medicine or ayurvedic).mp. 47638
48 or/43-47 282249
49 ((diet or dieting or slim*) adj (club* or organi?ation)).mp. 28
50 (weightwatcher* or weight watcher*).mp. 145
51 (correspondence adj (course* or program*)).mp. 93
52 (fat camp* or diet* camp*).mp. 27
53 or/49-52 293
54 exp Health Promotion/ 81232
55 exp Health Education/ 253760
56 (health promotion or health education).mp. 178600
57 (media intervention* or community intervention*).mp. 2649
58 health promoting school*.mp. 376
59 ((school* or community) adj4 program*).mp. 35625
60 School health services/ 17840
61 ((school* or community) adj4 intervention*).mp. 21247
62 (family intervention* or parent* intervention).mp. 2513
63 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).mp. 26219
64 or/54-63 365140
65 exp Health Policy/ 111172
66 ((health or school or food or nutrition*) adj3 (policy or policies)).mp. 120211
67 65 or 66 151124
68 exp Obesity/pc [Prevention & Control] 20422
69 exp Primary Prevention/ 162740

70 (primary prevention or secondary prevention).mp. 68528

71 (preventive measure* or preventative measure*).mp. 28824

72 (preventive care or preventative care).mp. 6173

73 (obesity adj2 (prevent* or treat*)).mp. 22250

74 or/68-73 281599

75 exp Cell Phones/ or Social media/ or Mobile Applications/ or Electronic Mail/ 37010

76 (app or apps or text messag* or texting or social media or facebook or mobile technolog* or e-mail* or email* or smartphone* or mobile phone*).ti,ab. 92063

77 75 or 76 103417

78 10 and (21 or 33 or 42 or 48 or 53 or 64 or 67 or 74 or 77) 286872

79 exp child/ or adolescent/ 3170185

80 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teenage* or young people or young person or schoolchild* or juvenile).tw. 1974681

81 79 or 80 3801892

82 78 and 81 64232

83 exp animals/ not humans.sh. 4890266

84 (animal* or rodent* or mouse or mice or rat or rats or murine).ti. 1593937

85 82 not (83 or 84) 62698

86 controlled clinical trial.pt. 94426

87 randomi#ed.ab. 639710

88 placebo.ab. 221714

89 randomly.ab. 366508

90 (clinical trials as topic or controlled clinical trials as topic).sh. 202924

91 trial.ti. 248175

92 exp randomized controlled trial/ or exp randomized controlled trials as topic/ 689840

93 or/86-92 1496200

94 85 and 93 9617

95 (202103* or 202104* or 202105* or 202106* or 202107* or 202108* or 202109*).ep,ez. 893938

96 ("2021 Mar*" or "2021 Apr*" or "2021 May*" or "2021 Jun*" or "2021 Jul*" or "2021 Aug*" or "2021 Sep*").dp. 678587

97 (2021 03* or 2021 04* or 2021 05* or 2021 06* or 2021 07* or 2021 08* or 2021 09*).dp. 234439

98 limit 94 to yr=2021- 388

99 95 or 96 or 97 1092323

100 94 and 99 303

101 98 or 100 391

****

Ovid Embase <1974 to 2021 September 24>

Date Limited: Mar-Sept 2021

1 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ 267785

2 *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ 44609

3 *body mass/ or *waist to height ratio/ or *waist hip ratio/ 36395

4 (obes* or adipos*).mp. 742525

5 (weight gain or weight loss).mp. 308464

6 (overweight or over weight or overeat* or over eat*).mp. 121599

7 weight change*.mp. 26001

8 ((bmi or body mass index) adj2 (alter* or measur* or gain or loss or change)).mp. 19810

9 or/1-8 1019356

10 *Behavior Therapy/ 16388

11 *social support/ 24496
12 *family therapy/ 6717
13 *group therapy/ 10256
14 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).mp. 111599
15 (group therapy or family therapy or cognitive therapy).mp. 74992
16 ((lifestyle or life style) adj (chang* or intervention*)).mp. 26120
17 counsel?ing.mp. 220349
18 social support.mp. 112851
19 (peer adj2 support).mp. 8315
20 (children adj3 parent* adj3 therapy).mp. 189
21 or/10-20 496871
22 exp *Diet Therapy/ 98711
23 (diets or diet or dieting).mp. 777251
24 (diet* adj (modif* or therapy or intervention* or strateg*)).mp. 75017
25 (low calorie or calorie control* or healthy eating).mp. 17252
26 (fasting or modified fast*).mp. 177877
27 exp *fat intake/ 17057
28 (fruit or vegetable*).mp. 230164
29 (high fat* or low fat* or fatty food*).mp. 86965
30 formula diet*.mp. 861
31 or/22-30 1095249
32 exp *Exercise/ 155651
33 exp *kinesiotherapy/ 35308
34 exercis*.mp. 570034
35 (aerobics or physical therapy or physical activity or physical inactivity).mp. 277386
36 (fitness adj (class* or regime* or program*)).mp. 1277
37 (aerobics or physical therapy or physical training or physical education).mp. 56302
38 dance therapy.mp. 708
39 sedentary behavio?r.mp. 8604
40 or/32-39 782671
41 exp *alternative medicine/ 35261
42 (alternative medicine or complementary therap* or complementary medicine).mp. 55867
43 (hypnotism or hypnosis or hypnotherapy).mp. 15869
44 (acupuncture or homeopathy or homoeopathy).mp. 57978
45 (chinese medicine or indian medicine or herbal medicine or ayurvedic).mp. 98826
46 or/41-45 208909
47 ((diet or dieting or slim*) adj (club* or organi?ation)).mp. 47
48 (weightwatcher* or weight watcher*).mp. 236
49 (correspondence adj (course* or program*)).mp. 81
50 (fat camp* or diet* camp*).mp. 30
51 or/47-50 394
52 exp *Health Education/ 117203
53 (health promotion or health education).mp. 226187
54 (media intervention* or community intervention*).mp. 3429
55 health promoting school*.mp. 450
56 ((school* or community) adj4 program*).mp. 45545
57 *school health service/ 7413
58 ((school* or community) adj4 intervention*).mp. 26744

59 (family intervention* or parent* intervention).mp. 3302

60 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).mp. 49137

61 or/52-60 369532

62 *health care policy/ 69961

63 ((health or school or food or nutrition*) adj3 (Policy or policies)).mp. 239520

64 62 or 63 239520

65 exp Obesity/pc [Prevention & Control] 16674

66 primary Prevention/ 42819

67 (primary prevention or secondary prevention).mp. 89810

68 (preventive measure* or preventative measure*).mp. 38213

69 (preventive care or preventative care).mp. 7719

70 (obesity adj2 (prevent* or treat*)).mp. 30589

71 or/65-70 175662

72 *mobile application/ or *text messaging/ or exp *mobile phone/ or *e-mail/ or *social media/ 35056

73 (app or apps or text messag* or texting or social media or facebook or mobile technolog* or e-mail* or email* or smartphone* or mobile phone*).ti,ab. 134604

74 72 or 73 142358

75 9 and (21 or 31 or 40 or 46 or 51 or 61 or 64 or 71 or 74) 363429

76 child/ or preschool child/ or school child/ or juvenile/ or adolescent/ 2957200

77 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teenage* or young people or young person or juvenile* or schoolchild*).tw. 2508471

78 76 or 77 3737806

79 75 and 78 70228

80 exp animal/ not human/ 4983435

81 (animal* or rodent* or mouse or mice or rat or rats or murine).ti. 1746540

82 79 not (80 or 81) 68027

83 randomized controlled trial/ or "randomized controlled trial (topic)"/ 884751

84 crossover procedure/ 68184

85 "double blind procedure"/ 187998

86 "single-blind procedure"/ 43827

87 ((doubl* or singl*) adj blind*).tw. 249100

88 placebo/ or placebo.tw. 478469

89 (cross adj over).tw. 34400

90 (random* or factorial* or crossover).tw. 1774825

91 or/83-90 2220300

92 82 and 91 10585

93 limit 92 to yr="2021" 535

94 (202103* or 202104* or 202105* or 202106* or 202107* or 202108* or 202109* or 2021*).dd,dc. 1876487

95 (spring 2021 or summer 2021 or autumn 2021).dp. 505

96 (mar* 2021 or 0* mar* 2021 or 1* mar* 2021 or 2* mar* 2021 or 3* mar* 2021 or apr* 2021 or 0* apr* 2021 or 1* apr* 2021 or 2* apr* 2021 or 3* apr* 2021 or may* 2021 or 0* may* 2021 or 1* may* 2021 or 2* may* 2021 or 3* may* 2021 or jun* 2021 or 0* jun* 2021 or 1* jun* 2021 or 2* jun* 2021 or 3* jun* 2021 or jul* 2021 or 0* jul* 2021 or 1* jul* 2021 or 2* jul* 2021 or 3* jul* 2021 or aug* 2021 or 0* aug* 2021 or 1* aug* 2021 or 2* aug* 2021 or 3* aug* 2021 or sep* 2021 or 0* sep* 2021 or 1* sep* 2021 or 2* sep* 2021 or 3* sep* 2021).dp. 841606

97 94 or 95 or 96 1903232

98 92 and 97 780

99 93 or 98 789

****

Ovid APA PsycInfo <1806 to September Week 3 2021>

2019 - 2020
1 exp overweight/ 27609
2 weight control/ 5141
3 (obes* or adipos*).ti. 17415
4 obesity.tw. 37939
5 (weight loss or weight gain).ti. 4977
6 (overweight or over weight).tw. 16357
7 weight loss/ 4106
8 weight gain/ 3310
9 (overeat* or over eat*).tw. 2784
10 weight change*.tw. 2349
11 ((bmi or body mass) adj3 (alter* or measur* or gain or loss or change)).tw. 3069
12 or/1-11 55473
13 (adolescence 13 17 yrs or childhood birth 12 yrs or preschool age 2 5 yrs or school age 6 12 yrs).ag. 824848
14 (teenage* or young people or young person or juvenile or schoolchild*).tw. 75214
15 (child or children or childhood or adololescen*).tw. 714760
16 (pediatr* or paediatr*).mp. 53867
17 (boy or boys or boyhood or girl or girlhood or girls or youth or youths).tw. 209081
18 or/13-17 1194126
19 12 and 18 18989
20 exp treatment effectiveness evaluation/ 26596
21 clinical trials/ 11978
22 placebo/ 6085
23 placebo*.tw. 42334
24 ((singl* or doubl* or trebl* or tripl*) adj3 (blind* or mask*)).tw. 27668
25 random*.tw. 218305
26 trial.ti. 33645
27 ((clinical adj3 trial*) or (evaluat* adj3 stud*)).tw. 108150
28 or/20-27 346310
29 19 and 28 2505
30 limit 29 to yr="2019 - 2021" 371
31 (2019* or 2020* or 2021*).up,yr,an. 518276
32 29 and 31 474
33 30 or 32 474
34 (BMIz or (BMI* adj2 (z-scor* or zscor*))).tw. 942
35 ((bmi or body mass index) adj3 outcome?).tw. 515
36 34 or 35 1394
37 18 and 28 and 36 320
38 (33 or 37) 794
****

2.2 Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library

Issue 9 of 12, 2021
Date Run: 26/09/2021

Rolling Search

Limited Mar-Sept 2021
ID Search Hits
#1 MeSH descriptor: [Obesity] explode all trees 14800
#2 MeSH descriptor: [Body Weight Changes] explode all trees 9217

#3 (obes*):ti,ab,kw 46134
#4 (“weight gain” or “weight loss”):ti,ab,kw 32868
#5 (overweight or “over weight” or overeat* or (over next eat*)):ti,ab,kw 18432
#6 (weight next change*):ti,ab,kw 4229
#7 ((bmi or “body mass index”) near (gain or loss or change*)):ti,ab,kw 4292
#8 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 69612
#9 MeSH descriptor: [Behavior Therapy] explode all trees 17646
#10 MeSH descriptor: [Social Support] explode all trees 3439
#11 MeSH descriptor: [Psychotherapy, Group] explode all trees 3560
#12 ((psychological or behavio?r*) near (therapy or modif* or strateg* or intervention*)):TI,AB,KW 53803
#13 (“group therapy” or “family therapy” or “cognitive therapy”):ti,ab,kw 10896
#14 ((lifestyle or “life style”) near (chang* or intervention*)):ti,ab,kw 10017
#15 counsel?ing:ti,ab,kw 22739
#16 “social support”:ti,ab,kw 8569
#17 (peer near2 support):ti,ab,kw 102294
#18 (children near/3 parent* near/3 therapy):ti,ab,kw 388
#19 #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 173694
#20 MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [diet therapy - DH] 2003
#21 MeSH descriptor: [Diet Therapy] explode all trees 6228
#22 MeSH descriptor: [Fasting] this term only 3327
#23 (diets or diet or dieting):ti,ab,kw 67825
#24 (diet* near (modif* or therapy or intervention* or strateg*)):ti,ab,kw 28307
#25 (“low calorie” or (calorie next control*) or “healthy eating”):ti,ab,kw 4036
#26 (fasting or (modified next fast*)):ti,ab,kw 35052
#27 MeSH descriptor: [Dietary Fats] explode all trees 7743
#28 (fruit or vegetable*):ti,ab,kw 9710
#29 (high next fat*) or (low next fat*) or (fatty next food*):ti,ab,kw 7159
#30 (formula next diet*):ti,ab,kw 237
#31 #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 103927
#32 MeSH descriptor: [Exercise] explode all trees 26442
#33 MeSH descriptor: [Exercise Therapy] explode all trees 15023
#34 exercis*:ti,ab,kw 112202
#35 (aerobics or “physical therapy” or “physical activity” or “physical inactivity”):ti,ab,kw 44627
#36 (fitness near (class* or regime* or program*)):ti,ab,kw 1349
#37 (“physical training” or “physical education”):ti,ab,kw 4525
#38 “dance therapy”:ti,ab,kw 180
#39 (sedentary next behavio?r*):ti,ab,kw 2522
#40 #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 139600
#41 MeSH descriptor: [Complementary Therapies] explode all trees 20952
#42 (“alternative medicine” or (complementary next therap*) or “complementary medicine”):ti,ab,kw 3613
#43 (hypnotism or hypnosis or hypnotherapy):ti,ab,kw 1818
#44 (acupuncture or homeopathy or homoeopathy):ti,ab,kw 16425
#45 (“chinese medicine” or “indian medicine” or “herbal medicine” or ayurvedic):ti,ab,kw 11369
#46 #41 OR #42 OR #43 OR #44 OR #45 44532
#47 (diet* or slim*) near (club* or organi?ation):ti,ab,kw 128
#48 (weightwatcher* or (weight next watcher*)):ti,ab,kw 134
#49 (correspondence near (course* or program*)):ti,ab,kw 28
#50 ((fat or diet*) next camp*):ti,ab,kw 2

#51 #47 OR #48 OR #49 OR #50 291

#52 MeSH descriptor: [Health Promotion] explode all trees 6886

#53 MeSH descriptor: [Health Education] explode all trees 20741

#54 (“health promotion” or “health education”):ti,ab,kw 19796

#55 (“media intervention*” or “community intervention*”):ti,ab,kw 630

#56 (health next promoting next school*):ti,ab,kw 48

#57 ((school or community) near/2 program*):ti,ab,kw 2921

#58 ((school or community) near/2 intervention*):ti,ab,kw 4510

#59 ((family next intervention*) or (parent* next intervention*)):ti,ab,kw 1744

#60 (parent* near/2 (behavio?r* or involve* or control* or attitude* or educat*)):ti,ab,kw 5960

#61 #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 41158

#62 MeSH descriptor: [Health Policy] explode all trees 672

#63 ((health next polic*) or (school next polic*) or (food next polic*) or (nutrition next polic*)):ti,ab,kw 1462

#64 #62 OR #63 1595

#65 MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [prevention & control - PC] 1761

#66 MeSH descriptor: [Primary Prevention] explode all trees 4376

#67 (“primary prevention” or “secondary prevention”):ti,ab,kw 10932

#68 (preventive next measure*) or (preventative next measure*):ti,ab,kw 1396

#69 (“preventive care” or “preventative care”):ti,ab,kw 581

#70 (obesity near/2 (prevent* or treat*)):ti,ab,kw 5220

#71 #65 OR #66 OR #67 OR #68 OR #69 OR #70 21508

#72 (#19 OR #31 OR #40 OR #46 OR #51 OR #61 OR #64 OR #71) 420107

#73 #8 AND #72 42842

#74 MeSH descriptor: [Child] explode all trees 58448

#75 MeSH descriptor: [Infant] explode all trees 33346

#76 (child* or adolescen* or infant*):ti,ab,kw 289920

#77 (teenage* or “young people” or “young person” or (young next adult*)):ti,ab,kw 91369

#78 (schoolchildren or “school children”):ti,ab,kw 12811

#79 (pediatr* or paediatr*):ti,ab,kw 37240

#80 (boys or girls or youth or youths):ti,ab,kw 17734

#81 MeSH descriptor: [Adolescent] this term only 106993

#82 #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 345686

#83 #73 AND #82 12799

[Additional terms for BMI]

#84 (BMIz or (BMI* near/2 (z-scor* or zscor*))):ti,ab 1102

#85 ((bmi or "body mass index") near/3 (assess* or calculat* or change? or changing or differ* or increas* or decreas* or reduc* or post-intervention* or "follow* up*" or followup*)):ti,ab 8093

#86 ((bmi or "body mass index") near/3 outcome?):ti,ab 1927

#87 ((adiposity or fat or weight) near/3 (goal? or outcome?)):ti,ab 5101

#88 #84 OR #85 OR #86 OR #87 14422

#89 #88 AND #72 AND #82 3596

#90 #89 NOT #83 625

2.3 Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library

New Search (difference set)

Issue 9 of 12, 2021

Date Run: 26/09/2021

#91 MeSH descriptor: [Marketing] explode all trees 530

#92 MeSH descriptor: [Persuasive Communication] this term only 314

#93 MeSH descriptor: [Communications Media] explode all trees 12804

#94 (marketing or advert* or campaign* or "mass media" or "social media" or blog* or vlog*):ti,ab,kw 8893

#95 (persuasive or persuasion or persuader*):ti,ab,kw 860

#96 MeSH descriptor: [Food Packaging] this term only 37

#97 MeSH descriptor: [Food Labeling] explode all trees 169

#98 ((food? or drink? or product? or nutrition* or diet* or carb* or sugar* or fat? or calori* or warning) NEAR/3 (label* or packag*)):ti,ab,kw 1855

#99 "traffic light*":ti,ab,kw 193

#100 (#91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99) 23426

#101 MeSH descriptor: [Artificially Sweetened Beverages] this term only 5

#102 MeSH descriptor: [Beverages] this term only and with qualifier(s): [adverse effects - AE] 138

#103 MeSH descriptor: [Sweetening Agents] explode all trees 770

#104 (artificial* near/3 sweeten*):ti,ab,kw 248

#105 ((sugar* or sweeten* or unsweeten* or diet or "low calorie" or fizzy or carbonated) NEAR/3 (beverag* or drinks or juice? or cordial? or pop or smoothie? or snack?)):ti,ab,kw 1777

#106 (((fizzy or carbonated) near/3 (beverag* or drinks)) or soda?):ti,ab,kw 804

#107 ("low sugar" or "high sugar" or "high fat" or HFSS):ti,ab,kw 4083

#108 ((sugar or fat or food) near/2 (literacy or education)):ti,ab,kw 309

#109 (#101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108) 7209

#110 MeSH descriptor: [Food Services] explode all trees 389

#111 MeSH descriptor: [Dietary Services] this term only 43

#112 (school* near/3 (breakfast? or catering or diet* or dinner? or dining or lunch* or meal? or food? or snack?)):ti,ab,kw 873

#113 ("breakfast club?" or "catering service?"):ti,ab,kw 173

#114 (mealtim* or "meal tim*" or "meal environment?"):ti,ab,kw 883

#115 ("packed lunches" or "tuck shops" or "snack shops"):ti,ab,kw 18

#116 "vending machine?":ti,ab,kw 23

#117 (#110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116) 2195

#118 ("after school" or out-of-school):ti,ab,kw 574

#119 MeSH descriptor: [Non-Medical Public and Private Facilities] explode all trees 5420

#120 MeSH descriptor: [Leisure Activities] explode all trees 19390

#121 MeSH descriptor: [Physical Education and Training] this term only 1621

#122 MeSH descriptor: [Sports and Recreational Facilities] explode all trees 118

#123 ((youth? or communit* or holiday* or vacation* or activit* or fitness or sport* or recreation* or leisure) near/3 (center? or centre? or camp? or club?)):ti,ab,kw 3740

#124 ((youth? or communit* or holiday* or vacation* or leisure) next based):ti,ab,kw 9610

#125 MeSH descriptor: [Movement] this term only 2461

#126 MeSH descriptor: [Fitness Trackers] this term only 123

#127 (((movement or activit* or fitness) near/2 (app or based or chang* or monitor* or measur* or track*)) or recreation* or sport* or play):ti,ab,kw 44174

#128 MeSH descriptor: [Sleep] explode all trees 6005

#129 sleep*:ti or ((sleep near/3 (duration or efficienc* or hygiene or problem* or quality)) or actigraph*):ti,ab,kw 25133

#130 (#118 OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR #126 OR #127 OR #128 OR #129) 101953

#131 ((parent* or family or families or guardian?) near/2 (advice or advisory or (behavi* near chang*) or coach* or educat* or focus* or intervention* or program* or project* or psychoeducat* or strateg* or study or support* or therap* or train* or trial)):ti,ab,kw 19851

#132 ((parent* or family or families or guardian?) next (based or centred or centered or focus* or tailored or target*)):ti,ab,kw 2863

#133 #131 OR #132 20617

#134 MeSH descriptor: [Religion] explode all trees 1271

#135 MeSH descriptor: [Culture] explode all trees 2923

#136 (religi* or church or spiritual or faith?):ti,ab,kw 3296

#137 ((cultur* or multicultur* or race or racial*) near/2 (adapted or appropriate or based or center* or centre* or competent or focus* or tailored or translat* or target*)):ti,ab,kw 2635

#138 #134 OR #135 OR #136 OR #137 9246

#139 MeSH descriptor: [Public Health] this term only 262

#140 "public health":ti,ab,kw 14709

#141 ((complex or co-ordinated or comprehensive or factorial or interdisciplinary or inter-disciplinary or multiple or "multi component?" or multicomponent? or multidisciplin* or "multi disciplin*" or multidimension* or "multi dimension*" or multifactor* or "multi factor*" or multifacet* or "multi facet*" or multilevel* or "multi level*" or multimodal* or "multi modal*" or multiparamet* or "multi paramet*" or multiecological or "multi* ecological") near (intervention? or program* or project? or strateg* or study or support* or system? or therap* or train* or trial)):ti,ab,kw 62757

#142 #139 OR #140 OR #141 76106

#143 MeSH descriptor: [Computer Communication Networks] explode all trees 4404

#144 MeSH descriptor: [Telecommunications] explode all trees 7443

#145 MeSH descriptor: [Mobile Applications] this term only 888

#146 MeSH descriptor: [Cell Phone] explode all trees 1992

#147 MeSH descriptor: [Therapy, Computer-Assisted] this term only 1358

#148 digital*:ti,kw OR (digital near/3 (assist* or based or deliver* or intervention? or pilot or platform? or program* or project? or strateg* or study or support* or system? or technolog* or therap* or train* or trial)):ab 5502

#149 (android or app or apps or avatar* or blog* or CD-ROM or "cell* phone*" or cellphone* or "chat room*" or chatroom* or cyber* or DVD or eHealth or e-health or "electronic health" or e-Portal or ePortal or ePsych* or e-Psych* or eTherap* or e-therap* or "electronic forum*" or gaming or "information technolog*" or "instant messag*" or ipad or i-pad or iphone or i-phone or ipod or i-pod or podcast or "smart phone" or smartphone or "social network* site*" or "social networking" or mHealth or m-health or multi-media or multimedia or "personal digital assistant" or PDA or SMS or smartwatch* or "smart watch*" or "social medi*" or telehealth* or tele-health* or telemed* or tele-med* or telemonitor* or tele-monitor* or telepsych* or tele-psych* or teletherap* or tele-therap* or texting):ti,ab,kw 27793

#150 (internet or technolog* or tele* or web):ti,kw or ((computer or e-mail* or email* or messaging or internet* or mobile or online* or on-line or software or technolog* or telecomm* or tele-comm* or "text messag*" or virtual* or web or WWW) near/3 (assist* or based or deliver* or intervention? or pilot or platform? or program* or project? or strateg* or study or support* or system? or technolog* or therap* or train* or trial)):ti,ab,kw 32308

#151 (gaming or gamification or "wearable device?" or wearables or videogame or "video game" or videoconferenc* or "video conferenc*"):ti,ab,kw 3342

#152 (synchronous or asynchronous or (electronic near/2 deliver*) or eLearning or e-learning or "blended learning"):ti,ab,kw 2642

#153 (screentime or "screen time"):ti,ab,kw 477

#154 ("self care" and (computers or internet or software)):kw 967

#155 #143 OR #144 OR #145 OR #146 OR #147 OR #148 OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 60834

#156 #100 OR #109 OR #117 OR #130 OR #133 OR #138 OR #142 OR #155 255258

#157 MeSH descriptor: [Child] explode all trees 58448

#158 (child* or adolescen*):ti,ab,kw 260114

#159 (teenage* or “young people” or “young person” or (young next adult*)):ti,ab,kw 91369

#160 (schoolchildren or “school children”):ti,ab,kw 12811

#161 (pediatr* or paediatr*):ti,ab,kw 37240

#162 (boys or girls or youth or youths):ti,ab,kw 17734

#163 MeSH descriptor: [Adolescent] this term only 106993

#164 (#157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163) 318126

#165 ((#8 OR #88) AND #156 AND #164) 7331

#166 #165 NOT #83 1281

****

2.4 New search of the education databases 1990 onwards

Australian Education Index (AEI) (ProQuest)

Searched 26-Sept-2021

Search History

[*Condition*]

#1 MAINSUBJECT.EXACT("Body weight") (85) or MAINSUBJECT.EXACT("Obesity") (215)

#2 (obes*) (249)

#3 (weight N/5 gain*) or (weight N/5 los*) (36)

#4 (overweight or “over weight”) (83)

#5 (overeat* or (over P/1 eat*)) (5)

#6 (weight N/5 chang*) (14)

#7 (bmi or bmiz or “body mass index”) (38)

#8 ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes)) (117)

#9 (1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8) (433)

[*Study Design Filter*]

#10 MAINSUBJECT.EXACT("Intervention") (2177)

#11 (RCT or cRCT or randomized or randomised or (control* P/3 group*) or (control* P/3 trial*) or (control* P/3 stud*)) (1508)

#12 noft(random* or groups or trial or placebo or matched) (37,586)

#13 (10 OR 11 OR 12) (39233)

#14 (9 AND 13) (130)

(MAINSUBJECT.EXACT("Body weight") OR obes* OR ((weight N/5 gain*) or (weight N/5 los*)) OR (overweight or “over weight”) OR (overeat* or (over P/1 eat*)) OR (weight N/5 chang*) OR (bmi or bmiz or “body mass index”) OR ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) AND (MAINSUBJECT.EXACT("Intervention") OR (RCT or cRCT or randomized or randomised or (control* P/3 group*) or (control* P/3 trial*) or (control* P/3 stud*)) OR noft(random* or groups or trial or placebo or matched))

Date Limited (1990-01-01 to 2021-09-26), n=126

[Record Type: Journal articles (43); Theses (41); Conference Papers (14); Journal Articles Overseas (13); Book Chapters (10); Research Reports (2); Books (1); Conference Proceedings (1); Government Reports (1)]

British Education Index (BEI) (EBSCOhost)

Searched 26-Sept-2021

Search History [Boolean Search]

[Condition]

S1 obes* (495)

S2 (weight N5 gain*) or (weight N5 los*) (58)

S3 (overweight or “over weight”) (138)

S4 (overeat* or (over W1 eat*)) (9)

S5 (weight N5 chang*) (21)

S6 (bmi or bmiz or “body mass index”) (169)

S7 ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes)) (110)

S8 (S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7) (692)

[Study Design Filter]

S9 (RCT or cRCT or randomized or randomised) (1271)

S10 ((control* N3 group*) or (control* N3 trial*) or (control* N3 stud*)) (3365)

S11 (random* or groups or trial or placebo) (33,876)

S12 (matched N5 (class or classes or cluster or clusters or school or schools or community or communities or population or populations) (73)

S13 (S9 OR S10 OR S11 OR S12) (34370)

S14 (S8 AND S13) (238)

Date Limited (1990 onwards), n=238

[Record Type: Academic Journals (234); Magazines(4)]

ERIC (Education Resources Information Center) (EBSCOhost)

Searched 26-Sept-2021

Search History [Boolean Search]

[Condition]

S1 TI obes* OR AB obes* OR KW obes* OR SU obes* (3526)

S2 TI (weight N5 gain*) OR AB (weight N5 gain*) OR KW (weight N5 gain*) OR SU (weight N5 gain*) (326)

S3 TI (weight N5 los*) OR AB (weight N5 los*) OR KW (weight N5 los*) OR SU (weight N5 los*) (640)

S4 TI overeat* OR AB overeat* OR KW overeat* OR SU overeat* (73)

S5 TI (over W1 eat*) OR AB (over W1 eat*) OR KW (over W1 eat*) OR SU (over W1 eat*) (21)

S6 TI (weight N5 chang*) OR AB (weight N5 chang*) OR KW (weight N5 chang*) OR SU (weight N5 chang*) (266)

S7 TI ((bmi or bmiz or “body mass index”)) OR AB ((bmi or bmiz or “body mass index”)) OR KW ((bmi or bmiz or “body mass index”)) OR SU ((bmi or bmiz or “body mass index”)) (1278)

S8 TI (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR AB (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR KW (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR SU (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) (1320)

S9 (S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8) (5762)

[Study Design Filter]

S10 TI ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR AB ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR KW ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR SU ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) (7981)

S11 TI ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR AB ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR KW ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR SU ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) (29063)

S12 TI "at random" OR AB "at random" OR KW "at random" OR SU "at random" (14001)

S13 AB (control* N3 group*) (22313)

S14 TI trial OR AB trial OR KW trial OR SU trial (15512)

S15 TI trial OR AB trial OR KW trial OR SU trial (806)

S16 AB (matched N5 (class or classes or cluster or clusters or school or schools or community or communities or population or populations) (1057)

S17 (S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16) (62683)

S18 (S9 AND S17) (637)

S19 (child* or adolescen* or pediatr* or paediatr* or boys or girls or youth or youths or teenage* or "young people" or "young person" or "young adult*") (500,370)

S20 TI school* OR AB school* OR KW school* OR SU school* (708643)

S21 TI communit* OR AB communit* OR KW communit* OR SU communit* (224783)

S22 (S19 OR S20 OR S21) (1,062,371)

S23 (S18 AND S22) (462)

S24 Limiters - Date Published: 19900101-20211231 n=435

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2.5 Pragmatic search for grey literature (theses – all years)

ProQuest Dissertations and Theses Global (www.proquest.com/pqdtglobal/dissertations/)

Date of search: 24-February-2022

[*Title*]ti((((randomised or randomized or "randomly allocated" or "randomly assigned" or "random assignment" or RCT or cRCT) AND (adolescent or adolescents or boys or girls or child or children or schoolchildren or childhood or parents or guardians or parental) AND (((obesity or overweight) and (prevent or preventing or prevention or promote or promotion or promoting)) or "weight management" or “weight gain” or “weight loss” or "physical activity" or "physical activities" or ((dietary or lifestyle) and (behaviours or behaviors or behavioural or behavioral or changes or intervention))) AND (cluster or cRCT or school or schools or schoolchildren or classroom or classrooms)))) OR
[*Abstract*] ab((((randomised or randomized or "randomly allocated" or "randomly assigned" or "random assignment" or RCT or cRCT) AND (adolescent or adolescents or boys or girls or child or children or schoolchildren or childhood or parents or guardians or parental) AND (((obesity or overweight) and (prevent or preventing or prevention or promote or promotion or promoting)) or "weight management" or “weight gain” or “weight loss” or "physical activity" or "physical activities" or ((dietary or lifestyle) and (behaviours or behaviors or behavioural or behavioral or changes or intervention))) AND (cluster or cRCT or school or schools or schoolchildren or classroom or classrooms)))) (214)

Electronic Theses Online Service (EThOS) - British Library (ethos.bl.uk/Home.do)

Date of search: 11-March-2022

Search terms (OR):

obesity and prevention and randomised (50)

obesity and prevention and randomized (14)

obesity and school(s) and randomised (18)

obesity and school(s) and randomized (9)

adiposity and randomised and children (9)

adiposity and randomized and children (4)

adiposity and randomised and school(s) (4)

adiposity and randomized and school(s) (0)

BMI and randomised and children (25)

BMI and randomized and children (11)

BMI and randomised and school(s) (13)

BMI and randomized and school(s) (7)

BMI and z-score and randomised (9)

BMI and z-score and randomized (3)

weight and randomised and children (50)

weight and randomized and children (25)

weight and randomised and school(s) (32)

weight and randomized and school(s) (24)

school-based and randomised (151)

school-based and randomized (159)

healthy and children and randomised (49)

healthy and children and randomized (17)

25 theses selected for screening (16 duplicates with PQDT)

9 new records to screen

DART - Europe e-theses Portal (https://www.dart-europe.org/basic-search.php)

Date of search: 31-March-2022

Search terms (OR):

obesity and prevention and children and randomised (7) (4 selected)

obesity and prevention and children and randomized (11) (4 selected)

obesity and prevention and adolescents and randomised (2) (2 duplicates)

obesity and prevention and adolescents and randomized (8) (4 selected, all duplicates)

obesity and randomised and schools (6) (3 selected; 2 duplicates)

obesity and randomized and schools (11) (5 selected; 3 duplicates)

adiposity and randomised and children (5) (4 selected; 2 duplicates)

adiposity and randomized and children (0 selected)

adiposity and randomised and adolescents (2) (1 selected)

adiposity and randomized and adolescents (3) (0 selected)

adiposity and randomised and schools (2) (2 selected, both duplicates)

adiposity and randomized and schools (0)

BMI and randomised and children (18) (3 selected, 2 duplicates)

BMI and randomized and children (23) (2 selected, both duplicates)

BMI and randomised and adolescents (10) (2 selected, all duplicates)

BMI and randomized and adolescents (15) (3 selected, 2 duplicates)

BMI and randomised and school(s) (5) (4 selected, all duplicates)

BMI and randomized and school(s) (11) (4 selected, all duplicates)

BMI and z-score and randomised and children (9) (2 selected, both duplicates)

BMI and z-score and randomised and adolescents (7) (2 selected, both duplicates)

BMI and z-score and randomized and children (15) (1 selected, 1 duplicates)

BMI and z-score and randomized and adolescents (12) (3 selected, all duplicates)

weight and randomised and children (46) (4 selected, 3 duplicates)

weight and randomized and children (71) (4 selected, 3 duplicates)

weight and randomised and adolescents (13) (1 duplicate)

weight and randomized and adolescents (24) (2 selected, both duplicates)

school-based and randomised (52) (4 selected, 2 duplicates)

school-based and randomized (81) (5 selected, 2 duplicates)

healthy and children and randomised (41) (5 selected, 4 duplicates)

healthy and children and randomized (82) (2 selected)

healthy and adolescents and randomised (12) (2 selected, 2 duplicate)

healthy and adolescents and randomized (27) (1 selected, 1 duplicate)

healthy and schools and randomised (12) (3 selected, 3 duplicates)

healthy and schools and randomized (10) (2 selected, both duplicates)

n=25 theses selected for screening

5 duplicates with PQDT and BL eTHOS

20 to screen

[Note. Several theses have also been retrieved from databases which index this type of literature, e.g. PsycINFO, Australian Education Index (AEI)]

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2.6 Search for retractions/errata

Date-of-search- 6-April-2022

Ovid multifile search

APA PsycInfo <1806 to April Week 1 2022>

Embase <1974 to 2022 April 06>

Ovid MEDLINE(R) ALL <1946 to April 06, 2022>

1 exp overweight/ or exp body weight changes/ or body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ or body mass index/ or adiposity/ 1789517

2 1 use medall 539949

3 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ or *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ or *body mass/ or *waist to height ratio/ or *waist hip ratio/ 573049

4 3 use oemezd 340024

5 exp overweight/ or weight control/ or weight loss/ or weight gain/ 1035600

6 5 use psyh 35168

7 (2 or 4 or 6) 915141

8 (obes* or adipos* or weight gain or weight loss or overweight or over weight or overeat* or over eat* or weight change*).mp. 1737633

9 ((bmi? or body mass index) adj2 (alter* or assess* or calculat* or change? or changing or differ* or gain or increas* or decreas* or loss or reduc* or post-intervention* or postintervention* or follow* up* or followup*)).mp. 107069

10 (BMIz or BMI-z* or zBMI* or z-BMI*).mp. 14358

11 (BMI* adj2 (z-scor* or zscor*)).mp. 13076

12 or/7-11 2010782

13 exp child/ or preschool child/ or school child/ or adolescent/ 6930323

14 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or young people or young person? or schoolchild* or youth or youths).tw. 5491742

15 (school? adj (based or setting student?)).tw. 53821

16 or/13-15 9153070

17 (12 and 16) 376094

18 exp randomized controlled trial/ 1271931

19 randomized controlled trial.pt. 563745

20 Randomization/ or Random Allocation/ 200537

21 (randomi#ed or randomi#ation or randomi#ing).mp. 2512633

22 (RCT or cRCT).tw. 80040

23 "at random".ab. 31601

24 (random* adj3 (administ* or allocat* or assign* or class* or cluster or crossover or cross-over or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or pragmatic or quasi or recruit* or selected or split or subsitut* or treat*)).tw. 1799071

25 ((single or double or triple or treble) adj2 (blind* or mask* or dummy)).mp. 632841

26 trial.ti. 650175

27 (prevention adj (study or trial)).tw. 16015

28 (intervention and trial).tw. 321931

29 program.ti. and trial.tw. 24533

30 ((intervention or program) and control* and (group? or school? or communit*)).tw. 500989

31 ((intervention or program) adj5 (control* or group? or study or trial)).tw. 481711

32 controlled clinical trial.mp. 604659

33 or/18-32 4070222

34 (17 and 33) 46661

35 (retracted publication or "retraction of publication").pt. 21796

36 Tombstone.pt. 3894

37 Retracted article/ 11134

38 (retracted or retraction).ti. 29282

39 (35 or 36 or 37 or 38) 51319

40 (17 and 39) 88

41 remove duplicates from 40 74

42 erratum.pt. 250070

43 published erratum.pt. 113022

44 (erratum or errata).ti. 209724

45 (42 or 43 or 44) 379603

46 (34 and 45) 59

47 remove duplicates from 46 48

48 (47 not 41) 45

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2.7 Search updates (Automated Searches; October 2022)

Sept. 2021 onwards

Cochrane Library

Search Name: Obesity-Living-Systematic-Review-1

#1 MeSH descriptor: [Obesity] explode all trees

#2 MeSH descriptor: [Body Weight Changes] explode all trees

#3 "body mass index":kw

#4 (obes* or adiposity):ti,ab,kw

#5 (“weight gain” or “weight loss” or (weight next change*) or (weight next fluctuat*)):ti,ab,kw

#6 (overweight or "over weight" or overeat* or (over next eat*) or overnutrition or "over nutrition"):ti,ab,kw

#7 ((fat or weight) near/3 (goal* or outcome*)):ti,ab,kw

#8 ((bmi or "body mass index") near/3 (assess* or calculat* or change* or changing or differ* or gain* or increas* or decreas* or reduc* or post-intervention* or (follow* next up*) or followup* or loss or outcome*)):ti,ab,kw

#9 (BMIz or BMI-z or zBMI or z-BMI or (BMI* near/2 (z-scor* or zscor*))):ti,ab

#10 ((waist near/2 height near/2 ratio*) or (waist near/2 hip* near/2 ratio*)):ti,ab,kw

#11 "weight control":ti,ab,kw

#12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)

#13 MeSH descriptor: [Child] this term only

#14 MeSH descriptor: [Child, Preschool] this term only

#15 MeSH descriptor: [Adolescent] this term only

#16 (child* or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or "young people" or (young next person*) or schoolchild* or (school next child*) or youth or youths):ti,ab,kw

#17 (school* next (based or setting or student*)):ti,ab,kw

#18 (#13 OR #14 OR #15 OR #16 OR #17)

#19 (#12 and #18)

Ovid multi-file search

APA PsycInfo <1806 to April Week 3 2022>

Embase <1974 to 2022 April 25>

Ovid MEDLINE(R) ALL <1946 to April 25, 2022>

1 exp overweight/ or exp body weight changes/ or body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ or body mass index/ or adiposity/

2 1 use medall

3 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ or *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ or *body mass/ or *waist to height ratio/ or *waist hip ratio/

4 3 use oemezd

5 exp overweight/ or weight control/ or weight loss/ or weight gain/

6 5 use psyh

7 (2 or 4 or 6)

8 (obes* or adipos* or weight gain or weight loss or overweight or over weight or overeat* or over eat* or weight change*).mp.

9 ((bmi? or body mass index) adj2 (alter* or assess* or calculat* or change? or changing or differ* or gain or increas* or decreas* or loss or reduc* or post-intervention* or postintervention* or follow* up* or followup*)).mp.

10 (BMIz or BMI-z* or zBMI* or z-BMI*).mp.

11 (BMI* adj2 (z-scor* or zscor*)).mp.

12 or/7-11

13 exp child/ or preschool child/ or school child/ or adolescent/

14 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or young people or young person? or schoolchild* or youth or youths).tw.

15 (school? adj (based or setting student?)).tw.

16 or/13-15

17 (12 and 16)

18 exp randomized controlled trial/

19 randomized controlled trial.pt.

20 Randomization/ or Random Allocation/

21 (randomi#ed or randomi#ation or randomi#ing).mp.

22 (RCT or cRCT).tw.

23 "at random".ab.

24 (random* adj3 (administ* or allocat* or assign* or class* or cluster or crossover or cross-over or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or pragmatic or quasi or recruit* or selected or split or subsitut* or treat*)).tw.

25 ((single or double or triple or treble) adj2 (blind* or mask* or dummy)).mp.

26 trial.ti.

27 (prevention adj (study or trial)).tw.

28 (intervention and trial).tw.

29 program.ti. and trial.tw.

30 ((intervention or program) and control* and (group? or school? or communit*)).tw.

31 ((intervention or program) adj5 (control* or group? or study or trial)).tw.

32 controlled clinical trial.mp.

33 or/18-32

34 (17 and 33)

35 remove duplicates from 34

****

Appendix 3. Extracted data

Appendix 3: Information extracted from study reports

We collected the following data from study reports.

- Methods: study design (including number of clusters in cluster-RCTs); total duration of study; details of any 'run in' period; number of study centres and location; study setting; date of study.
- Participants: numbers randomised, lost to follow-up/withdrawn and analysed; age (mean and range); sex; exclusion criteria.
- Baseline zBMI, BMI and/or BMI percentile.
    - For studies that did not report any of these measurements we instead collected data on the prevalence of overweight/obesity at baseline (if available).
- Interventions: description of experimental and comparator interventions, such as type of intervention, duration of intervention, setting, theory behind the intervention, unit of intervention (who is targeted), who delivers the intervention.
- Outcomes: zBMI (mean and SD); BMI (mean and SD); BMI percentile (mean and SD); numbers of reported serious adverse events. For studies that did not report one of the three primary outcomes, we instead collected the prevalence of overweight/obesity at the follow up time (if available).
    - Time points: as described under types of outcome measures in the Methods section;
    - Measurement: we recorded whether BMI and zBMI were self-reported (by parent or child) or measured by researchers;
    - Effect estimates (contrast-level data): we collected contrast-level data on BMI, zBMI and BMI percentile according to these preferences:
        - post-intervention difference in means adjusted for baseline zBMI/BMI/BMI percentile from analysis of covariance; in preference to
        - difference in mean change from baseline; in preference to
        - post-intervention difference in means (unadjusted).
    - Follow up measurements (arm level data): we collected arm-level data on BMI, zBMI and BMI percentile according to these preferences:
        - post-intervention means adjusted for baseline BMI/zBMI/percentile; in preference to

        - change from baseline means (change scores); in preference to
        - post-intervention means (unadjusted)
    - Effect estimates from cluster-RCTs: we collected BMI, zBMI and BMI percentile results that were adjusted for clustering in preference to results that are not adjusted for clustering;
- PROGRESS factors;
- Information about the costs of interventions, for the purposes of secondary analysis by healthcare policymakers (we did not analyse costs in this review, but we have reported this information in a table);
- Notes: funding for trial, and notable conflicts of interest of trial authors.

Appendix 4. Statistical details

4.1 Details of statistical method

4.1.1 Selecting outcome data

We aimed to combine data on mean differences between groups in change-from-baseline measures (of zBMI/BMI/percentile). Since most studies reported arm-level data rather than contrast level data and because many contrast level estimates came from models that were either not fully explained or involved a high level of covariate adjustment, we decided to prioritize arm level data where available. Arm level data were prioritized as follows (i) follow-up means adjusted for baseline values, (ii) mean change from baseline (change scores), (iii) unadjusted baseline and follow-up means, (iv) unadjusted follow-up means without baseline data. In the absence of arm-level data we collected contrast-level data if they could be interpreted as a measure of mean difference in change from baseline.

4.1.2 Calculation of mean differences from arm level data

For options (i), (ii) and (iv) above we calculate the mean difference (MD) and its standard error (SE) in the same way. We label the arm level means as , standard deviations (SDs) as , and participant numbers (at follow up) as where represents the two intervention groups. The MD and SE are then calculated as follows,

$MD = m_A - m_B$

$SE = \sqrt{(s_A^2/n_A + s_B^2/n_B)}.$

For option (iii) we label the baseline variables with the subscript 0 and follow-up variables with the subscript 1. The MD and SE are then

$MD = (m_{A1} - m_{A0}) - (m_{B1} - m_{B0})$

$SE = \sqrt{(s_{A0}^2/n_{A0} + s_{A1}^2/n_{A1} + s_{B0}^2/n_{B0} + s_{B1}^2/n_{B1} - 2\rho(s_{A0}s_{A1}/\sqrt{(n_{A0}n_{A1})} + s_{B0}s_{B1}/\sqrt{(n_{B0}n_{B1})}))},$

where ρ is the correlation coefficient between baseline and follow-up measurements, given by given by

$\rho = (s_0^2 + s_1^2 - s_{CS}^2)/2s_0s_1,$

where s_{CS} is the standard deviation on the change score (CS). Based on our analysis of similar studies (Spiga TBD) we imputed a value of ρ=0.95.

4.1.3 Cluster adjustment

The majority of studies were cluster randomized. For each result, we assessed whether the authors had adjusted for clustering in their reported precision. For those that had not, we accounted for the effect of clustering by adjusting the standard error on the mean difference via

$SE' = SE\sqrt{(1 + \text{ICC}(c-1))},$

where SE' is the adjusted standard error, c is the mean cluster size (= number of participants divided by the number of clusters), and ICC is the intra-cluster correlation coefficient. We discuss choices for the value of ICC in Section 4.1.3.1. We decided not to adjust for clustering at the family level as the cluster sizes were very small.

4.1.3.1 Intra-cluster correlation coefficient

Most studies that required cluster adjustment did not report the relevant ICC. For these studies we used ICC=0.02, a value imputed based on our previous analysis of similar studies (Spiga TBD). This value was consistent with the median ICC reported in trials in this data set (also equal to 0.02).

Some studies assumed an ICC value in their sample size calculations. These values were usually based on external evidence. The median across all the assumed ICCs was 0.04. In line with this result and our previous analysis of similar studies (Spiga TBD) we performed a sensitivity analysis using ICC=0.04 and with ICC=0 (i.e. no cluster adjustment).

4.2 Data extraction and imputation

4.2.1 General methods

4.2.1.1 Combining results from subgroups

18 studies reported data on the subgroup level only. Usually this meant the results were stratified by sex. To use these results in the meta-analysis we had to combine the subgroup results. We label the mean, standard deviation, and number of participants in each subgroup as m_i, s_i and n_i where the subscript $i \in (a, b)$ labels subgroups a and b. The mean and standard deviation of the combined subgroups are calculated via Higgins 2019b

$m_{a+b} = (n_a m_a + n_b m_b)/(n_a+n_b)$,

$s_{a+b}^2 = ((n_a-1)s_a^2 + (n_b-1)s_b^2)/(n_a+n_b-1) + ((n_a n_b/(n_a+n_b))(m_a 2+m_b^2-2m_a m_b)/(n_a+n_b-1)$.

For results with more than two subgroups these equations can be applied sequentially.

4.2.1.2 Multiple follow up times

Follow-up times were categorized into three groups: (i) short term [3 to <9 months], (ii) medium term [9 to <15 months], (iii) long term [15 months]. For any studies that reported more than one follow-up time within categories (i) and (ii) we chose the time point that was closest to the mid-point of the interval (6 and 12 months respectively). For studies that reported more than one long term time point, we chose the longest follow-up time.

4.2.1.3 Estimating zBMI from proportions of overweight/with obesity

In some studies, the only outcome data available were the proportion of participants classified as overweight or with obesity. Since definitions of overweight/obesity are based on zBMI or equivalent percentile cut offs, we used these data to estimate zBMI means. The Centers for Disease Control and Prevention (CDC) charts define a child as being overweight if their BMI exceeds the 85th percentile for their age and sex and define obesity as a BMI greater than or equal to the 95th percentile. The World Health Organization (WHO) classify an overweight child as one whose zBMI exceeds 1 and obesity is defined as zBMI > 2. We can convert between zBMI and percentile cut offs using the standard normal cumulative distribution,

$p_c = \Phi(z_c)$,

$z_c = \Phi^{-1}(p_c)$,

where z_c is the zBMI cut-off for overweight and obesity, p_c is the equivalent percentile cut-off and $\Phi(z) = Pr(Z \leq z)$ is the cumulative distribution function (CDF) of a variable z with a standard normal distribution. For each study we used the zBMI or percentile cut off reported by the growth chart or classification index used to define overweight/obesity in that study. In the following we will use η_c to represent the proportion of participants whose zBMI exceeds the threshold z_c

For a normally distributed variable $X = \mu + Z\sigma$ with mean μ and standard deviation σ the CDF is

$Pr(X \leq x) = Pr(\mu + Z\sigma \leq x) = \Phi((x-\mu)/\sigma)$.

Furthermore, from the CDF we can write

$Pr(Z > z) = 1 - \Phi(z)$.

Therefore, to estimate mean zBMI from the proportion of participants classified as overweight or with obesity we assume that zBMI sampled within a trial follows a (non-standard) normal distribution, $X \sim N(\mu_z, \sigma_z^2)$, with mean μ_z and standard deviation σ_z. The probability that a sampled value of zBMI exceeds the zBMI cut off for overweight and obesity is then

$Pr(X > z_c) = Pr(Z > (z_c-\mu_z)/\sigma_z) = 1 - \Phi((z_c-\mu_z)/\sigma_z)$,

where $Z \sim N(0,1)$ represents a standard normal random variable. The proportion of participants, η_c, with zBMI greater than z_c is an estimate of the probability $Pr(X > z_c)$. Therefore, inserting this estimate into the above equation gives

$\eta_c = 1 - \Phi((z_c-\mu_z)/\sigma_z)$,

$(z_c-\mu_z)/\sigma_z = \Phi^{-1}(1- \eta_c)$.

By definition, the population standard deviation of zBMI is equal to 1. Therefore, in order to estimate μ_z, we assume that the sample standard deviation is equal to the population standard deviation. Inserting $\sigma_z=1$ into the above equation gives

$\mu_z \approx z_c - \Phi^{-1}(1- \eta_c)$.

This is the equation we used to convert overweight/obesity proportions into estimates of mean zBMI. If the study reported the proportions of participants that were classified as overweight and with obesity separately then these values were summed to give the value of η_c. If the study only reported the prevalence of obesity then we used this as η_c and replaced z_c with the zBMI cut off for obesity.

Because of the strong assumptions involved in this method (of normality with known standard deviations), to avoid unstable estimates of proportions we chose a threshold of 100 participants per arm for implementing transformations of proportions to means. Therefore, we omit from the meta-analysis any study that reports proportions of overweight/obesity as their only outcome and has fewer than 100 participants per arm at any time point.

4.2.1.4 Missing follow-up SDs and participant numbers

For any study that did not report standard deviations or any other measure of precision on their follow-up means, we set the follow-up SDs equal to the baseline SDs in each group. From inspection of other studies in the data set in which both baseline and follow-up precisions were reported, this was deemed a reasonable assumption as these values tended to be very similar.

In a similar vein, for any study that did not explicitly report the number of participants at follow-up or the number of dropouts during the study, we assumed that the number of participants at follow-up was equal to the number at baseline.

4.2.1.5 Missing precisions

For any study that reported no measure of precision on any of their zBMI means, we assumed a standard deviation of 1 (equal to the standard deviation of the population). This assumption was supported from inspection of studies that did report precision on zBMI as these SDs were approximately equal to 1.

To impute missing precisions on BMI percentiles we performed a simulation. We sampled 10^4 zBMI values from a standard normal distribution (mean = 0, SD = 1) and converted each value to a percentile using the CDF of the standard normal, $p = \Phi(z)$. The standard deviation of these percentiles was 28.9. This was similar to the median of percentile SDs in the rest of the data set (27.3). We therefore used 28.9 as our imputed SD for arm level percentile means.

For BMI studies with missing precisions we imputed values from SDs reported in the rest of the data set. The median of SDs on arm level BMI means was 3.3. We observed little difference in SD at baseline compared to follow up.

For missing precisions on change scores for all outcomes we assumed equal baseline and follow up SDs (equal to the imputed arm level SDs) and a correlation coefficient of 0.95, and calculated

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

4.2.1.6 Reading values from graphs

When studies only reported outcomes in the form of a graph we used the Engauge Digitizer 4.1 software (Mitchell, Muftakhidinov and Winchen 2020) to extract the plotted values.

4.2.2 Notes on specific trials

4.2.2.1 Adab 2018

Participants in this study were recruited in two waves (group 1 and group 2). Three long term follow up values are reported. The longest follow up includes only participants in the first group (group 1) and thus has only half the number of participants compared with the other two follow up times. Therefore, we chose to use the second longest follow up.

4.2.2.2 Annesi 2016

This study is missing a measure of precision on baseline and follow up percentile means. We imputed arm level percentile SDs using the methods described in Section 4.2.1.5.

4.2.2.3 Annesi 2017

This study is missing precision on follow-up means. We assumed SD at follow-up was equal to SD at baseline.

4.2.2.4 Coleman 2012

We imputed mean zBMI from the proportion of participants with obesity at baseline and follow up using the methods described in Section 4.2.1.3.

This study includes two follow up times but does not report group-specific participant numbers at the first follow up. At baseline and the second follow-up we calculate the ratio of the number of participants in each group relative to the total. We take the average of each ratio across the baseline and second follow up. We assume the ratio of participants in each group relative to the total at the first follow up is equal to the average ratio at the other times. We use this ratio and the total number of participants at the first follow up to impute the group specific values.

4.2.2.5 Cunha 2013

This study reports a time by interaction coefficient from a mixed model based on three time points: 0, 6 and 9 months. We converted the coefficient to a mean difference by multiplying by the longest time period (9 months).

The coefficient is reported alongside a p value. We converted this to a standard error using a 2-tailed t-test (Higgins 2019b). We multiplied this value by 9 months to convert it to the correct scale.

4.2.2.6 De Heer 2011

This study reports change scores with p values. We imputed SEs on the change scores using the p values and assuming a 2-tailed t-test (Higgins 2019b).

4.2.2.7 De Ruyter 2012

This study includes baseline measurements and three follow up times: 6, 12 and 18 months. Measurements at all four time points are plotted on a graph. A change score is reported for the 18 month follow up. We read the baseline, 6- and 12-month values (means and SEs) off the graph using the Engauge Digitizer software (Mitchell, Muftakhidinov and Winchen 2020).

4.2.2.8 Fulkerson 2010

This study is missing a measure precision on zBMI and percentiles. We imputed the SDs on arm level means using the methods described in Section 4.2.1.5.

4.2.2.9 Greve 2015

This study takes place over three school years from 2009 to 2012. The number of participants in each grade (0,1,5,9) in each school year (2009/10, 2010/11, 2011/12) are reported. The total number across the grades and across all school grades is also provided. The estimated coefficient uses all of this data. To calculate the total number of participants that contribute to the analysis we must not double count participants; students in grade 1 in the second year will have been in grade 0 in the first year and students in grade 1 in the third year will have been in grade 0 in the second year. Therefore, we subtracted the number of participants in grade 1 at year 2 and year 3 from the total number provided.

4.2.2.10 Ha 2021

This study is missing a measure of precision on BMI at all time points. We imputed SD on arm level BMI means using the method described in Section 4.2.1.5.

4.2.2.11 Han 2006

We imputed mean zBMI from the proportion of overweight and obese participants at baseline and follow up using the methods described in Section 4.2.1.3. We could not identify what reference was used to define overweight and obesity in this study. Since the study is set in China we used the definition provided by the Working Group for Obesity in China (WGOC) (Li 2008).

4.2.2.12 Hendy 2011

BMI percentile is plotted in figures at two follow up times (3 and 9 months). Baseline percentile is only shown in the 3-month figure. We read baseline and 3 month follow up values off the figure using the Engauge Digitizer software (Mitchell, Muftakhidinov and Winchen 2020). We excluded the 9-month figure as it is not shown with respect to a relevant baseline.

We imputed SDs on the arm level percentile means using the methods described in Section 4.2.1.5.

4.2.2.13 Hopper 2005

This study is missing a measure of precision on BMI at all time points. We imputed SD on arm level BMI means using the method described in Section 4.2.1.5.

4.2.2.14 Howe 2011

Results are presented for subgroups of ‘attenders’ and ‘non-attenders’. In line with an intention to treat analysis, we combined results from the different subgroups using the methods outlined in Section 4.2.1.1.

4.2.2.15 Hull 2018

The study reports intervention effects at two follow up times reported as the difference in ‘growth rate’ between the intervention and control groups. Growth rate is described in the paper as the ‘outcome variable divided by the number of months between baseline and follow up’. Therefore, we multiplied each intervention effect and its SE by the number of follow up months.

4.2.2.16 Ickovics 2019

This study presents results on a factorial level (Diet vs No Diet and Activity vs No Activity) and on a non-factorial level (Diet vs Activity vs Diet and Activity vs Control). We chose to use the non-factorial results as this informs more comparisons.

Change scores are reported without a measure of precision, but they do report precision on baseline means. Therefore, we impute the SD on the change score using

$$s_{cs} = s_0\sqrt{2(1 - \rho)}$$

assuming a correlation coefficient of 0.95 and that follow up SDs are equal to baseline SDs.

4.2.2.17 Jansen 2011

We combined results from the different subgroups (grades) using the methods outlined in Section 4.2.1.1.

4.2.2.18 Jones 2015

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.19 Kain 2014

We combined BMI results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

zBMI results are presented per cluster. We take the weighted mean of these values with weights equal to the participant number in each cluster. We calculate the variance on these means as the sum of the between cluster variance and the within cluster variance. The between cluster variance is the square of the standard deviation across the cluster means (with no weighting). The within cluster variance is the pooled SD,

$$SD_W = \sqrt{(\sum_{i=1}^{N}(n_i - 1)s_i^2)/(\sum_{i=1}^{N}(n_i - 1))}$$

where *i* labels each cluster, is the number of participants in cluster and is the SD in cluster . We calculate the intra-cluster correlation coefficient as the between cluster variance divided by the sum of the between cluster variance and within cluster variance. We then adjust the variance on each group mean using the ICC and mean cluster size.

4.2.2.20 Keller 2009

Here results are presented for two groups: those who wanted to participate (active) and those who did not (observed). Results for the observed group at follow up are stratified by boys and girls.

We combined the follow up means for the observed group in the two subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

In line with an intention to treat analysis, we combined results from the different subgroups (active and observed) using the methods outlined in Section 4.2.1.1.

4.2.2.21 Kobel 2017

This study reports the total number of participants per group at baseline and the total number of missing values per time point. That is, we do not know the number missing per group at each time point. We assumed the ratio of number missing in group A to number missing in group B is the same as the ratio of the total number in group A to the total number in group B at baseline. We then used the imputed missing values to calculate the number in each group at the follow up times.

4.2.2.22 Lazaar 2007

Here, results are stratified by sex but they do not report the number of participants per sub group (boys and girls) in the two intervention groups. The study reports the number of boys and girls in the overall population. We assumed the ratio of boys to girls in each intervention arm is the same as the ratio of boys to girls in the total population.

We then combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.23 Levy 2012

We imputed mean zBMI at baseline and follow up from the proportion of participants that were classified as overweight or with obesity using the methods described in Section 4.2.1.3.

We then combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.24 Marcus 2009

We imputed the missing SD on zBMI change scores using the methods described in Section 4.2.1.5.

4.2.2.25 Martinez-Vizcaino 2014

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.26 Martinez-Vizcaino 2020

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.27 Martinez-Vizcaino 2022

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.28 Nyberg 2015

This study reports a change score at short term follow up without a precision. We assume the follow up SD is the same as the baseline SD (reported in the study) and a correlation coefficient of 0.95 to calculate

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

We imputed mean zBMI at the second follow up (medium term) from the proportion of participants that were classified as overweight or with obesity at baseline and follow up using the methods described in Section 4.2.1.3.

4.2.2.29 Pena 2021

This study does not report the group specific participant numbers at follow up. We used the group specific participant numbers at baseline and the total number at follow up to impute these values. We assumed that the rate of reduction in each group is the same and equal to the rate of reduction in the total population.

4.2.2.30 Rerksuppaphol 2017

We imputed the missing SD on BMI change score using the methods described in Section 4.2.1.5.

4.2.2.31 Robinson 2010

This study reports a 'change per year' from a regression analysis including baseline and four follow up measurements: 6, 12, 18 and 24 months. We converted the change per year measurement to a mean difference by multiplying by 2 years (the maximum follow-up time).

4.2.2.32 Rush 2012

We combined results from the different subgroups (age categories) using the methods outlined in Section 4.2.1.1.

4.2.2.33 Senguin-Fawler 2021

We imputed SE on the mean difference from the reported p value using a 2-tailed t-test (Higgins 2019b).

4.2.2.34 Sekhavat 2014

We combined results from the different subgroups (age categories and sex) using the methods outlined in Section 4.2.1.1.

4.2.2.35 Sgambato 2019

This study reports change scores without a measure of precision but reports a p value for a group by time interaction effect (without quoting the effect itself). We calculated the mean difference from the reported change scores and imputed a SE from the p value assuming a z-test (Higgins 2019b).

4.2.2.36 Simon 2008

BMI results at medium term follow up are reported for non-overweight participants and participants without obesity only. Participant numbers for this subgroup are not reported at follow up. We assumed the ratio of drop out in each group in the non-overweight/obese subset was equal to the ratio of dropout rate per group in the total population.

In this study precision on baseline means at BMI medium term are not adjusted for clustering but precision at follow up are adjusted for clustering. We converted the adjusted SEs to effective standard deviations and assumed that SD at baseline was equal to SD at follow up. We then treated the resulting SEs from the analysis as adjusted.

4.2.2.37 Spiegel 2006

We imputed mean zBMI at baseline and follow up from the proportion of participants that were classified as overweight and with obesity using the methods described in 4.2.1.3.

4.2.2.38 Tanskey 2017

This study reports regression coefficients described in the study as being the mean change in outcome (BMI or zBMI) in the intervention group relative to control 'expressed on a per month basis'. The final follow up time is approximately one year so we multiplied the coefficients and their SEs by 12 months to calculate MDs and SEs.

This is a multi-arm study without complete arm level data. Therefore, we need to impute the covariance between the different arms of the study which is equal to variance on the change score in the reference (control) arm. We converted each variance on MD to a variance on CS in the reference arm by assuming the standard deviation in all the arms are equal. We used the fact that the variance on the mean difference is a sum of the variances on change score in the two arms. Writing the variances in terms of standard deviations, , and participant numbers, , in each arm gives,

$SE^2_{MD} = (s_A^2/n_A)+(s_B^2/n_B)$

Then we assumed the standard deviations in the different arms are equal, $s_A = s_B$, and rearranged for s_B .

Finally, we converted the standard deviation on the reference arm to a variance using the standard relation, $Var_B = SE^2_B = s^2_B/n_B$. We computed this for each of the arms in the trial and averaged the result.

4.2.2.39 Telford 2012

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

We then imputed the missing SD on BMI using the method described in 4.2.1.5.

4.2.2.40 Topham 2021

This study reports a coefficient for the 'intervention condition' from a random intercept model on 'BMI log transformed for skew'. The study also reports a coefficient of change (per year) in the control group on log transformed BMI. We assume that the coefficient for the intervention condition is equal to the difference between the coefficient of change in the intervention and control groups. We use this to impute the coefficient of change in the intervention group. We then convert the coefficients of change per year in each group to change scores by multiplying by 3.3 years (the maximum follow-up time).

We follow Method 3 of Higgins 2008 to convert the effect estimate to the linear scale. In this method we calculate the geometric mean using our imputed change scores as the means of the log-transformed values. The difference in means on the logarithmic scale (and its SE) is the coefficient for the intervention condition (and its SE) multiplied by the time difference (3.3 years). The effect estimate on the linear scale is then the difference in means on the logarithmic scale multiplied by the geometric mean. Similarly, the SE on the linear scale is the SE on the logarithmic scale multiplied by the geometric mean. We use this estimate as an imputed value of the mean difference and its SE.

This is a multi-arm study without complete arm level data. Therefore, we need to impute the covariance between the different arms of the study which is equal to variance on the change score in the reference (control) arm. The study reports the SD on BMI at baseline in the control arm. We assume follow up SD is equal to baseline SD and that the correlation coefficient is 0.95, such that we can calculate the standard deviation on the change score in the control arm using

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

We then calculate the standard error on the change score by dividing the standard deviation by the square root of the sample size in the control arm. Finally, the variance in the reference arm (equal to the covariance between the intervention arms) is the square of the standard error.

4.2.2.41 Viggiano 2018

This study does not report standard deviations on baseline means. We imputed these by averaging the SDs reported at the two follow up times.

4.2.2.42 Vizcaino 2008

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 3.2.1.1.

4.2.2.43 Wang 2012

We imputed mean zBMI at baseline and follow up from the proportion of participants that were classified as overweight and with obesity using the methods described in 3.2.1.3. We could not identify what reference was used to define overweight and obesity in this study. Since the study was set in China we used the definition from the Working Group for Obesity in China (WGOC) (Li 2008).

4.2.2.44 Wendel 2016

This study reports data for intervention groups that:

- Began with treatment and continued with treatment (TT)
- Began with treatment and switched to control (TC)
- Began with control and switched to treatment (CT)
- Began with control and stayed on control (CC)

In line with an intention to treat analysis, we combined results from (i) TT and TC and (ii) CT and CC using the methods outlined in Section 4.2.1.1.

4.2.2.45 Williamson 2012

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.46 Xu 2017

Here, results are stratified by weight status: overweight/with obesity, normal weight and malnourished. We used the results for normal weight. However, the study does not report the number of participants in this subset. Instead, we have the total number of participants and the percentage with overweight/obesity. We assumed that the number of malnourished participants is small and took the number of normal weight participants to be equal to the number of participants without overweight or obesity.

Appendix 5. Supplementary data files for cluster adjustment

The following table lists all the cluster randomized trials along term with values of the original standard errors (using values reported in the trials) and standard errors that we subsequently adjusted for clustering. The table also includes the data used to calculate the adjusted errors.

Study	Outcome	Sample size	Number of clusters	Original SE	Is cluster adjustment required?	Mean cluster size	Reported ICC	ICC used in analysis	Cluster-adjusted SE
Adab 2018	zBMI long term	1094	54	0.0281	Y	20.26	0.0051	0.0051	0.0294
Annesi 2016	BMI short term	114	9	0.1255	Y	12.67	n/a	0.02	0.1394
Annesi 2016	BMI medium term	114	9	0.1624	Y	12.67	n/a	0.02	0.1804
Annesi 2016	Percentile medium term	114	9	1.7744	Y	12.67	n/a	0.02	1.9706
Annesi 2017	BMI short term	141	9	0.0962	Y	15.67	n/a	0.02	0.1094
Annesi 2017	BMI medium term	141	9	0.1603	Y	15.67	n/a	0.02	0.1823
Barnes 2015	zBMI short term	48	40	0.0920	N	1.20	n/a	n/a	0.0920
Barnes 2021	zBMI medium term	323	6	0.0404	Y	53.83	0.017	0.02	0.0579
Barnes 2021	zBMI medium term	442	6	0.0383	Y	73.67	0.017	0.02	0.0600
Barnes 2021	zBMI medium term	362	6	0.0393	Y	60.33	0.017	0.02	0.0581
Barnes 2021	BMI medium term	323	6	0.1230	Y	53.83	0.017	0.02	0.1764
Barnes 2021	BMI medium term	442	6	0.1156	Y	73.67	0.017	0.02	0.1811
Barnes 2021	BMI medium term	362	6	0.1208	Y	60.33	0.017	0.02	0.1787
Brandstetter 2012	BMI long term	945	32	0.0689	N	29.53	n/a	n/a	0.0689
Branscum 2013	Percentile short term	70	12	2.0539	Y	5.83	n/a	0.02	2.1509
Breheny 2020	zBMI short term	1643	40	0.0203	Y	41.08	0.005	0.005	0.0223
Breheny 2020		1670	40	0.0213	Y	41.75	0.001	0.001	0.0217
Caballero 2003	BMI long term	1409	41	0.1658	N	34.37	n/a	n/a	0.1658
Cao 2015	zBMI medium term	1706	14	0.0026	Y	121.86	n/a	0.02	0.0048
Cao 2015	zBMI long term	1813	14	0.0036	Y	129.50	n/a	0.02	0.0068
Choo 2020	zBMI short term	104	8	0.0808	Y	13.00	n/a	0.02	0.0900
Clemes 2020	BMI short term	166	8	0.1165	Y	20.75	n/a	0.02	0.1376
Coleman 2012	zBMI medium term	480	8	0.0287	Y	60.00	n/a	0.02	0.0424
Coleman 2012	zBMI long term	424	8	0.0317	Y	53.00	n/a	0.02	0.0453
Crespo 2012	zBMI medium term	350	7	0.0370	Y	50.00	0.016	0.016	0.0494
Crespo 2012	zBMI medium term	372	7	0.0370	Y	53.14	0.016	0.016	0.0501
Crespo 2012	zBMI medium term	401	7	0.0345	Y	57.29	0.016	0.016	0.0475
Crespo 2012	zBMI long term	217	7	0.0537	Y	31.00	0.016	0.016	0.0653
Crespo 2012	zBMI long term	230	7	0.0487	Y	32.86	0.016	0.016	0.0599
Crespo 2012	zBMI long term	262	7	0.0462	Y	37.43	0.016	0.016	0.0581
Crespo 2012	Percentile medium term	350	7	0.9098	Y	50.00	0.016	0.016	1.2152
Crespo 2012	Percentile medium term	372	7	0.8708	Y	53.14	0.016	0.016	1.1794
Crespo 2012	Percentile medium term	401	7	0.8473	Y	57.29	0.016	0.016	1.1681
Crespo 2012	Percentile long term	217	7	1.3602	Y	31.00	0.016	0.016	1.6548

Crespo 2012	Percentile long term	230	7	1.3427	Y	32.86	0.016	0.016	1.6498
Crespo 2012	Percentile long term	262	7	1.2367	Y	37.43	0.016	0.016	1.5559
Cunha 2013	BMI medium term	559	20	0.0231	N	27.95	0.07	n/a	0.0231
Damsgaard 2014	zBMI short term	823	9	0.0077	N	91.44	n/a	n/a	0.0077
Davis 2021	zBMI medium term	3135	16	0.0361	Y	195.94	n/a	0.02	0.0798
Davis 2021	BMI medium term	3135	16	0.1140	Y	195.94	n/a	0.02	0.2524
Davis 2021	Percentile medium term	3135	16	0.9485	Y	195.94	n/a	0.02	2.0993
De Bock 2013	BMI short term	660	37	0.0404	Y	17.84	0.043	0.043	0.0531
De Bock 2013	BMI medium term	572	37	0.0511	Y	15.46	0.043	0.043	0.0651
de Greeff 2016	BMI short term	376	12	0.0700	N	31.33	n/a	n/a	0.0700
De Heer 2011	BMI short term	568	85	0.1449	N	6.68	n/a	n/a	0.1449
De Heer 2011	Percentile short term	568	85	1.6689	N	6.68	n/a	n/a	1.6689
Donnelly 2009	BMI long term	1490	24	0.0986	N	62.08	n/a	n/a	0.0986
Drummy 2016	BMI short term	107	14	0.1862	Y	7.64	n/a	0.02	0.1981
Duncan 2019	BMI short term	589	16	0.0040	N	36.81	n/a	n/a	0.0040
Elder 2014	zBMI medium term	488	30	0.0267	Y	16.27	0.038	0.038	0.0335
Elder 2014	zBMI long term	489	30	0.0282	Y	16.30	0.038	0.038	0.0354
Elder 2014	BMI medium term	488	30	0.1027	Y	16.27	0.038	0.038	0.1291
Elder 2014	BMI long term	489	30	0.1307	Y	16.30	0.038	0.038	0.1644
Elder 2014	Percentile medium term	488	30	0.7302	Y	16.27	0.038	0.038	0.9179
Elder 2014	Percentile long term	489	30	0.7690	Y	16.30	0.038	0.038	0.9670
Fairclough 2013	zBMI short term	221	12	0.1217	N	18.42	0.18	n/a	0.1217
Fairclough 2013	BMI short term	221	12	0.2857	N	18.42	0.17	n/a	0.2857
Farmer 2017	zBMI medium term	715	16	0.0264	Y	44.69	n/a	0.02	0.0361
Farmer 2017	zBMI long term	624	16	0.0294	Y	39.00	n/a	0.02	0.0390
Farmer 2017	BMI medium term	715	16	0.0803	Y	44.69	n/a	0.02	0.1099
Farmer 2017	BMI long term	624	16	0.1146	Y	39.00	n/a	0.02	0.1520
Foster 2008	zBMI long term	843	10	0.0357	N	84.30	n/a	n/a	0.0357
Foster 2008	BMI long term	843	10	0.1173	N	84.30	n/a	n/a	0.1173
Gentile 2009	BMI short term	1201	10	0.1567	Y	120.10	n/a	0.02	0.2883
Gentile 2009	BMI medium term	1116	10	0.0712	Y	111.60	n/a	0.02	0.1276
Greve 2015	BMI long term	12919	31	0.0920	N	416.74	n/a	n/a	0.0920
Grydeland 2014	zBMI long term	1324	37	0.0276	Y	35.78	0.02	0.02	0.0359
Grydeland 2014	BMI long term	1324	37	0.0570	Y	35.78	0.02	0.02	0.0743
Ha 2021	BMI short term	148	171	0.1698	N	0.87	n/a	n/a	0.1698
Ha 2021	BMI medium term	118	171	0.1987	N	0.69	n/a	n/a	0.1987
Habib-Mourad 2014	BMI short term	363	8	0.1576	Y	45.38	n/a	0.02	0.2165

Habib-Mourad 2020	zBMI long term	806	36	0.0722	N	22.39	n/a	n/a	0.0722
Haire-Joshu 2010	zBMI short term	223	112	0.2687	N	1.99	n/a	n/a	0.2687
Han 2006	zBMI long term	2670	10	0.0122	Y	267.00	n/a	0.02	0.0307
Hannon 2018	Percentile short term	144	92	1.3877	N	1.57	n/a	n/a	1.3877
Hannon 2018	Percentile medium term	154	98	1.4719	N	1.57	n/a	n/a	1.4719
HEALTHY Study Group 2010	zBMI long term	4603	42	0.0101	Y	109.60	n/a	0.02	0.0180
Hendrie 2011	zBMI short term	140	93	0.0638	Y	1.51	n/a	0.02	0.0641
Hendrie 2011	BMI short term	140	93	0.1839	Y	1.51	n/a	0.02	0.1848
Hopper 2005	BMI short term	238	6	0.1379	Y	39.67	n/a	0.02	0.1836
Hull 2018	zBMI short term	206	168	0.2587	N	1.23	0.393	n/a	0.2587
Hull 2018	zBMI long term	169	142	0.3224	N	1.19	0.142	n/a	0.3224
Hull 2018	BMI short term	206	168	0.6260	N	1.23	0.257	n/a	0.6260
Hull 2018	BMI long term	169	142	0.9673	N	1.19	0.064	n/a	0.9673
Ickovics 2019	Percentile long term	265	6	1.1541	Y	44.17	0	0	1.1541
Ickovics 2019	Percentile long term	291	6	1.1704	Y	48.50	0	0	1.1704
Ickovics 2019	Percentile long term	265	6	1.1509	Y	44.17	0	0	1.1509
James 2004	zBMI medium term	574	29	0.0383	N	19.79	0	n/a	0.0383
James 2004	zBMI long term	434	29	0.0533	N	14.97	0	n/a	0.0533
James 2004	BMI medium term	574	29	0.0982	N	19.79	0.01	n/a	0.0982
James 2004	BMI long term	434	29	0.1608	N	14.97	0.01	n/a	0.1608
Jansen 2011	BMI short term	2622	20	0.0470	Y	131.10	0.01	0.01	0.0713
Kain 2014	zBMI medium term	1468	9	0.0620	N	163.11	n/a	n/a	0.0620
Kain 2014	BMI medium term	1474	9	0.0467	Y	163.78	n/a	0.02	0.0963
Keshani 2016	BMI medium term	171	8	0.1979	Y	21.38	n/a	0.02	0.2348
Kipping 2008	BMI short term	472	19	0.1862	N	24.84	0.02	n/a	0.1862
Kipping 2014	zBMI short term	1825	60	0.0146	Y	30.42	0.02	0.02	0.0184
Kipping 2014	zBMI long term	1793	60	0.0152	Y	29.88	0.02	0.02	0.0191
Kobel 2017	BMI medium term	479	91	0.0785	Y	5.26	n/a	0.02	0.0818
Kobel 2017	Percentile medium term	479	91	0.8477	Y	5.26	n/a	0.02	0.8831
Kocken 2016	zBMI short term	1064	43	0.0231	Y	24.74	n/a	0.02	0.0281
Kocken 2016	zBMI long term	838	38	0.0258	Y	22.05	n/a	0.02	0.0308
Kovalskys 2016	zBMI long term	760	8	0.0430	Y	95.00	n/a	0.02	0.0730
Kriemler 2010	BMI medium term	502	15	0.0799	Y	33.47	0.01	0.01	0.0919
Kriemler 2010	BMI long term	296	15	0.1611	Y	19.73	0.01	0.01	0.1755
Lazaar 2007	zBMI short term	325	19	0.0184	Y	17.11	n/a	0.02	0.0212
Lazaar 2007	BMI short term	325	19	0.0414	Y	17.11	n/a	0.02	0.0477
Lent 2014	zBMI medium term	596	10	0.0302	Y	59.60	n/a	0.02	0.0445

Lent 2014	zBMI long term	511	10	0.0348	Y	51.10	n/a	0.02	0.0492
Lent 2014	BMI medium term	596	10	0.1699	Y	59.60	n/a	0.02	0.2504
Lent 2014	BMI long term	511	10	0.2153	Y	51.10	n/a	0.02	0.3046
Lent 2014	Percentile medium term	596	10	0.7865	Y	59.60	n/a	0.02	1.1592
Lent 2014	Percentile long term	511	10	0.8155	Y	51.10	n/a	0.02	1.1539
Levy 2012	zBMI short term	997	60	0.0200	Y	16.62	n/a	0.02	0.0229
Li 2010	zBMI medium term	4187	20	0.0139	Y	209.35	0.15	0.15	0.0790
Li 2010	zBMI long term	4120	20	0.0205	Y	206.00	0.15	0.15	0.1158
Li 2010	BMI medium term	4187	20	0.0363	Y	209.35	0.15	0.15	0.2063
Li 2010	BMI long term	4120	20	0.0542	Y	206.00	0.15	0.15	0.3055
Li 2019	zBMI medium term	1581	40	0.0206	Y	39.53	0.118	0.118	0.0485
Lichtenstein 2011	zBMI medium term	414	9	0.0276	Y	46.00	n/a	0.02	0.0380
Lichtenstein 2011	zBMI long term	326	9	0.0374	Y	36.22	n/a	0.02	0.0489
Liu 2019	zBMI short term	1837	12	0.0180	Y	153.08	0.05	0.05	0.0528
Liu 2019	zBMI medium term	1839	12	0.0178	Y	153.25	0.05	0.05	0.0522
Liu 2019	BMI short term	1837	12	0.0515	Y	153.08	0.04	0.04	0.1369
Liu 2019	BMI medium term	1839	12	0.0537	Y	153.25	0.04	0.04	0.1431
Liu 2022	zBMI short term	1373	24	0.0245	Y	57.21	n/a	0.02	0.0357
Liu 2022	zBMI medium term	1362	24	0.0240	Y	56.75	n/a	0.02	0.0349
Liu 2022	BMI short term	1373	24	0.0655	Y	57.21	n/a	0.02	0.0954
Liu 2022	BMI medium term	1362	24	0.0657	Y	56.75	n/a	0.02	0.0956
Llargues 2012	BMI long term	278	16	0.3401	N	17.38	n/a	n/a	0.3401
Lloyd 2018	zBMI long term	1250	32	0.0221	Y	39.06	0.014	0.014	0.0273
Lloyd 2018	BMI long term	1250	32	0.0673	Y	39.06	0.011	0.011	0.0802
Magnusson 2012	BMI long term	185	6	0.1195	Y	30.83	n/a	0.02	0.1510
Marcus 2009	zBMI long term	2838	10	0.0119	Y	283.80	n/a	0.02	0.0307
Martinez-Vizcaino 2014	BMI medium term	469	20	0.1053	Y	23.45	n/a	0.02	0.1268
Martinez-Vizcaino 2020	zBMI short term	1434	21	0.0240	Y	68.29	0.0996	0.0996	0.0666
Martinez-Vizcaino 2020	BMI short term	1434	21	0.0415	Y	68.29	0.0695	0.0695	0.0989
Martinez-Vizcaino 2022	zBMI medium term	396	10	0.0317	Y	39.60	n/a	0.02	0.0422
Martinez-Vizcaino 2022	BMI medium term	396	10	0.1233	Y	39.60	n/a	0.02	0.1642
Meng 2013 (Beijing)	zBMI medium term	1075	6	0.0922	Y	179.17	n/a	0.02	0.1969
Meng 2013 (Beijing)	zBMI medium term	1050	6	0.0922	Y	175.00	n/a	0.02	0.1951
Meng 2013 (Beijing)	BMI medium term	1075	6	0.2121	Y	179.17	n/a	0.02	0.4532
Meng 2013 (Beijing)	BMI medium term	1050	6	0.2121	Y	175.00	n/a	0.02	0.4490
Morgan 2011	zBMI short term	71	53	0.0920	N	1.34	n/a	n/a	0.0920
Morgan 2014	zBMI short term	132	93	0.0523	N	1.42	n/a	n/a	0.0523

Morgan 2014	BMI short term	132	93	0.0920	N	1.42	n/a	n/a	0.0920
Morgan 2019	zBMI medium term	153	115	0.0506	N	1.33	n/a	n/a	0.0506
Muller 2016	zBMI medium term	182	7	0.0494	Y	26.00	0.046	0.046	0.0725
Muller 2016	Percentile long term	376	18	1.1654	Y	20.89	0.046	0.046	1.6127
Muller 2019	zBMI medium term	519	8	0.0417	Y	64.88	0.009	0.009	0.0523
Muzaffar 2019	Percentile short term	101	7	1.8931	Y	14.43	n/a	0.02	2.1323
Muzaffar 2019		101	7	1.9307	Y	14.43	n/a	0.02	2.1745
NCT02067728 2014	zBMI short term	89	12	0.1382	Y	7.42	n/a	0.02	0.1468
Nemet 2011a	BMI medium term	725	30	0.0566	Y	24.17	n/a	0.02	0.0684
Nemet 2011a	Percentile medium term	725	30	1.1314	Y	24.17	n/a	0.02	1.3686
Nemet 2011b	BMI medium term	297	11	0.0849	Y	27.00	n/a	0.02	0.1046
Nemet 2011b		203	11	0.1265	Y	18.45	n/a	0.02	0.1469
Nemet 2011b	Percentile medium term	297	11	1.7692	Y	27.00	n/a	0.02	2.1812
Nemet 2011b	Percentile long term	203	11	2.4207	Y	18.45	n/a	0.02	2.8117
Nyberg 2015	zBMI short term	234	14	0.0493	Y	16.71	n/a	0.02	0.0565
Nyberg 2015	zBMI medium term	234	14	0.0414	Y	16.71	n/a	0.02	0.0475
Nyberg 2016	zBMI short term	332	31	0.0510	N	10.71	n/a	n/a	0.0510
Nyberg 2016	zBMI medium term	332	31	0.0510	N	10.71	n/a	n/a	0.0510
O'Connor 2020	zBMI short term	46	27	0.0649	N	1.70	n/a	n/a	0.0649
Paineau 2008	zBMI short term	674	38	0.0523	Y	17.74	n/a	0.02	0.0605
Paineau 2008	zBMI short term	669	38	0.0562	Y	17.61	n/a	0.02	0.0648
Paineau 2008	BMI short term	674	38	0.0725	Y	17.74	n/a	0.02	0.0838
Paineau 2008	BMI short term	669	38	0.0807	Y	17.61	n/a	0.02	0.0931
Pena 2021	zBMI short term	1912	20	0.1097	N	95.60	0.015	n/a	0.1097
Pena 2021	BMI short term	1912	20	0.3291	N	95.60	0.011	n/a	0.3291
Puder 2011	BMI medium term	625	40	0.0405	Y	15.63	0.05	0.05	0.0533
Rosario 2012	zBMI short term	294	7	0.0640	Y	42.00	n/a	0.02	0.0864
Rosario 2012	BMI short term	294	7	0.1041	Y	42.00	n/a	0.02	0.1405
Rosenkranz 2010	zBMI short term	72	7	0.0641	N	10.29	n/a	n/a	0.0641
Rosenkranz 2010	BMI short term	72	7	0.2879	N	10.29	n/a	n/a	0.2879
Rosenkranz 2010	Percentile short term	72	7	1.9043	N	10.29	n/a	n/a	1.9043
Rush 2012	zBMI long term	1352	124	0.0175	Y	10.90	n/a	0.02	0.0191
Sacchetti 2013	BMI long term	428	26	0.1315	Y	16.46	n/a	0.02	0.1504
Safdie 2013	BMI short term	606	19	0.2351	Y	31.89	n/a	0.02	0.2990
Safdie 2013	BMI short term	608	19	0.2215	Y	32.00	n/a	0.02	0.2819
Safdie 2013	BMI medium term	606	19	0.2351	Y	31.89	n/a	0.02	0.2990
Safdie 2013	BMI medium term	578	18	0.2385	Y	32.11	n/a	0.02	0.3038
Safdie 2013	BMI long term	606	19	0.2509	Y	31.89	n/a	0.02	0.3191

Safdie 2013	BMI long term	578	18	0.2714	Y	32.11	n/a	0.02	0.3457
Sahota 2001	zBMI medium term	595	10	0.0510	N	59.50	n/a	n/a	0.0510
Sahota 2019	zBMI long term	311	8	0.2551	N	38.88	n/a	n/a	0.2551
Salmon 2022	zBMI long term	232	10	0.0541	N	23.20	n/a	n/a	0.0541
Salmon 2022	zBMI long term	208	10	0.0578	N	20.80	n/a	n/a	0.0578
Salmon 2022	zBMI long term	212	10	0.0559	N	21.20	n/a	n/a	0.0559
Santos 2014	zBMI medium term	647	20	0.0216	N	32.35	n/a	n/a	0.0216
Sgambato 2019	BMI short term	2276	18	0.0510	Y	126.44	n/a	0.02	0.0956
Sichieri 2008	BMI short term	927	47	0.0842	Y	19.72	0.024	0.024	0.1014
Siegrist 2013	zBMI medium term	719	39	0.0257	Y	18.44	n/a	0.02	0.0298
Siegrist 2013		719	39	0.0778	Y	18.44	n/a	0.02	0.0903
Siegrist 2018	BMI long term	434	15	0.1149	Y	28.93	n/a	0.02	0.1434
Simon 2008	zBMI long term	531	8	0.0613	N	66.38	0.02	n/a	0.0613
Simon 2008	BMI medium term	725	8	0.0700	N	90.63	n/a	n/a	0.0700
Simon 2008	BMI long term	531	8	0.1569	N	66.38	0.039	n/a	0.1569
Spiegel 2006	zBMI short term	1013	70	0.0199	Y	14.47	n/a	0.02	0.0224
Stettler 2015	zBMI medium term	75	11	0.0481	Y	6.82	0.012	0.012	0.0497
Stettler 2015	zBMI medium term	70	9	0.0444	Y	7.78	0.012	0.012	0.0462
Stettler 2015	BMI medium term	75	11	0.3394	Y	6.82	0.012	0.012	0.3511
Stettler 2015	BMI medium term	70	9	0.3287	Y	7.78	0.012	0.012	0.3418
Story 2012	zBMI long term	454	14	0.0583	N	32.43	n/a	n/a	0.0583
Story 2012	BMI long term	454	14	0.1495	N	32.43	n/a	n/a	0.1495
Tanskey 2017	zBMI medium term	520	12	0.0438	N	43.33	n/a	n/a	0.0438
Tanskey 2017	zBMI medium term	508	12	0.0370	N	42.33	n/a	n/a	0.0370
Tanskey 2017	BMI medium term	520	12	0.1880	N	43.33	n/a	n/a	0.1880
Tanskey 2017	BMI medium term	508	12	0.1451	N	42.33	n/a	n/a	0.1451
Telford 2012	BMI long term	620	29	0.0838	Y	21.38	n/a	0.02	0.0994
Tessier 2008	BMI short term	939	52	0.0606	Y	18.06	0.1	0.1	0.0996
Thivel 2011	BMI short term	355	19	0.0371	Y	18.68	n/a	0.02	0.0431
Topham 2021	zBMI long term	198	10	0.0997	N	19.80	n/a	n/a	0.0997
Topham 2021	zBMI long term	168	13	0.0981	N	12.92	n/a	n/a	0.0981
Topham 2021	zBMI long term	205	8	0.1048	N	25.63	n/a	n/a	0.1048
Topham 2021	zBMI long term	210	13	0.1065	N	16.15	n/a	n/a	0.1065
van de Berg 2020	Percentile medium term	621	14	1.1039	N	44.36	n/a	n/a	1.1039
van de Berg 2020	Percentile medium term	632	14	1.0706	N	45.14	n/a	n/a	1.0706
van de Berg 2020	Percentile medium term	643	14	1.0837	N	45.93	n/a	n/a	1.0837
Viggiano 2018	zBMI short term	1007	10	0.0212	Y	100.70	n/a	0.02	0.0367
Viggiano 2018		456	10	0.0522	Y	45.60	n/a	0.02	0.0718

	zBMI long term								
Vizcaino 2008	BMI medium term	1044	20	0.0689	Y	52.20	n/a	0.02	0.0980
Wang 2012	zBMI medium term	931	6	0.0205	Y	155.17	n/a	0.02	0.0414
Wang 2018	zBMI medium term	9858	48	0.0141	Y	205.38	n/a	0.02	0.0319
Wang 2018	BMI medium term	9858	48	0.0283	Y	205.38	n/a	0.02	0.0638
Wendel 2016	BMI long term	193	24	0.1545	Y	8.04	n/a	0.02	0.1650
Wendel 2016	Percentile long term	193	24	1.9417	Y	8.04	n/a	0.02	2.0739
Williamson 2012	zBMI long term	1059	11	0.0316	N	96.27	n/a	n/a	0.0316
Williamson 2012	zBMI long term	1085	12	0.0310	N	90.42	n/a	n/a	0.0310
Xu 2015	zBMI medium term	1125	8	0.1082	N	140.63	n/a	n/a	0.1082
Xu 2015	BMI medium term	1125	8	0.3608	N	140.63	n/a	n/a	0.3608
Xu 2017 (5 other cities)	zBMI medium term	5283	30	0.0173	Y	176.10	n/a	0.02	0.0368
Xu 2017 (5 other cities)	BMI medium term	5283	30	0.0358	Y	176.10	n/a	0.02	0.0759
Yin 2012	zBMI medium term	527	18	0.0317	N	29.28	n/a	n/a	0.0317
Yin 2012	zBMI long term	481	18	0.0343	N	26.72	n/a	n/a	0.0343

Abbreviations: ICC: intra-cluster correlation coefficient; N: no; n/a: not applicable; SE: standard error; Y: yes.

Appendix 6. Sensitivity Analysis

6.1 Excluding high risk of bias studies

The following table shows the results of all meta-analyses in the main analysis (mean difference, 95% confidence interval, I^2, number of studies and number of participants) alongside the equivalent results excluding studies evaluated as high risk of bias.

Comparison: Dietary intervention vs Control										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short term	0	(-0.1, 0.1)	0	5	2107	0	(-0.1, 0.1)	0	4	2061
BMI medium term	-0.01	(-0.15, 0.12)	43	9	6815	-0.05	(-0.19, 0.09)	46	6	2434
BMI long term	-0.17	(-0.48, 0.13)	8	2	945	-0.26	(-0.58, 0.06)	n/a	1	434
zBMI short term	-0.06	(-0.13, 0.01)	93	8	3695	-0.03	(-0.11, 0.04)	94	6	2642
zBMI medium term	-0.04	(-0.1, 0.02)	80	9	7048	-0.05	(-0.12, 0.03)	86	6	2358
zBMI long term	-0.05	(-0.1, 0.01)	67	7	5285	-0.06	(-0.18, 0.06)	83	3	1224
Percentile short term	1.9	(-3.44, 7.24)	49	3	394	1.9	(-3.44, 7.24)	49	3	394
Percentile medium term	-0.94	(-2.65, 0.78)	24	3	4363	0.3	(-1.97, 2.57)	n/a	1	596
Percentile long term	-1.49	(-4.8, 1.82)	77	2	776	n/a	n/a	n/a	0	0
Comparison: Activity intervention vs Control										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short term	-0.02	(-0.17, 0.13)	86	14	4069	0.06	(-0.2, 0.32)	87	8	1327
BMI medium term	-0.11	(-0.18, -0.05)	16	16	21286	-0.13	(-0.2, -0.07)	0	10	18166
BMI long term	-0.07	(-0.24, 0.1)	64	8	8302	-0.17	(-0.56, 0.23)	81	4	5703
zBMI short term	-0.02	(-0.07, 0.02)	35	6	3580	-0.03	(-0.08, 0.02)	48	5	2146
zBMI medium term	-0.05	(-0.09, -0.02)	48	13	20600	-0.04	(-0.06, -0.01)	7	8	17734
zBMI long term	-0.02	(-0.09, 0.04)	55	6	6940	-0.05	(-0.14, 0.04)	61	4	5699
Percentile short term	-0.74	(-4.1, 2.62)	n/a	1	27	-0.74	(-4.1, 2.62)	n/a	1	27
Percentile medium term	-2.26	(-4.42, -0.1)	n/a	1	621	n/a	n/a	n/a	0	0
Percentile long term	-0.8	(-2.74, 1.13)	19	3	860	0.9	(-2.26, 4.06)	n/a	1	376
Comparison: Dietary and Activity intervention vs Control										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short term	-0.11	(-0.21, -0.01)	72	27	16066	-0.07	(-0.21, 0.07)	82	15	8788
BMI medium term	-0.11	(-0.21, 0)	74	21	17547	-0.07	(-0.19, 0.06)	75	15	14183

BMI long term	0.03	(-0.11, 0.16)	72	16	22098	0.01	(-0.16, 0.18)	59	9	6001
zBMI short term	-0.03	(-0.06, 0)	58	26	12784	-0.04	(-0.08, 0)	51	13	7463
zBMI medium term	-0.05	(-0.07, -0.02)	77	24	20998	-0.04	(-0.07, 0)	78	18	17648
zBMI long term	-0.02	(-0.06, 0.01)	88	22	23594	-0.01	(-0.03, 0.02)	59	10	13540
Percentile short term	0.73	(-0.5, 1.97)	0	5	1036	0.57	(-0.83, 1.97)	0	4	903
Percentile medium term	-0.64	(-1.85, 0.56)	64	8	3823	-0.45	(-1.89, 1)	62	5	2587
Percentile long term	-0.67	(-3.05, 1.72)	82	5	1765	-0.34	(-1.43, 0.74)	0	2	856
Comparison: Activity intervention vs Dietary intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI medium term	-0.25	(-0.55, 0.06)	0	2	1644	-0.28	(-0.6, 0.04)	n/a	1	439
zBMI medium term	-0.11	(-0.22, 0)	0	2	1644	-0.12	(-0.23, -0.01)	n/a	1	439
Percentile medium term	-0.04	(-2.05, 1.97)	n/a	1	683	n/a	n/a	n/a	0	0
Percentile long term	2.3	(0.27, 4.33)	n/a	1	330	n/a	n/a	n/a	0	0
Comparison: Activity and Dietary intervention vs Dietary intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI medium term	-0.16	(-0.42, 0.1)	0	2	456	-0.16	(-0.42, 0.1)	0	2	456
zBMI medium term	-0.03	(-0.1, 0.04)	0	2	456	-0.03	(-0.1, 0.04)	0	2	456
Percentile medium term	1.03	(-0.94, 3)	n/a	1	705	n/a	n/a	n/a	0	0
Percentile long term	-0.13	(-2.12, 1.86)	n/a	1	304	n/a	n/a	n/a	0	0
Comparison: Activity and Dietary intervention vs Activity intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short term	0.34	(-0.25, 0.93)	0	2	95	0.34	(-0.25, 0.93)	0	2	95
BMI medium term	0.19	(-0.12, 0.49)	0	2	509	0.19	(-0.12, 0.49)	0	2	509
BMI long term	-0.08	(-0.43, 0.27)	n/a	1	261	n/a	n/a	n/a	0	0
zBMI short term	-0.12	(-0.3, 0.06)	n/a	1	35	-0.12	(-0.3, 0.06)	n/a	1	35
zBMI medium term	-0.07	(-0.42, 0.28)	90	2	509	-0.07	(-0.42, 0.28)	90	2	509
zBMI long term	-0.04	(-0.13, 0.05)	n/a	1	261	n/a	n/a	n/a	0	0
Percentile medium term	1.07	(-0.97, 3.11)	n/a	1	694	n/a	n/a	n/a	0	0
Percentile long term	-2.43	(-4.46, -0.4)	n/a	1	330	n/a	n/a	n/a	0	0

6.2 Different ICCs

The following table shows the results of all meta-analyses in the main analysis (mean difference, 95% confidence interval, I^2, number of studies and number of participants) alongside the equivalent results using imputed ICC values of 0 and 0.04 (compared to 0.02 in the main analysis).

Comparison: Dietary intervention vs Control											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short term	0	(-0.1, 0.1)	0	5	2107	-0.01	(-0.1, 0.09)	0	0.01	(-0.1, 0.12)	0
BMI medium term	-0.01	(-0.15, 0.12)	43	9	6815	0	(-0.12, 0.11)	52	-0.02	(-0.16, 0.12)	38
BMI long term	-0.17	(-0.48, 0.13)	8	2	945	-0.11	(-0.46, 0.24)	44	-0.2	(-0.49, 0.09)	0
zBMI short term	-0.06	(-0.13, 0.01)	93	8	3695	-0.06	(-0.13, 0.01)	94	-0.05	(-0.12, 0.02)	93
zBMI medium term	-0.04	(-0.1, 0.02)	80	9	7048	-0.04	(-0.09, 0.02)	86	-0.04	(-0.11, 0.02)	77
zBMI long term	-0.05	(-0.1, 0.01)	67	7	5285	-0.04	(-0.1, 0.01)	79	-0.05	(-0.11, 0.01)	62
Percentile short term	1.9	(-3.44, 7.24)	49	3	394	1.9	(-3.44, 7.24)	49	1.9	(-3.44, 7.24)	49
Percentile medium term	-0.94	(-2.65, 0.78)	24	3	4363	-0.65	(-2.06, 0.77)	45	-1.23	(-2.88, 0.43)	3
Percentile long term	-1.49	(-4.8, 1.82)	77	2	776	-1.39	(-4.7, 1.92)	83	-1.59	(-4.9, 1.72)	71
Comparison: Activity intervention vs Control											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short term	-0.02	(-0.17, 0.13)	86	14	4069	-0.02	(-0.17, 0.13)	87	-0.02	(-0.17, 0.14)	85
BMI medium term	-0.11	(-0.18, -0.05)	16	16	21286	-0.12	(-0.2, -0.05)	53	-0.1	(-0.16, -0.04)	1
BMI long term	-0.07	(-0.24, 0.1)	64	8	8302	-0.07	(-0.25, 0.12)	74	-0.07	(-0.24, 0.09)	56
zBMI short term	-0.02	(-0.07, 0.02)	35	6	3580	-0.02	(-0.06, 0.02)	36	-0.02	(-0.07, 0.02)	35
zBMI medium term	-0.05	(-0.09, -0.02)	48	13	20600	-0.05	(-0.09, -0.02)	66	-0.05	(-0.09, -0.02)	42
zBMI long term	-0.02	(-0.09, 0.04)	55	6	6940	-0.02	(-0.08, 0.04)	59	-0.03	(-0.09, 0.04)	53
Percentile short term	-0.74	(-4.1, 2.62)	n/a	1	27	-0.74	(-4.1, 2.62)	n/a	-0.74	(-4.1, 2.62)	n/a
Percentile medium term	-2.26	(-4.42, -0.1)	n/a	1	621	-2.26	(-4.42, -0.1)	n/a	-2.26	(-4.42, -0.1)	n/a
Percentile long term	-0.8	(-2.74, 1.13)	19	3	860	-0.87	(-2.86, 1.12)	25	-0.75	(-2.63, 1.14)	14
Comparison: Dietary and Activity intervention vs Control											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**

BMI short term	-0.11	(-0.21, -0.01)	72	27	16066	-0.1	(-0.19, 0)	79	-0.11	(-0.21, -0.01)	68
BMI medium term	-0.11	(-0.21, 0)	74	21	17547	-0.1	(-0.21, 0)	85	-0.1	(-0.21, 0.01)	67
BMI long term	0.03	(-0.11, 0.16)	72	16	22098	0.04	(-0.11, 0.19)	80	0.02	(-0.11, 0.14)	67
zBMI short term	-0.03	(-0.06, 0)	58	26	12784	-0.03	(-0.07, 0)	69	-0.03	(-0.06, 0)	51
zBMI medium term	-0.05	(-0.07, -0.02)	77	24	20998	-0.05	(-0.08, -0.02)	90	-0.04	(-0.07, -0.02)	70
zBMI long term	-0.02	(-0.06, 0.01)	88	22	23594	-0.03	(-0.07, 0.02)	97	-0.02	(-0.05, 0.01)	82
Percentile short term	0.73	(-0.5, 1.97)	0	5	1036	0.73	(-0.5, 1.97)	0	0.73	(-0.5, 1.97)	0
Percentile medium term	-0.64	(-1.85, 0.56)	64	8	3823	-0.85	(-2.14, 0.44)	71	-0.5	(-1.65, 0.65)	57
Percentile long term	-0.67	(-3.05, 1.72)	82	5	1765	-0.78	(-3.19, 1.64)	83	-0.58	(-2.95, 1.79)	81
Comparison: Activity intervention vs Dietary intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI medium term	-0.25	(-0.55, 0.06)	0	2	1644	-0.19	(-0.46, 0.08)	38	-0.25	(-0.64, 0.14)	0
zBMI medium term	-0.11	(-0.22, 0)	0	2	1644	-0.08	(-0.2, 0.04)	50	-0.11	(-0.25, 0.02)	0
Percentile medium term	-0.04	(-2.05, 1.97)	n/a	1	683	-0.04	(-2.05, 1.97)	n/a	-0.04	(-2.05, 1.97)	n/a
Percentile long term	2.3	(0.27, 4.33)	n/a	1	330	2.3	(0.27, 4.33)	n/a	2.3	(0.27, 4.33)	n/a
Comparison: Activity and Dietary intervention vs Dietary intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI medium term	-0.16	(-0.42, 0.1)	0	2	456	-0.13	(-0.32, 0.06)	0	-0.18	(-0.48, 0.11)	0
zBMI medium term	-0.03	(-0.1, 0.04)	0	2	456	-0.02	(-0.08, 0.03)	0	-0.03	(-0.1, 0.05)	0
Percentile medium term	1.03	(-0.94, 3)	n/a	1	705	1.03	(-0.94, 3)	n/a	1.03	(-0.94, 3)	n/a
Percentile long term	-0.13	(-2.12, 1.86)	n/a	1	304	-0.13	(-2.12, 1.86)	n/a	-0.13	(-2.12, 1.86)	n/a
Comparison: Activity and Dietary intervention vs Activity intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short term	0.34	(-0.25, 0.93)	0	2	95	0.34	(-0.25, 0.93)	0	0.34	(-0.25, 0.93)	0
BMI medium term	0.19	(-0.12, 0.49)	0	2	509	0.19	(0, 0.38)	0	0.19	(-0.19, 0.56)	0
BMI long term	-0.08	(-0.43, 0.27)	n/a	1	261	-0.08	(-0.43, 0.27)	n/a	-0.08	(-0.43, 0.27)	n/a
zBMI short term	-0.12	(-0.3, 0.06)	n/a	1	35	-0.12	(-0.3, 0.06)	n/a	-0.12	(-0.3, 0.06)	n/a
zBMI medium term	-0.07	(-0.42, 0.28)	90	2	509	-0.07	(-0.42, 0.28)	92	-0.07	(-0.42, 0.28)	89
zBMI long term	-0.04	(-0.13, 0.05)	n/a	1	261	-0.04	(-0.13, 0.05)	n/a	-0.04	(-0.13, 0.05)	n/a
Percentile medium term	1.07	(-0.97, 3.11)	n/a	1	694	1.07	(-0.97, 3.11)	n/a	1.07	(-0.97, 3.11)	n/a
Percentile long term	-2.43	(-4.46, -0.4)	n/a	1	330	-2.43	(-4.46, -0.4)	n/a	-2.43	(-4.46, -0.4)	n/a

Abbreviations: CI: confidence interval; ICC: inter cluster coefficient; MD: mean difference; n: number of; n/a: not applicable

Appendix 7. Funnel Plots

We reported nine meta-analyses with at least 10 studies. As planned in the protocol, we produced a funnel plot for these meta-analyses which did not show notable asymmetry (Figure 6; Figure 7; Figure 8; Figure 9; Figure 10; Figure 11; Figure 12; Figure 13; Figure 14). P values from Egger test for funnel plot asymmetry are reported in the table below. All test resulted in P values are >0.05, which does not indicate an important problem.

7.1 P values from Egger test for funnel plot asymmetry

Comparison: Activity intervention vs Control	
Meta-analysis outcome	**P value**
BMI short term	0.3992
BMI medium term	0.1892
zBMI medium term	0.1236
Comparison: Dietary and Activity intervention vs Control	
Meta-analysis outcome	**P value**
BMI short term	0.3672
BMI medium term	0.5364
BMI long term	0.9486
zBMI short term	0.3955
zBMI medium term	0.4642
zBMI long term	0.4115

Appendix 8. Subgroup analyses

We conducted subgroup analyses by main setting of the interventions, country income status, participants socioeconomic status and duration of the interventions. Here we present the results of the tests for subgroup

differences, all the meta-analysis results in summary forest plots, and for each analysis selectively highlight subgroups in which an effect was observed.

8.1 Test for subgroup analysis

The following table shows the results of the test for subgroup differences (P value) alongside the total number of studies and the number of studies in each subgroup.

Comparison: Dietary intervention vs Control									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis outcome	**N of studies (total)**	**N of studies/subgroup (school/home/school + home/other)**	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short term	5	1/2/1/1	0.64	1/4	0.26	4/1	0.26	5/0/0	n/a
BMI medium term	9	6/1/1/1	0.10	5/4	0.71	6/3	0.12	2/6/1	0.87
BMI long term	2	2/0/0/0	n/a	1/1	n/a	2/0	n/a	0/1/1	0.30
zBMI short term	8	3/2/1/2	0.84	0/8	n/a	8/0	n/a	7/0/1	0.20
zBMI medium term	9	6/0/1/2	0.78	4/5	0.31	8/1	0.83	1/5/3	0.71
zBMI long term	7	6/0/0/1	0.02	2/5	0.54	6/1	0.14	1/2/4	0.69
Percentile short term	3	0/1/0/2	0.05	0/3	n/a	3/0	n/a	2/0/1	0.05
Percentile medium term	3	2/0/1/0	0.11	3/0	n/a	3/0	n/a	1/1/1	0.27
Percentile long term	2	2/0/0/0	n/a	2/0	n/a	2/0	n/a	0/0/2	n/a
Comparison: Activity intervention vs Control									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis outcome	**N of studies (total)**	**N of studies/subgroup (school/home/school + home/other)**	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short term	14	12/1/1/0	0.01	2/12	0.74	12/2	0.002	14/0/0	n/a
BMI medium term	16	15/0/1/0	0.43	2/14	0.96	12/4	0.06	5/9/2	**0.02**
BMI long term	8	8/0/0/0	n/a	0/8	n/a	7/1	n/a	0/3/5	0.03
zBMI short term	6	3/1/1/1	0.97	1/5	0.14	6/0	n/a	5/1/0	0.14
zBMI medium term	13	11/0/1/1	0.47	3/10	0.25	9/4	0.02	3/7/3	0.37
zBMI long term	6	6/0/0/0	n/a	0/6	n/a	4/2	n/a	0/2/4	0.20
Percentile short term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	1/0/0	n/a
Percentile medium term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long term	3	3/0/0/0	n/a	1/2	n/a	3/0	n/a	0/0/3	n/a
Comparison: Dietary and Activity intervention vs Control									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis outcome	**N of studies (total)**	**N of studies/subgroup (school/home/school + home/other)**	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short term	27	16/0/2/9	0.07	**8/19**	**0.05**	21/6	0.63	21/5/1	0.0001
BMI medium term	21	13/2/2/4	0.86	6/15	0.92	16/5	0.52	4/14/3	0.11
	16	12/2/0/2	0.80	5/11	0.69	15/1	0.001	0/6/10	0.80

BMI long term									
zBMI short term	26	12/1/2/11	<0.0001	6/20	0.89	21/5	0.21	21/3/2	0.51
zBMI medium term	24	13/2/3/6	0.09	5/19	0.34	17/7	0.09	6/15/3	0.003
zBMI long term	22	12/2/4/4	0.29	6/16	0.12	20/2	0.65	3/7/12	0.18
Percentile short term	5	2/1/0/2	0.87	2/3	0.14	5/0	n/a	5/0/0	n/a
Percentile medium term	8	4/1/2/1	0.51	3/5	0.18	8/0	n/a	2/5/1	0.35
Percentile long term	5	2/1/1/1	<0.0001	2/3	0.004	5/0	n/a	1/2/2	0.01
Comparison: Activity intervention vs Dietary intervention									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis outcome	**N of studies (total)**	**N of studies/subgroup (school/home/school + home/other)**	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
BMI medium term	2	1/0/1/0	0.55	1/1	0.55	1/1	0.55	1/1/0	0.55
BMI long term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI medium term	2	1/0/1/0	0.52	1/1	0.52	1/1	0.52	1/1/0	0.52
zBMI long term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a
Comparison: Dietary and Activity intervention vs Dietary intervention									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis outcome	**N of studies (total)**	**N of studies/subgroup (school/home/school + home/other)**	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
BMI medium term	2	0/0/1/1	0.45	1/1	0.45	2/0	n/a	1/1/0	0.45
BMI long term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI medium term	2	0/0/1/1	0.89	1/1	0.89	2/0	n/a	1/1/0	0.89
zBMI long term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a
Comparison: Dietary and Activity intervention vs Activity intervention									
		Setting		**Socioeconomic status**		**Country income**		**Duration of intervention**	
Meta-analysis	**N of studies**	**N of studies/subgroup**	**P**	**N of studies/subgroup**	**P**	**N of studies/subgroup**	**P**	**N of studies/subgroup**	**P**

outcome	(total)	(school/home/school + home/other)		(low/mixed)		(high/non high)		(short/medium/long)	
BMI short term	2	1/1/0/0	0.70	0/2	n/a	2/0	n/a	2/0/0	n/a
BMI medium term	2	1/0/1/0	0.96	1/1	0.96	2/0	n/a	2/0/0	n/a
BMI long term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	0/0/1	n/a
zBMI short term	1	1/0/0/0	n/a	0/1	n/a	1/0	n/a	1/0/0	n/a
zBMI medium term	2	1/0/1/0	0.001	1/1	0.001	2/0	n/a	2/0/0	n/a
zBMI long term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	0/0/1	n/a
Percentile short term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a

8.2.1 Subgroup analysis by setting

Summary forest plots for subgroup analyses by setting (school, home, school and home, other) are provided in Figure 15; Figure 16; Figure 17; Figure 18; Figure 19; Figure 20; Figure 21; Figure 22; Figure 23; Figure 24; Figure 25; Figure 26; Figure 27; Figure 28; Figure 29; Figure 30; Figure 31; Figure 32.

8.2.1.1 School

In studies in which the interventions were conducted at school, we found that dietary interventions, compared with control, may reduce zBMI at long-term follow-up (MD -0.06, 95% CI: -0.12 to -0.01; 6 studies, 5136 participants). We found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI: -0.18 to -0.04; 15 studies, 20844 participants; zBMI: MD -0.05, 95% CI: -0.09 to -0.01; 11 studies, 20005 participants). We found that dietary and activity interventions, compared with control, may reduce BMI and zBMI at follow-up (BMI: MD -0.14, 95% CI: -0.26 to -0.01; 16 studies, 11874 participants; zBMI: MD -0.06, 95% CI: -0.09 to -0.02; 12 studies, 10296 participants), zBMI at medium-term follow-up (MD -0.06, 95% CI: -0.12 to -0.01; 13 studies, 16530 participants), and BMI percentile at long-term follow-up (MD -3.68, 95% CI: -5.77 to -1.59; 2 studies, 468 participants). We also found that a dietary and activity intervention, compared with an activity intervention, may reduce zBMI at medium-term follow-up (MD -0.26, 95% CI: -0.44 to -0.07; 1 study, 31 participants).

8.2.1.2 Home

In studies conducted at home we found that dietary interventions, compared with control, may increase BMI percentile at short-term follow up (MD 5.9, 95% CI: 0.08 to 11.72; 1 study, 45 participants). We also found that activity interventions, compared with control, may increase BMI at follow-up (MD 1.14, 95% CI: 0.35 to 1.93; 1 study, 27 participants).

8.2.1.3 School and home

In studies in which the interventions were conducted at school and home, we found that dietary interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.22, 95% CI: -4.32 to -0.12; 1 study, 632 participants). We found that activity interventions, compared with control, may reduce zBMI and BMI percentile at medium-term follow-up (zBMI: MD -0.12, 95% CI: -0.24 to 0; 1 study, 442 participants; BMI percentile: MD -2.26, 95% CI: -4.42 to -0.1; 1 study, 621 participants). We also found that an activity intervention, compared with a dietary intervention, may reduce zBMI at medium-term follow-up (MD -2.26, 95% CI: -4.42 to -0.1; 1 study, 621 participants).

8.2.1.4 Other

In studies in which the interventions were conducted in setting other than school and/or home, we found that a dietary intervention, compared with control, may reduce BMI at medium-term follow-up (MD -0.8, 95% CI: -1.49 to -0.11; 1 study, 75 participants). We also found that dietary and activity interventions, compared with control, may reduce BMI at follow-up (MD -0.14, 95% CI: -0.28 to 0; 9 studies, 715 participants) and zBMI at medium- term follow-up (MD -0.04, 95% CI: -0.09 to 0; 6 studies, 1077 participants).

8.2.2 Subgroup analysis by country income status

Summary forest plots for subgroup analyses by country income status (high income and non-high income) are provided in Figure 33; Figure 34; Figure 35; Figure 36; Figure 37; Figure 38; Figure 39; Figure 40; Figure 41; Figure 42; Figure 43; Figure 44; Figure 45; Figure 46; Figure 47; Figure 48; Figure 49; Figure 50.

8.2.2.1 High-income countries

In studies in which the interventions were conducted in high-income countries, we found that activity interventions, compared with control, may reduce BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.09, 95% CI: -0.17 to -0.01; 12 studies, 6073 participants; zBMI: MD -0.02, 95% CI: -0.05 to 0; 9 studies, 4986 participants; BMI percentile: MD -2.26, 95% CI: -4.42 to -0.1; 1 study, 621 participants). We found that dietary and activity interventions, compared with control, may reduce BMI at (MD -0.11, 95% CI: -0.2 to -0.03; 21 studies, 9140 participants) and medium-term (MD -0.12, 95% CI: -0.23 to 0; 16 studies, 7108 participants) follow-up. We found that activity interventions, compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI: -0.23 to -0.01; 1 study, 439 participants) and BMI percentile at long-term follow-up (MD -2.3, 95% CI: -4.33 to -0.27; 1 study, 330 participants). We also found that a dietary and activity intervention, compared with a dietary intervention, may reduce BMI percentile at long-term follow-up (MD -2.43, 95% CI: -4.42 to -0.44; 1 study, 304 participants).

8.2.2.2 Non-high-income countries

In studies in which the interventions were conducted in non-high-income countries, we found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.22, 95% CI: -0.33 to -0.1; 4 studies, 15213 participants; zBMI: MD -0.11, 95% CI: -0.18 to -0.05; 4 studies, 15614 participants), while they may increase BMI at short-term follow-up (MD 0.48, 95% CI: 0.16 to 0.79; 2 studies, 228 participants). We also found that dietary and activity interventions, compared with control, may reduce zBMI at (MD -0.06, 95% CI: -0.12 to -0.01; 5 studies, 4465 participants), medium-term (MD -0.1, 95% CI: -0.17 to -0.02; 7 studies, 13827 participants) and long-term (MD -0.03, 95% CI: -0.05 to -0.01; 2 studies, 2619 participants) follow-up, while they may increase BMI at long-term follow-up (MD 0.95, 95% CI: 0.39 to 1.5; 1 study, 830 participants).

8.2.3 Subgroup analysis by participants socioeconomic status

Summary forest plots for subgroup analyses by participants socioeconomic status (low and mixed) are provided in Figure 33; Figure 34; Figure 35; Figure 36; Figure 37; Figure 38; Figure 39; Figure 40; Figure 41; Figure 42; Figure 43; Figure 44; Figure 45; Figure 46; Figure 47; Figure 48; Figure 49; Figure 50.

8.2.3.1 Low socioeconomic status

In studies in which participants were in a low socioeconomic status, we found that dietary interventions compared with control may reduce zBMI at long-term follow-up (MD -0.07, 95% CI: -0.13 to 0; 2 studies, 935 participants) but may increase BMI at medium-term follow-up (MD 0.05, 95% CI: 0 to 0.09; 5 studies, 4920 participants). We found that activity interventions compared with control may reduce BMI percentile at medium (MD -2.26, 95% CI: -4.42 to -0.1; 1 study, 621 participants) and medium-term (MD -3.18, 95% CI: -5.47 to -0.89; 1 study, 291 participants) follow-up. We found that dietary and activity interventions, compared with control, may reduce BMI percentile at long-term follow-up (MD -3.68, 95% CI: -5.77 to -1.59; 2 studies, 468 participants). We found that activity interventions, compared with dietary interventions, reduce zBMI at medium-term follow-up (MD -0.12, 95% CI: -0.23 to -0.01; 1 study, 439 participants) and BMI percentile at long-term follow-up (MD -2.3, 95% CI: -4.33 to -0.27; 1 study, 330 participants). We also found that dietary and activity interventions, compared with a dietary intervention, may reduce BMI percentile at medium-term follow-up (MD -2.43, 95% CI: -4.42 to -0.44; 1 study, 304 participants).

8.2.3.2 Mixed socioeconomic status

In studies in which participants were in a mixed socioeconomic status, we found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.12, 95% CI: -0.2 to -0.04; 14 studies, 20075 participants; zBMI: MD -0.06, 95% CI: -0.11 to -0.02; 10 studies, 17719 participants). We found that dietary and activity interventions, compared with control, may reduce BMI at follow-up (MD -0.17, 95% CI: -0.3 to -0.05; 19 studies, 9363 participants) and zBMI at medium-term (MD -0.05, 95% CI: -0.08 to -0.02; 19 studies, 18447 participants) and long-term (MD -0.04, 95% CI: -0.09 to 0; 16 studies, 14778 participants) follow-up. We also found that dietary and activity interventions, compared with activity interventions, may reduce zBMI at medium-term follow-up (MD -0.26, 95% CI: -0.44 to -0.07; 1 study, 31 participants).

8.2.4 Subgroup analysis by duration of intervention

Summary forest plots for subgroup analyses by intervention duration (short, medoum and long) are provided in Figure 51; Figure 52; Figure 53; Figure 54; Figure 55; Figure 56; Figure 57; Figure 58; Figure 59; Figure 60; Figure 61; Figure 62; Figure 63; Figure 64; Figure 65; Figure 66; Figure 67; Figure 68.

8.2.4.1 Short duration

In studies in which the duration of the interventions was short (<9 months) we found that dietary interventions, compared with control, may reduce BMI percentile at medium-term (MD -2.22, 95% CI: -4.32 to -0.12; 1 study, 632 participants). We found that activity interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.26, 95% CI: -4.42 to -0.1; 1 study, 621 participants). We found that dietary and activity interventions, compared with control, may reduce BMI and zBMI at short-term follow-up (BMI: MD -0.15, 95% CI: -0.26 to -0.04; 21 studies, 11535 participants; zBMI: MD -0.04, 95% CI: -0.07 to 0; 21 studies, 8123 participants), but they may increase BMI percentile at long-term follow-up (MD 4.13, 95% CI: 1.57 to 6.68; 1 study,

441 participants). We also found that activity interventions compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI: -0.23 to -0.01; 1 study, 439 participants).

8.2.4.2 Medium duration

In studies in which the duration of the interventions was medium (9 months to < 15 months) we found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.2, 95% CI: -0.29 to -0.12; 9 studies, 17220 participants; zBMI: MD -0.08, 95% CI: -0.14 to -0.01; 7 studies, 18131 participants). We also found that dietary and activity interventions, compared with control, may reduce BMI at short-term follow-up (MD -0.17, 95% CI: -0.29 to -0.06; 5 studies, 3671 participants), and BMI and zBMI at medium-term follow-up (BMI: MD -0.18, 95% CI: -0.31 to -0.04; 14 studies, 14375 participants; zBMI: MD -0.08, 95% CI: -0.12 to -0.03; 15 studies, 16800 participants).

8.2.4.3 Long duration

In studies in which the duration of the interventions was long (15 months or more) we found that dietary interventions, compared with control, may reduce zBMI at short-term follow-up (MD -0.1, 95% CI: -0.12 to -0.08; 1 study, 641 participants). We found that dietary and activity interventions, compared with control, may increase BMI at short-term follow-up (MD 0.91, 95% CI: 0.42 to 1.39; 1 study, 860 participants). We found that activity interventions, compared with dietary interventions, may reduce BMI percentile at medium-term follow-up (MD -2.3, 95% CI: -4.33 to -0.27; 1 study, 330 participants). We also found that dietary and activity interventions, compared with dietary interventions, may decrease BMI percentile at medium-term follow-up MD -2.43, 95% CI: -4.42 to -0.44; 1 studies, 304 participants).

Abbreviations: CI: confidence interval; MD: mean difference; n/a: not applicable.

References

References to studies included in this review

Adab 2018 {published data only}

studyIdentifiers

Adab P, Barrett T, Bhopal R, Cade JE, Canaway A, Cheng KK, et al. The West Midlands ActiVe lifestyle and healthy Eating in School children (WAVES) study: a cluster randomised controlled trial testing the clinical effectiveness and cost-effectiveness of a multifaceted obesity prevention intervention programme targeted at children aged 6-7 years. Health Technology Assessment (Winchester, England) 2018;22(8):1-608. [DOI: https://dx.doi.org/10.3310/hta22080]

* Adab P, Pallan MJ, Lancashire ER, Hemming K, Frew E, Barrett T, et al. Effectiveness of a childhood obesity prevention programme delivered through schools, targeting 6 and 7 year olds: cluster randomised controlled trial (WAVES study). BMJ 2018;360:k211. [DOI: https://dx.doi.org/10.1136/bmj.k211]

Adab P, Pallan MJ, Lancashire ER, Hemming K, Frew E, Barrett T, et al. Erratum: Effectiveness of a childhood obesity prevention programme delivered through schools, targeting 6 and 7 year olds: Cluster randomised controlled trial (WAVES study) (BMJ (Online) (2018) 360 (k211) DOI: 10.1136/bmj.k211). BMJ 2018;361:(no pagination). [DOI: http://dx.doi.org/10.1136/bmj.k1954]

Adab P, Pallan MJ, Lancashire ER, Hemming K, Frew E, Griffin T, et al. A cluster-randomised controlled trial to assess the effectiveness and cost-effectiveness of a childhoodobesity prevention programme delivered through schools, targeting 6–7 year old children: the WAVES study protocol. BMC Public Health 2015;15:488.

Canaway A, Frew E, Lancashire E, Pallan M, Hemming K, Adab P, et al. Economic evaluation of a childhood obesity prevention programme for children: Results from the WAVES cluster randomised controlled trial conducted in schools. PLoS ONE [Electronic Resource] 2019;14(7):e0219500. [DOI: https://dx.doi.org/10.1371/journal.pone.0219500]

Griffin TL, Pallan MJ, Clarke JL, Lancashire ER, Lyon A, Parry JM, et al. Process evaluation design in a cluster randomised controlled childhood obesity prevention trial: the WAVES study. International Journal of Behavioral Nutrition and Physical Activity 2014;11:22-43. [DOI: 10.1186/s12966-014-0112-1]

ISRCTN97000586. A study to assess the effectiveness and value for money of a programme to prevent primary school age children becoming overweight and obese [A cluster randomised controlled trial of the effectiveness and cost-effectiveness of an obesity prevention intervention in primary school age children]. http://isrctn.com/ISRCTN97000586 (first received 19 May 2010). [UNITED: Kingdom]

Anand 2007 {published data only}

studyIdentifiers

* Anand SS, Davis AD, Ahmed R, Jacobs R, Xie C, Hill A, et al. A family-based intervention to promote healthy lifestyles in an aboriginal community in Canada. Canadian Journal of Public Health 2007;98(6):447-52. [DOI: 10.1007/bf03405436]

NCT00334269. Study of Health Assessment and Risk Evaluation in Aboriginal Peoples Action Toward Obesity Prevention (SHARE-AP Action) [Study of Health Assessment and Risk Evaluation (SHARE) in

Aboriginal Peoples (AP) Action Toward Obesity Prevention (SHARE-AP Action)]. https://clinicaltrials.gov/show/NCT00334269 (first received 6 June 2006).

Annesi 2016 {published data only}

studyIdentifiers

Annesi JJ, Smith AE, Walsh SM, Mareno N, Smith KR. Effects of an after-school care-administered physical activity and nutrition protocol on body mass index, fitness levels, and targeted psychological factors in 5- to 8-year-olds. Transl Behav Med 2016;6(3):347-57. [DOI: 10.1007/s13142-015-0372-6]

Annesi 2017 {published data only}

studyIdentifiers

Annesi JJ, MWalsh S, LGreenwood B, NMareno, LUnruh-Rewkowski J. Effects of the Youth Fit 4 Life physical activity/nutrition protocol on body mass index, fitness and targeted social cognitive theory variables in 9- to 12-year-olds during after-school care. Journal of Paediatrics & Child Health 2017;53(4):365-73. [DOI: https://dx.doi.org/10.1111/jpc.13447]

Baranowski 2003 {published data only}

studyIdentifiers

* Baranowski T, Baranowski JC, Cullen KW, Thompson DI, Nicklas T, Zakeri IE, et al. The Fun, Food, and Fitness Project (FFFP): the Baylor GEMS pilot study. Ethnicity and Disease 2003;13 (Suppl 1):S30-39.

Kumanyika SK, Obarzanek E, Robinson TN, Beech BM. Phase 1 of the Girls health Enrichment Multi-site Studies (GEMS): conclusion. Ethnicity & Disease 2003;13(1 SUPPL. 1):S1-88-91.

Obarzanek E, Pratt CA. Girls health Enrichment Multi-site Studies (GEMS): new approches to obesity prevention among young African-American girls. Ethnicity & Disease 2003;13(1 SUPPL. 1):S1-1-5.

Rochon J, Klesges RC, Story M, Robinson TNBaranowski T, EObarzanek, et al. Common design elements of the Girls health Enrichment Multi-site Studies (GEMS). Ethnicity & Disease 2003;13(Suppl 1):S6-14.

Story M, Sherwood NE, Obarzanek E, Beech BM, Baranowski JC, NThompson, et al. Recruitment of African-American pre-adolescent girls into an obesity prevention trial: the GEMS pilot studies. Ethnicity & Disease 2003;13(Suppl 1):S78-87.

Baranowski 2011 {published data only}

studyIdentifiers

Baranowski T, Baranowski J, Thompson D, Buday R, Jago R, Griffith MJ, et al. Video game play, child diet, and physical activity behavior change: A randomized clinical trial. American Journal of Preventive Medicine 2011;40(1):33-38.

Barbeau 2007 {published data only}

studyIdentifiers

Barbeau P, Johnson MH, Howe CA, Allison J, Davis CL, Gutin B, et al. Ten months of exercise improves general and visceral adiposity, bone, and fitness in black girls. Obesity 2007;15(8):2077-85. [DOI: 10.1038/oby.2007.247]

Barnes 2015 {published data only}

studyIdentifiers

Barnes A, Collins C, Plotnikoff R, Morgan P. Feasibility and preliminary efficacy of the 'Mothers and Daughters Exercising (M.A.D.E.) 4 Life' pilot randomized controlled trial. Journal of Science and Medicine in Sport 2014;18:e123-. [DOI: 10.1016/j.jsams.2014.11.093]

* Barnes AT, Plotnikoff RC, Collins CE, Morgan PJ. Feasibility and Preliminary Efficacy of the MADE4Life Program: A Pilot Randomized Controlled Trial. Journal of Physical Activity & Health 2015;12(10):1378-93. [DOI: https://dx.doi.org/10.1123/jpah.2014-0331]

Barnes AT. The M.A.D.E (Mothers and Daughters Exercising) 4 Life pilot randomised control trial: a theory-based, physical activity intervention targeting mothers and their daughters. http://hdl.handle.net/1959.13/1312702 2015.

Barnes 2021 {published data only}

studyIdentifiers

ACTRN12616001228471. School-based interventions to improve the lunchbox contents and physical activity levels of children [The efficacy of school-based intervention, relative to comparison, in improving child physical activity and the nutritional quality of foods packed for children to consume at school]. https://anzctr.org.au/ACTRN12616001228471.aspx (first received 5 September 2016).

* Barnes C, Hall A, Nathan N, Sutherland R, McCarthy N, Pettet M, et al. Efficacy of a school-based physical activity and nutrition intervention on child weight status: Findings from a cluster randomized controlled

trial. Preventive Medicine 2021;153:106822. [DOI: 10.1016/j.ypmed.2021.106822]
Nathan NK, Sutherland RL, Hope K, McCarthy NJ, Pettett M, Elton B, et al. Implementation of a School Physical Activity Policy Improves Student Physical Activity Levels: Outcomes of a Cluster-Randomized Controlled Trial. Journal of Physical Activity and Health 2020;17(10):1009-18. [DOI: 10.1123/jpah.2019-0595]
Sutherland R, Nathan N, Brown A, Yoong S, Finch M, Lecathelinais C, et al. A randomized controlled trial to assess the potential efficacy, feasibility and acceptability of an m-health intervention targeting parents of school aged children to improve the nutritional quality of foods packed in the lunchbox 'SWAP IT'. International Journal of Behavioral Nutrition and Physical Activity 2019;16(1):54. [DOI: 10.1186/s12966-019-0812-7]

Beech 2003 {published data only}

studyIdentifiers

Beech BM, Klesges RC, Kumanyika SK, Murray DM, Klesges L, McClanahan B, et al. Child- and parent-targeted interventions: the Memphis GEMS pilot study. Ethnicity and Disease 2003;13(1 Suppl 1):S40-53.

Bohnert 2013 {published data only}

studyIdentifiers

Bohnert AM, Ward AK. Making a difference: Evaluating the Girls in the Game (GIG) after-school program. The Journal of Early Adolescence 2013;33(1):5-16.

Brandstetter 2012 {published data only}

studyIdentifiers

Brandstetter S, Klenk J, Berg S, Galm C, Fritz M, Peter R, et al. Overweight prevention implemented by primary school teachers: a randomised controlled trial. Obesity Facts 2012;5(1):1-11.

Branscum 2013 {published data only}

studyIdentifiers

Branscum P, Sharma M, Wang LL, Wilson B, Rojas-Guyler L. A process evaluation of a social cognitive theory-based childhood obesity prevention intervention: the Comics for Health program. Health Promotion Practice 2013;14(2):189-98. [DOI: 10.1177/1524839912437790]
* Branscum P, Sharma M, Wang LL, Wilson B. A true challenge for any superhero: an evaluation of a comic book obesity prevention program. Family & Community Health 2013;36(1):63-76.
Branscum PW. Designing and evaluating an after-school social cognitive theory based comic book intervention for the prevention of childhood obesity among elementary aged school children [thesis]. Vol. 3475137. Ann Arbor: University of Cincinnati, 2011.

Breheny 2020 {published data only}

studyIdentifiers

Breheny K, Adab P, Passmore S, Martin J, Lancashire E, Hemming K, et al. A cluster randomised controlled trial evaluating the effectiveness and cost-effectiveness of the daily mile on childhood obesity and wellbeing; the Birmingham daily mile protocol. BMC Public Health 2018;18(1):126. [DOI: https://dx.doi.org/10.1186/s12889-017-5019-8]
* Breheny K, Passmore S, Adab P, Martin J, Hemming K, Lancashire ER, et al. Effectiveness and cost-effectiveness of The Daily Mile on childhood weight outcomes and wellbeing: a cluster randomised controlled trial. International Journal of Obesity 2020;44:812-22. [DOI: 10.1038/s41366-019-0511-0]
Ward G, Scott D. Negotiating the Daily Mile Challenge; looking-like a walking break from the classroom. Sport, Education & Society 2021;26(2):119-134. [DOI: 10.1080/13573322.2019.1700106]

Brown 2013 {published data only}

studyIdentifiers

Brown B, Noonan C, Harris KJ, Parker M, Gaskill S, Ricci C, et al. Developing and piloting the Journey to Native Youth Health program in Northern Plains Indian communities. The Diabetes Educator 2013;39(1):109-18. [DOI: 10.1177/0145721712465343]

Caballero 2003 {published data only}

studyIdentifiers

* Caballero B, Clay T, Davis SM, Ethelbah B, Rock BH, Lohman T, et al. Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren. American Journal of Clinical Nutrition 2003;78(5):1030-38.
Caballero B, Davis S, Davis CE, Ethelbah B, Evans M, Lohman T, et al. Pathways: A school-based program for the primary prevention of obesity in American Indian children. Journal of Nutritional Biochemistry

1998;9(9):535-43. [DOI: https://dx.doi.org/10.1016/S0955-2863(98)00049-7]
Davis S, Gomez Y, Lambert L, Skipper B. Primary prevention of obesity in American Indian Children. Annals of the New York Academy of Sciences 1993;699:167-80.
Stone EJ, Norman JE, Davis SM, Stewart D, Clay TE, Caballero B, et al. Design, implementation, and quality control in the Pathways American-Indian multicenter trial. Preventive Medicine 2003;37:S13-23.

Cao 2015 {published data only}

studyIdentifiers

Cao Z, Hua J, Zhang D, Thapa JR, Wang S. A cohort study assessing the sustainable long-term effectiveness of a childhood-obesity intervention in China. International Journal of Epidemiology 2019;48(1):108-15. [DOI: https://dx.doi.org/10.1093/ije/dyy145]
* Cao ZJ, Wang SM, Chen Y. A randomized trial of multiple interventions for childhood obesity in China. American Journal of Preventive Medicine 2015;48(5):552-60.
Cao ZJ, Wang SM, Zheng WJ, Guo JN, Qu SX. Evaluation on the effectiveness of intervention comprehensive program on child obesity using Generalized Estimating Equation. Chinese Journal of Epidemiology 2014;35(7):773-78.

Carlin 2021 {published data only}

studyIdentifiers

* Carlin A, Logue C, Flynn J, Murphy MH, Gallagher AM. Development and Feasibility of a Family-Based Health Behavior Intervention Using Intelligent Personal Assistants: Randomized Controlled Trial. Journal of Medical Internet Research Formative Research 2021;5:e17501. [DOI: 10.2196/17501]
ISRCTN16792534. Can intelligent personal systems help families to be more physically active? [GetAMoveOn+: Using intelligent personal systems to promote physical activity within the home setting]. http://isrctn.com/ISRCTN16792534 (first received 30 May 2019).
Logue C, Flynn J, Gallagher A, Murphy M, Carlin A. Get A Move On: Using intelligent personal systems to promote behaviour change within the home setting - A process evaluation. In: Proceedings of the Nutrition Society. Conference: 13th European Nutrition Conference, FENS. Vol. 79. 2019. [DOI: http://dx.doi.org/10.1017/S0029665120000312]

Chai 2019 {published data only}

studyIdentifiers

Chai L, Collins C, May C, Holder C, Brown LJ, Burrows T. An online telehealth nutrition intervention to support parents in child weight management - A randomised feasibility controlled trial. Obesity facts 2019;12:111-12. [DOI: 10.1159/000489691]
* Chai LK, Collins CE, May C, Ashman A, Holder C, Brown LJ, et al. Feasibility and efficacy of a web-based family telehealth nutrition intervention to improve child weight status and dietary intake: A pilot randomised controlled trial. Journal of Telemedicine and Telecare 2019;27(3):146-58. [DOI: 10.1177/1357633x19865855]
Chai LK, Collins CE, May C, Holder C, Burrows TL. Accuracy of Parent-Reported Child Height and Weight and Calculated Body Mass Index Compared With Objectively Measured Anthropometrics: Secondary Analysis of a Randomized Controlled Trial. Journal of Medical Internet Research 2019;21(9):e12532. [DOI: https://dx.doi.org/10.2196/12532]

Chen 2010 {published data only}

studyIdentifiers

* Chen JL, Weiss S, Heyman MB, Lustig RH. Efficacy of a child-centred and family-based program in promoting healthy weight and healthy behaviors in Chinese American children: a randomized controlled study. Journal of Public Health 2010;32(2):219-29.
Chen JL, Weiss SJ, Heyman MB, Cooper B, Lustig RH. The Active Balance Childhood program for improving coping and quality of life in Chinese American children. Nursing Research 2010;59(4):270-79.

Choo 2020 {published data only}

studyIdentifiers

Choo Jina, Yang Hwa-Mi, Jae Sae-Young, Kim Hye-Jin, You Jihyun, Lee Juneyoung. Effects of the Healthy Children, Healthy Families, Healthy Communities Program for Obesity Prevention among Vulnerable Children: A Cluster-Randomized Controlled Trial. International Journal of Environmental Research and Public Health 2020;17(8):2895. [DOI: 10.3390/ijerph17082895]

Clemes 2020 {published data only}

studyIdentifiers

Chen Y, Tolfrey K, Pearson N, Bingham DD, Edwardson CL, Cale L, et al. Stand Out in Class: Investigating the Potential Impact of a Sit–Stand Desk Intervention on Children's Sitting and Physical Activity during

Class Time and after School. International Journal of Environmental Research and Public Health 2021;18(9):4759.

Clemes SA, Bingham DD, Pearson N, Chen Y, Edwardson C, McEachan R, et al. Stand Out in Class: restructuring the classroom environment to reduce sedentary behaviour in 9–10-year-olds — study protocol for a pilot cluster randomised controlled trial. Pilot and Feasibility Studies 2018;4(1):103. [DOI: 10.1186/s40814-018-0295-3]

* Clemes SA, Bingham DD, Pearson N, Chen Y, Edwardson CL, McEachan RRC, et al. Stand Out in Class: restructuring the classroom environment to reduce sitting time – findings from a pilot cluster randomised controlled trial. International Journal of Behavioral Nutrition and Physical Activity 2020;17(1):55. [DOI: 10.1186/s12966-020-00958-z]

ISRCTN12915848. Stand Out in Class: reducing sitting in the classroom environment [Stand Out in Class: restructuring the classroom environment to reduce sedentary behaviour – a pilot cluster randomised controlled trial]. CompletedURL: http://isrctn.com/ISRCTN12915848 (first received 9 November 2016).

Coleman 2012 {published data only}

studyIdentifiers

Coleman KJ, Shordon M, Caparosa SL, Pomichowski ME, Dzewaltowski DA. The healthy options for nutrition environments in schools (Healthy ONES) group randomized trial: using implementation models to change nutrition policy and environments in low income schools. International Journal of Behavioral Nutrition & Physical Activity 2012;9:80. [DOI: 10.1186/1479-5868-9-80]

Crespo 2012 {published data only}

studyIdentifiers

* Crespo NC, Elder JP, Ayala GX, Slymen DJ, Campbell NR, Sallis JF, et al. Results of a multi-level intervention to prevent and control childhood obesity among Latino children: the Aventuras Para Ninos Study. Annals of Behavioral Medicine 2012;43(1):84-100.

Elder JP, Arredondo EM, Campbell N, Baquero B, Duerksen S, Ayala G, et al. Individual, family, and community environmental correlates of obesity in Latino elementary school children. The Journal of school health 2010;80(1):20-55. [DOI: 10.1111/j.1746-1561.2009.00462.x]

Cunha 2013 {published data only}

studyIdentifiers

Cunha DB, de Souza Bda S, Pereira RA, Sichieri R. Effectiveness of a randomized school-based intervention involving families and teachers to prevent excessive weight gain among adolescents in Brazil. PLoS One 2013;8(2):e57498. [DOI: 10.1371/journal.pone.0057498]

Damsgaard 2014 {published data only}

studyIdentifiers

* Damsgaard CT, Dalskov SM, Laursen RP, Ritz C, Hjorth MF, Lauritzen L, et al. Provision of healthy school meals does not affect the metabolic syndrome score in 8-11-year-old children, but reduces cardiometabolic risk markers despite increasing waist circumference. British Journal of Nutrition 2014;112(11):1826-36.

Damsgaard CT, Dalskov SM, Petersen RA, Sorensen LB, Molgaard C, Biltoft-Jensen A, et al. Design of the OPUS School Meal Study: a randomised controlled trial assessing the impact of serving school meals based on the New Nordic Diet. Scandinavian Journal of Public Health 2012;40(8):693-703. [DOI: 10.1177/1403494812463173]

Hjorth MF, Sjodin A, Dalskov SM, Damsgaard CT, Michaelsen KF, Biltoft-Jensen A, et al. Sleep duration modifies effects of free ad libitum school meals on adiposity and blood pressure. Applied Physiology, Nutrition, & Metabolism = Physiologie Appliquee, Nutrition et Metabolisme 2016;41(1):33-40. [DOI: https://dx.doi.org/10.1139/apnm-2015-0319]

Davis 2021 {published data only}

studyIdentifiers

Davis J, Ghaddar R, Nikah K, Asigbee F, Landry M, Vandyousefi S, et al. A school-based cluster randomized gardening, nutrition, and cooking intervention: Effects on lipids. Obesity 2020;28 (SUPPL 2):44. [DOI: http://dx.doi.org/10.1002/oby.23063]

Davis J, Nikah K, Asigbee FM, Landry MJ, Vandyousefi S, Ghaddar R, et al. Design and participant characteristics of TX sprouts: A school-based cluster randomized gardening, nutrition, and cooking intervention. Contemporary Clinical Trials 2019;85:105834. [DOI: https://dx.doi.org/10.1016/j.cct.2019.105834]

* Davis JN, Pérez A, Asigbee FM, Landry MJ, Vandyousefi S, Ghaddar R, et al. School-based gardening, cooking and nutrition intervention increased vegetable intake but did not reduce BMI: Texas sprouts - a cluster randomized controlled trial. International Journal of Behavioral Nutrition & Physical Activity 2021;18(1):1-14. [DOI: 10.1186/s12966-021-01087-x]

Ghaddar R, Jeans M, Asigbee F, Landry M, Vandyousefi S, Davis J. Effect of a school-based gardening, nutrition, and cooking cluster randomized trial on diabetes risk. Obesity 2020;28 (SUPPL 2):83. [DOI: http://dx.doi.org/10.1002/oby.23063]

Jeans MR, Vandyousefi S, Landry MJ, Leidy HJ, Gray MJ, Bray MS, et al. Breakfast Consumption May Improve Fasting Insulin, HOMA-IR, and HbA1c Levels in Predominately Low-Income, Hispanic Children 7-12 Years of Age. Nutrients 2022;14(11):2320. [DOI: 10.3390/nu14112320]

Landry M, Asigbee F, Jeans M, Ghaddar R, Vandyousefi S, Van Den Berg A, et al. Effects of a school-based obesity intervention on knowledge & preference towards fruit & vegetables. Obesity 2020;28 (SUPPL 2):88. [DOI: http://dx.doi.org/10.1002/oby.23063]

De Bock 2013 {published data only}

studyIdentifiers

De Bock F, Fischer JE, Hoffmann K, Renz-Polster H. A participatory parent-focused intervention promoting physical activity in preschools: design of a cluster-randomized trial [Erratum appears in BMC Public Health. 2012;12:355]. BMC Public Health 2010;10:49.

* De Bock F, Genser B, Raat H, Fischer JE, Renz-Polster H. A participatory physical activity intervention in preschools: a cluster randomized controlled trial. American Journal of Preventive Medicine 2013;45(1):64-74. [DOI: 10.1016/j.amepre.2013.01.032]

de Greeff 2016 {published data only}

studyIdentifiers

Mullender-Wijnsma MJ, Hartman E, de Greeff JW, Bosker RJ, Doolaard S, Visscher C. Improving academic performance of school-age children by physical activity in the classroom: 1-year program evaluation. Journal of School Health 2015;85(6):365-71. [DOI: 10.1111/josh.12259]

* de Greeff JW, Hartman E, Mullender-Wijnsma MJ, Bosker RJ, Doolaard S, Visscher C. Effect of Physically Active Academic Lessons on Body Mass Index and Physical Fitness in Primary School Children. Journal of School Health 2016;86(5):346-52. [DOI: https://dx.doi.org/10.1111/josh.12384]

De Heer 2011 {published data only}

studyIdentifiers

de Heer H. Project I.e.a.n.: An after-school health and exercise program for elementary school children in El Paso, Texas. Dissertation Abstracts International: Section B: The Sciences and Engineering 2009;70(6-B):3769.

* de Heer HD, Koehly L, Pederson R, Morera O. Effectiveness and spillover of an after-school health promotion program for Hispanic elementary school children. American Journal of Public Health 2011;101(10):1907-13.

de Ruyter 2012 {published data only}

studyIdentifiers

De Ruyter JC, Olthof MO, Kuijper LDJ, Liem G, Seidell JC, Katan MB. Short-term satiety and long-term weight effects of sugarfree and sugar-sweetened beverages in children. Obesity facts 2013;6:33.

De Ruyter JC, Olthof MR, Kuijper LDJ, Katan MB. Effect of sugar-sweetened beverages on body weight in children: design and baseline characteristics of the Double-blind, Randomized INtervention study in Kids. Contemporary Clinical Trials 2012;33(1):247-57. [DOI: 10.1016/j.cct.2011.10.007]

Johnson RK. Children gain less weight and accumulate less fat when sugar-free, non-caloric beverages are substituted for sugar-sweetened beverages. Evidence Based Medicine 2013;18(5):185-86. [DOI: 10.1136/eb-2012-101137]

Katan MB, De Ruyter JC, Kuijper LDJ, Chow CC, Hall KD, Olthof MR. Impact of masked replacement of sugar-sweetened with sugar-free beverages on body weight increases with initial bmi: Secondary analysis of data from an 18 month double-blind trial in children. PLoS ONE 2016;11(7):e0159771. [DOI: http://dx.doi.org/10.1371/journal.pone.0159771]

NTR1796. A Study of the Effect of Replacing Sugary Drinks by Low-Sugar Alternatives on Body Weight and Fat Mass in Children (DRINK) [A double blind, randomized trial of the effects of liquid carbohydrates on body weight and fat mass in school children.]. https://www.onderzoekmetmensen.nl/en/trial/27678 (first received 4 May 2009).

Olthof M, De Ruyter J, Kuijper L, Chow C, Hall K, Katan M. Impact of a sugary beverage on body weight goes up with initial BMI in children. Annals of Nutrition and Metabolism 2015;67:187-8. [DOI: 10.1159/000440895]

de Ruyter C. A double-blind randomized trial in school children on the effects of sugar-sweetened or sugar-free beverages on body weight and body fatness. DART-Europe E-theses Portal [www.dart-europe.org]. Amsterdam: Vrije Universiteit Amsterdam, 2013.

* de Ruyter JC, Olthof MR, Seidell JC, Katan MB. A trial of sugar-free or sugar-sweetened beverages and body weight in children. The New England Journal of Medicine 2012;367(15):1397-1406.

Diaz-Castro 2021 {published data only}

studyIdentifiers

Diaz-Castro J, Garcia-Vega JE, Ochoa JJ, Puche-Juarez M, Toledano JM, Moreno-Fernandez J. Implementation of a Physical Activity Program Protocol in Schoolchildren: Effects on the Endocrine Adipose Tissue and Cognitive Functions. Front Nutr 2021;8:761213. [DOI: 10.3389/fnut.2021.761213]

Di Maglie 2022 {published data only}

studyIdentifiers

Di Maglie A, Marsigliante S, My G, Colazzo S, Muscella A. Effects of a physical activity intervention on schoolchildren fitness. Physiological Reports 2022;10(2):e15115. [DOI: 10.14814/phy2.15115]

Donnelly 2009 {published data only}

studyIdentifiers

* Donnelly JE, Greene JL, Gibson CA, Smith BK, Washburn RASullivan DK, et al. Physical Activity Across the Curriculum (PAAC): a randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. Preventive Medicine 2009;49:336-41.

DuBose KD, Mayo MS, Gibson CA, Green JL, Hill JO, Jacobsen DJ, et al. Physical activity across the curriculum (PAAC): rationale and design. Contemporary Clinical Trials 2008;29(1):83-93. [DOI: 10.1016/j.cct.2007.05.004]

Gibson CA, Smith BK, Dubose KD, Greene JL, Bailey BW, Williams SL, et al. Physical activity across the curriculum: year one process evaluation results. International Journal of Behavioral Nutrition and Physical Activity 2008;5:36.

Drummy 2016 {published data only}

studyIdentifiers

Drummy C, Murtagh EM, McKee DP, Breslin G, Davison GW, Murphy MH. The effect of a classroom activity break on physical activity levels and adiposity in primary school children. Journal of Paediatrics and Child Health. 2016;52:745-49. [DOI: http://dx.doi.org/10.1111/jpc.13182]

Duncan 2019 {published data only}

studyIdentifiers

Duncan S, Stewart T, McPhee J, Borotkanics R, Prendergast K, Zinn C, et al. Efficacy of a compulsory homework programme for increasing physical activity and improving nutrition in children: a cluster randomised controlled trial. International Journal of Behavioral Nutrition & Physical Activity 2019;16(1):80. [DOI: https://dx.doi.org/10.1186/s12966-019-0840-3]

Elder 2014 {published data only}

studyIdentifiers

Elder JP, Crespo NC, Corder K, Ayala GX, Slymen DJ, Lopez NV, et al. Childhood obesity prevention and control in city recreation centres and family homes: the MOVE/me Muevo Project. Pediatric Obesity 2014;9(3):218-31.

Epstein 2001 {published data only}

studyIdentifiers

Epstein LH, Gordy CC, Raynor HAB, Eddome M, Kilanowski CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. Obesity Research 2001;9(3):171-78.

Fairclough 2013 {published data only}

studyIdentifiers

Fairclough SJ, Hackett AF, Davies IG, Gobbi R, Mackintosh KA, Warburton GL, et al. Promoting healthy weight in primary school children through physical activity and nutrition education: a pragmatic evaluation of the CHANGE! randomised intervention study. BMC Public Health 2013;13:626.

Farmer 2017 {published data only}

studyIdentifiers

Farmer VL, Williams SM, Mann JI, Schofield G, McPhee JC, Taylor RW. The effect of increasing risk and challenge in the school playground on physical activity and weight in children: a cluster randomised controlled trial (PLAY). International Journal of Obesity 2017;41(5):793-800. [DOI: https://dx.doi.org/10.1038/ijo.2017.41]

Ford 2013 {published data only}

studyIdentifiers

Ford PA, Perkins G, Swaine I. Effects of a 15-week accumulated brisk walking programme on the body composition of primary school children. Journal of Sports Sciences 2013;31(2):114-22. [DOI: 10.1080/02640414.2012.723816]

Foster 2008 {published data only}

studyIdentifiers

Borradaile KE. Stick a fork in it: A psychometric evaluation of a food frequency questionnaire and an activity frequency questionnaire [thesis]. Vol. 3260882. Ann Arbor: University of Pennsylvania, 2007.

* Foster GD, Sherman S, Borradaile KE, Grundy KM, Vander Veur SS, Nachmani J, et al. A policy-based school intervention to prevent overweight and obesity. Pediatrics 2008;121:e794-e802.

NCT00142012. School-Based Obesity Prevention Program [School-Based Obesity Prevention Program]. https://clinicaltrials.gov/show/NCT00142012 (first received 31 August 2005).

Rappaport EB, Daskalakis C, Sendecki JA. Using routinely collected growth data to assess a school-based obesity prevention strategy. International Journal of Obesity 2013;37(1):79-85.

Fulkerson 2010 {published data only}

studyIdentifiers

Fulkerson JA, Rydell S, Kubik MY, Lytle L, Boutelle K, Story M, et al. Healthy Home Offerings via the Mealtime Environment (HOME): feasibility, acceptability, and outcomes of a pilot study. Obesity 2010;18 Suppl 1:S69-74.

Fulkerson 2015 {published data only}

studyIdentifiers

Arcan C, Friend S, Flattum CF, Story M, Fulkerson JA. Fill "half your child's plate with fruits and vegetables": Correlations with food-related practices and the home food environment. Appetite 2019;133:77-82. [DOI: https://dx.doi.org/10.1016/j.appet.2018.10.017]

Flattum C, Draxten M, Horning M, Fulkerson JANeumark-Sztainer DGarwick A, et al. HOME Plus: Program design and implementation of a family-focused, community-based intervention to promote the frequency and healthfulness of family meals, reduce children's sedentary behavior, and prevent obesity. International Journal of Behavioral Nutrition and Physical Activity 2015;12:53. [DOI: https://dx.doi.org/10.1186/s12966-015-0211-7]

* Fulkerson JA, Friend S, Flattum C, Horning M, Draxten M, Neumark-Sztainer D, et al. Promoting healthful family meals to prevent obesity: HOME Plus, a randomized controlled trial. International Journal of Behavioral Nutrition and Physical Activity 2015;12(1):154. [DOI: 10.1186/s12966-015-0320-3]

Fulkerson JA, Friend S, Horning M, Flattum C, Draxten M, Neumark-Sztainer D, et al. Family Home Food Environment and Nutrition-Related Parent and Child Personal and Behavioral Outcomes of the Healthy Home Offerings via the Mealtime Environment (HOME) Plus Program: A Randomized Controlled Trial. Journal of the Academy of Nutrition and Dietetics 2018;118(2):240-51. [DOI: 10.1016/j.jand.2017.04.006]

Fulkerson JA, Neumark-Sztainer D, Story M, Gurvich O, Kubik MY, Garwick A, et al. The Healthy Home Offerings via the Mealtime Environment (HOME) Plus study: design and methods. Contemporary Clinical Trials 2014;38(1):59-68. [DOI: https://dx.doi.org/10.1016/j.cct.2014.01.006]

Loth KA, Horning M, Friend S, Neumark-Sztainer D, Fulkerson J. An Exploration of How Family Dinners Are Served and How Service Style Is Associated With Dietary and Weight Outcomes in Children. Journal of Nutrition Education & Behavior 2017;49(6):513-18.e1. [DOI: https://dx.doi.org/10.1016/j.jneb.2017.03.003]

Myers ML, Fulkerson JA, Friend SE, Horning ML, Flattum CF. Case study: Behavior changes in the family-focused obesity prevention HOME Plus program. Public Health Nursing 2018;35(4):299-306. [DOI: https://dx.doi.org/10.1111/phn.12403]

Fulkerson 2022 {published data only}

studyIdentifiers

Fulkerson J, Horning M, Barr-Anderson D, Sidebottom A, Linde J, Lindberg R, et al. Weight outcomes of the new ULM at home (Nu-Home) RCT to prevent child obesity in rural communities. Obesity 2020;28 (SUPPL 2):36. [DOI: http://dx.doi.org/10.1002/oby.23057]

* Fulkerson JA, Horning M, Barr-Anderson DJ, Sidebottom A, Linde JA, Lindberg R, et al. Weight outcomes of NU-HOME: a randomized controlled trial to prevent obesity among rural children. International Journal of Behavioral Nutrition & Physical Activity 2022;19(1):29. [DOI: 10.1186/s12966-022-01260-w]

Fulkerson JA, Horning ML, Barr-Anderson DJ, Linde JA, Sidebottom AC, Lindberg R, et al. Universal childhood obesity prevention in a rural community: study design, methods and baseline participant characteristics of the NU-HOME randomized controlled trial. Contemporary Clinical Trials 2020;100:106160-. [DOI: 10.1016/j.cct.2020.106160]

Grace SM, Barr-Anderson DJ, Fulkerson JA. Exploring Associations of Household Chaos and Child Health Behaviors in Rural Families. American Journal of Health Behavior 2022;46(1):49-59. [DOI: 10.5993/AJHB.46.1.5]

Horning ML, Friend S, Freese RL, Barr-Anderson DJ, Linde JA, Sidebottom A, et al. Parent Weight, Diet, Active Living, and Food-Related Outcomes of the Family-Focused:NU-HOME Randomized Controlled Trial: NU-HOME Randomized Controlled Trial. Journal of the Academy of Nutrition and Dietetics 2023;123(5):751-60 e1. [DOI: 10.1016/j.jand.2022.10.009]

Horning ML, Friend S, Lee J, Flattum C, Fulkerson JA. Family Characteristics Associated with Preparing and Eating More Family Evening Meals at Home. Journal of the Academy of Nutrition and Dietetics 2022;122(1):121-28. [DOI: 10.1016/j.jand.2021.07.002]

Kramer-Kostecka EN, Folk AL, Friend S, Coan B, Kne L, Beaudette J, et al. A novel method to map community- and neighborhood-level access to rural physical activity built environments in the United States. Preventive Medicine Reports 2022;30:102066. [DOI: 10.1016/j.pmedr.2022.102066]

NCT02973815. New Ulm at HOME (Healthy Offerings Via the Mealtime Environment), NU-HOME [New Ulm at HOME (Healthy Offerings Via the Mealtime Environment), NU-HOME]. https://clinicaltrials.gov/show/NCT02973815 (first received 8 November 2016).

Gentile 2009 {published data only}

studyIdentifiers

Eisenmann JC, Gentile DA, Welk GJ, Callahan R, Strickland S, Walsh M, et al. SWITCH: rationale, design, and implementation of a community, school, and family-based intervention to modify behaviors related to childhood obesity. BMC Public Health 2008;8:223-23. [DOI: 10.1186/1471-2458-8-223]

* Gentile DA, Welk G, Eisenmann JC, Reimer RA, Walsh DA, Russell DW, et al. Evaluation of a multiple ecological level child obesity prevention program: Switch what you Do, View, and Chew. BMC Medicine 2009;7:49.

Welk GJ, Chen S, Nam YH, Weber TE. A formative evaluation of the SWITCH obesity prevention program: print versus online programming. BMC Obesity 2015;2:20. [DOI: https://dx.doi.org/10.1186/s40608-015-0049-1]

Gortmaker 1999 {published data only}

studyIdentifiers

* Gortmaker SL, Peterson K, Wiecha J, Sobal AM, Dixit S, Fox MK, et al. Reducing obesity via a school-based interdisciplinary intervention among youth. Archives of Pediatrics and Adolescent Medicine 1999;153(4):409-18.

Gortmaker SLPeterson K, Wiecha J, Sobal AM, Dixit S, Fox MK, et al. A school-based, interdisciplinary curriculum in grades 6 and 7 reduced obesity in girls. Evidence Based Nursing 2000;3:13.

Greve 2015 {published data only}

studyIdentifiers

Greve J, Heinesen E. Evaluating the impact of a school-based health intervention using a randomized field experiment. Economics & Human Biology 2015;18:41-56. [DOI: https://dx.doi.org/10.1016/j.ehb.2015.03.005]

Griffin 2019 {published data only}

studyIdentifiers

Griffin T, Sun Y, Sidhu M, Adab P, Burgess A, Collins C, et al. Healthy Dads, Healthy Kids UK, a weight management programme for fathers: feasibility RCT. BMJ Open 2019;9(12):e033534. [DOI: 10.1136/bmjopen-2019-033534]

Grydeland 2014 {published data only}

studyIdentifiers

Bergh IH, van Stralen MM, Bjelland M, Grydeland M, Lien N, Klepp KI, et al. Post-intervention effects on screen behaviours and mediating effect of parental regulation: the HEalth In Adolescents study--a multi-component school-based randomized controlled trial. BMC Public Health 2014;14:200. [DOI: https://dx.doi.org/10.1186/1471-2458-14-200]

Bjelland M, Hausken SE, Bergh IH, Grydeland M, Klepp KI, Andersen LF, et al. Changes in adolescents' and parents' intakes of sugar-sweetened beverages, fruit and vegetables after 20 months: results from the HEIA study - a comprehensive, multi-component school-based randomized trial. Food & Nutrition Research 2015;59:25932. [DOI: 10.3402/fnr.v59.25932]

Grydeland M, Bergh IH, Bjelland M, Lien N, Andersen LF, Ommundsen Y, et al. Intervention effects on physical activity: The HEIA study - a cluster randomized controlled trial. International Journal of Behavioral Nutrition and Physical Activity 2013;10:17.

* Grydeland M, Bjelland M, Anderssen SA, Klepp KI, Bergh IH, Andersen L, et al. Effects of a 20-month cluster randomised controlled school-based intervention trial on BMI of school-aged boys and girls: the HEIA

study. British Journal of Sports Medicine 2014;48(9):768-73.

Ha 2021 {published data only}

studyIdentifiers

ACTRN12618001524280. Promoting physical activity in children through family-based intervention: the "Active 1+FUN" program [Promoting physical activity in children through family-based intervention: Protocol of the "Active 1+FUN" randomized controlled trial]. https://anzctr.org.au/ACTRN12618001524280.aspx (first received 11 September 2018).

* Ha AS, Lonsdale C, Lubans DR, Ng FF, Ng JYY. Improving children's fundamental movement skills through a family-based physical activity program: results from the "Active 1 + FUN" randomized controlled trial. International Journal of Behavioral Nutrition & Physical Activity 2021;18(1):99. [DOI: 10.1186/s12966-021-01160-5]

Ha AS, Ng JYY, Lonsdale C, Lubans DR, Ng FF. Promoting physical activity in children through family-based intervention: protocol of the "Active 1 + FUN" randomized controlled trial. BMC Public Health 2019;19(1):218. [DOI: 10.1186/s12889-019-6537-3]

Habib-Mourad 2014 {published data only}

studyIdentifiers

* Habib-Mourad C, Ghandour LA, Moore HJ, Nabhani-Zeidan M, Adetayo K, Hwalla N, Summerbell C. Promoting healthy eating and physical activity among school children: findings from Health-E-PALS, the first pilot intervention from Lebanon. BMC Public Health 2014;14:940. [DOI: https://dx.doi.org/10.1186/1471-2458-14-940]

Habib-Mourad C, Moore H, Zeidan MN, Hwalla N, Summerbell C. Health-E-PALS: promoting Healthy Eating and Physical Activity in Lebanese school children - Intervention development. Education & Health 2014;32(1):3-8.

Habib-Mourad C An intervention to promote Healthy Eating and Physical Activity in Lebanese School children: Health-E-PALS, a pilot cluster randomised controlled trial. In: Obesity Facts. Vol. Conference. 2014.

Habib-Mourad C. An intervention to promote healthy eating and physical activity in lebanese school children: health-e-pals: a pilot cluster randomised controlled trial [thesis]. Vol. U597697. Ann Arbor: University of Durham (United Kingdom), 2013.

NCT03040258. Interventions to Promote Healthy Eating and Physical Activity in Lebanese School Children Targeting Overweight and Obesity- Pilot Study [Interventions to Promote Healthy Eating and Physical Activity in Lebanese School Children Targeting Overweight and Obesity- Pilot Study]. https://clinicaltrials.gov/show/NCT03040258 (first received 25 January 2017).

Habib-Mourad 2020 {published data only}

studyIdentifiers

Habib-Mourad CGhandour LA, Moore HJ, Nabhani-Zeidan MAdetayo K, Hwalla N, et al. Impact of a Three-Year Obesity Prevention Study on Healthy Behaviors and BMI among Lebanese Schoolchildren: Findings from Ajyal Salima Program. Nutrients 2020;12(9):2687. [DOI: 10.3390/nu12092687]

Haire-Joshu 2010 {published data only}

studyIdentifiers

Haire-Joshu D, Nanney MS, Elliott M, Davey C, Caito N, Loman D, et al. The use of mentoring programs to improve energy balance behaviors in high-risk children. Obesity 2010;18 Suppl 1:S75-83.

Han 2006 {published data only}

studyIdentifiers

Han X, Ling P, Chen Y. The Outcome Evaluation of the Elementary Students about 3-year in System-intervention of Nutrition Dinner in Yangpu District, Shanghai. Health Education and Health Promotion 2006;1:21-24.

Hannon 2018 {published data only}

studyIdentifiers

Hannon TS, Carroll AE, Palmer KN, Saha C, Childers WK, Marrero DG. Rationale and design of a comparative effectiveness trial to prevent type 2 diabetes in mothers and children: the ENCOURAGE healthy families study. Contemporary Clinical Trials 2015;40:105-11. [DOI: https://dx.doi.org/10.1016/j.cct.2014.11.016]

* Hannon TS, Saha CK, Carroll AE, Palmer KN, O'Kelly Phillips E, Marrero DG. The ENCOURAGE healthy families study: A comparative effectiveness trial to reduce risk for type 2 diabetes in mothers and children. Pediatric Diabetes 2018;20:20. [DOI: https://dx.doi.org/10.1111/pedi.12692]

Wessel J, O'Kelly-Phillips E, Palmer K, Saha C, Hannon T, Carroll A, et al. Abstract P121: Comparative Effectiveness Study of the Diabetes Prevention Program in Families: Preliminary Results. Circulation 2015;131 (Suppl.1):121. [DOI: 10.1161/circ.131.suppl_1.p121]
Wessel J, Phillips E, Palmer K, Saha C, Hannon TS, Carroll A, et al. Comparative effectiveness trial of the diabetes prevention program in families. Diabetes 2015;64:A633. [DOI: http://dx.doi.org/10.2337/db1524622510]

HEALTHY Study Group 2010 {published data only}

studyIdentifiers

Drews KL, Harrell JS, Thompson D, Mazzuto SL, Ford EG, Carter M, et al. Recruitment and retention strategies and methods in the HEALTHY study. International Journal of Obesity 2009;33(4):S21-28. [DOI: 10.1038/ijo.2009.113]
Hall WJ, Schneider M, Thompson D, Volpe SL, Steckler A, Hall JM, et al. School factors as barriers to and facilitators of a preventive intervention for pediatric type 2 diabetes. Translational Behavioral Medicine 2014;4(2):131-40.
Healthy Study Group. HEALTHY study rationale, design and methods: moderating risk of type 2 diabetes in multi-ethnic middle school students. International Journal of Obesity 2009;33(4):S4-20. [DOI: 10.1038/ijo.2009.112]
Marcus MD, Foster GD, El Ghormli L. Shifts in BMI category and associated cardiometabolic risk: prospective results from HEALTHY study. Pediatrics 2012;129(4):e983-991.
McMurray RG, Bassin S, Jago R, Bruecker S, Moe EL, Murray T, et al. Rationale, design and methods of the HEALTHY study physical education intervention component. International Journal of Obesity 2009;33(SUPPL. 4):S37-43. [DOI: 10.1038/ijo.2009.115]
Mobley CC, Stadler DD, Staten MA, El Ghormli L, Gillis B, Hartstein J, et al. Effect of Nutrition Changes on Foods Selected by Students in a Middle School-Based Diabetes Prevention Intervention Program: The HEALTHY Experience. Journal of School Health 2012;82(2):82-90.
Schneider M, Hall WJ, Hernandez AE, Hindes K, Montez G, Pham T, et al. Rationale, design and methods for process evaluation in the HEALTHY study. International Journal of Obesity 2009;33 Suppl 4(Suppl 4):S60-7. [DOI: 10.1038/ijo.2009.118]
* The Healthy Study Group. A school-based intervention for diabetes risk reduction. New England Journal of Medicine 2010;363(5):443-53.
Volpe SL, Hall WJ, Steckler A, Schneider M, Thompson D, Mobley C, et al. Process evaluation results from the HEALTHY nutrition intervention to modify the total school food environment. Health Education Research 2013;28(6):970-78.

Hendrie 2011 {published data only}

studyIdentifiers

Hendrie G, Sohonpal G, Lange K, Golley R. Change in the family food environment is associated with positive dietary change in children. International Journal of Behavioral Nutrition and Physical Activity 2013;10:4. [DOI: 10.1186/1479-5868-10-4]
* Hendrie GA, Golley RK. Changing from regular-fat to low-fat dairy foods reduces saturated fat intake but not energy intake in 4-13-y-old children. American Journal of Clinical Nutrition 2011;93(5):1117-27. [DOI: 10.3945/ajcn.110.010694]

Hendy 2011 {published data only}

studyIdentifiers

Hendy HM, Williams KE, Camise TS. Kid's Choice Program improves weight management behaviors and weight status in school children. Appetite 2011;56(2):484-94. [DOI: 10.1016/j.appet.2011.01.024]

Hooft van Huysduynen 2014 {published data only}

studyIdentifiers

Hooft Van Huysduynen EJC. Towards healthy diets for parents: effectiveness of a counselling intervention [thesis]. Wageningen: Wageningen University, 2014.

Hopper 2005 {published data only}

studyIdentifiers

Hopper Chris A, Munoz Kathy D, Gruber Mary B, Nguyen Kim P. The Effects of a Family Fitness Program on the Physical Activity and Nutrition Behaviors of Third-Grade Children. Research Quarterly for Exercise and Sport 2005;76(2):130-39.

Howe 2011 {published data only}

studyIdentifiers

Howe CA, Harris RA, Gutin B. A 10-month physical activity intervention improves body composition in young black boys. Journal of Obesity 2011;2011:358581.

Hull 2018 {published data only}

studyIdentifiers

* Hull PC, Buchowski M, Canedo JR, Beech BM, Du L, Koyama T, et al. Childhood obesity prevention cluster randomized trial for Hispanic families: outcomes of the healthy families study. Pediatric Obesity 2018;13(11):686-96. [DOI: https://dx.doi.org/10.1111/ijpo.12197]
Zoorob R, Buchowski MS, Beech B. Healthy families study: design of a childhood obesity prevention trial for Hispanic families. Contemporary Clinical Trials 2013;35(2):108-21.

Huys 2020 {published data only}

studyIdentifiers

Androutsos O, Anastasiou C, Lambrinou CP, Mavrogianni C, Cardon G, Van Stappen V, et al. Intra- and inter-observer reliability of anthropometric measurements and blood pressure in primary schoolchildren and adults: the Feel4Diabetes-study. BMC Endocrine Disorders 2020;20(Suppl 1):27. [DOI: 10.1186/s12902-020-0501-1]
* Huys N, Van Stappen V, Shadid S, De Craemer M, Androutsos O, Wikström K, et al. Effectiveness of a family-, school- and community-based intervention on physical activity and its correlates in Belgian families with an increased risk for type 2 diabetes mellitus: the Feel4Diabetes-study. BMC Public Health 2020;20(1):1231. [DOI: 10.1186/s12889-020-09336-7]
Manios Y, Androutsos O, Lambrinou CP, Cardon G, Lindstrom J, Annemans L, et al. A school- and community-based intervention to promote healthy lifestyle and prevent type 2 diabetes in vulnerable families across Europe: design and implementation of the Feel4Diabetes-study. Public Health Nutrition 2018;21(17):3281-3290. [DOI: https://dx.doi.org/10.1017/S1368980018002136]
Willems R, Tsoutsoulopoulou K, Brondeel R, Cardon G, Makrilakis K, Liatis S, et al. Cost-effectiveness analysis of a school- and community-based intervention to promote a healthy lifestyle and prevent type 2 diabetes in vulnerable families across Europe: the Feel4Diabetes-study. Preventive Medicine 2021;153:106722. [DOI: 10.1016/j.ypmed.2021.106722]

Ickovics 2019 {published data only}

studyIdentifiers

Ickovics JR, Duffany KO, Shebl FM, Peters SM, Read MA, Gilstad-Hayden KR, et al. Implementing School-Based Policies to Prevent Obesity: Cluster Randomized Trial. American Journal of Preventive Medicine 2019;56(1):e1-11. [DOI: https://dx.doi.org/10.1016/j.amepre.2018.08.026]

James 2004 {published data only}

studyIdentifiers

James J, Thomas P, Cavan D, Kerr D. Erratum: Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. BMJ 2004;328(7450):1236. [DOI: 10.1136/bmj.328.7450.1236]
* James J, Thomas P, Cavan D, Kerr D. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. BMJ 2004;328(7450):22.
James J, Thomas P, Kerr D. Preventing childhood obesity: two year follow-up results from the Christchurch obesity prevention programme in schools (CHOPPS). BMJ 2007;335:762.
Promotion Evidence-based Health. School anti-"fizzy drinks" programme helps to prevent obesity in children. Evidence-based Healthcare and Public Health 2004;8(6):368-69. [DOI: 10.1016/j.ehbc.2004.09.004]

Jansen 2011 {published data only}

studyIdentifiers

* Jansen W, Borsboom G, Meima A, Zwanenburg EJV, Mackenbach J. Effectiveness of a primary school-based intervention to reduce overweight. International Journal of Pediatric Obesity 2011;6(2-2):e70-7.
Jansen W, Raat H, Zwanenburg EJ, Reuvers I, van Walsem R, Brug J. A school-based intervention to reduce overweight and inactivity in children aged 6-12 years: study design of a randomized controlled trial. BMC Public Health 2008;8:257. [DOI: 10.1186/1471-2458-8-257]

Johnston 2013 {published data only}

studyIdentifiers

Johnston CA, Moreno JP, El-Mubasher A, Gallagher M, Tyler C, Woehler D. Impact of a school-based pediatric obesity prevention program facilitated by health professionals. Journal of School Health 2013;83(3):171-81.

Jones 2015 {published data only}

studyIdentifiers

Jones RA, Kelly J, Cliff DP, Batterham M, Okely AD. Acceptability and Potential Efficacy of Single-Sex After-School Activity Programs for Overweight and At-Risk Children: The Wollongong SPORT RCT. Pediatric Exercise Science 2015;27(4):535-45. [DOI: 10.1123/pes.2015-0116]

Kain 2014 {published data only}

studyIdentifiers

Kain J, Concha F, Moreno L, Leyton B. School-based obesity prevention intervention in Chilean children: effective in controlling, but not reducing obesity. Journal of Obesity 2014;2014:618293.

Keller 2009 {published data only}

studyIdentifiers

Keller A, Klossek A, Gausche R, Hoepffner W, Kiess W, Keller E. Prevention for obesity in children. Deutsche Medizinische Wochenschrift 2009;134:13-18.

Keshani 2016 {published data only}

studyIdentifiers

IRCT2014021613080N2. Effect of nutrition education on students nutritional status [The effect of a school based education on nutrition status and physical activity of grade 4 students of shiraz elemtary schools]. http://en.irct.ir/trial/13014 (first received 14 April 2014).

* Keshani P, Mousavi SM, Mirzaei Z, Hematdar Z, Maayeshi N, Mirshekari M, et al. Effect of a School-based Nutrition Education Program on the Nutritional Status of Primary School Children. Nutrition and Food Sciences Research 2016;3(1):27-34. [DOI: 10.18869/acadpub.nfsr.3.1.27]

Ketelhut 2022 {published data only}

studyIdentifiers

Ketelhut S, Roglin L, Martin-Niedecken AL, Nigg CR, Ketelhut K. Integrating Regular Exergaming Sessions in the ExerCube into a School Setting Increases Physical Fitness in Elementary School Children: A Randomized Controlled Trial. Journal of Clinical Medicine 2022;11(6):1570. [DOI: 10.3390/jcm11061570]

Khan 2014 {published data only}

studyIdentifiers

* Khan NA, Raine LB, Drollette ES, Scudder MR, Pontifex MB, Castelli DM, et al. Impact of the FITKids physical activity intervention on adiposity in prepubertal children. Pediatrics 2014;133(4):e875-83.

Raine LB, Khan NA, Drollette ES, Pontifex MB, Kramer AF, Hillman CH. Obesity, Visceral Adipose Tissue, and Cognitive Function in Childhood. Journal of Pediatrics 2017;187:134-40.e3. [DOI: https://dx.doi.org/10.1016/j.jpeds.2017.05.023]

Kipping 2008 {published data only}

studyIdentifiers

Kipping R. Preventing obesity in children: developing a school-based intervention [thesis]. Vol. U561254. Ann Arbor: University of Bristol (United Kingdom), 2010.

* Kipping RR, Payne C, Lawlor DA. Randomised controlled trial adapting US school obesity prevention to England. Archives of Disease in Chidhood 2008;93:469-73.

Kipping 2014 {published data only}

studyIdentifiers

Anderson EL, Howe LD, Kipping RR, Campbell R, Jago R, Noble SM, et al. Long-term effects of the Active for Life Year 5 (AFLY5) school-based cluster-randomised controlled trial. BMJ Open 2016;6(11):e010957. [DOI: http://dx.doi.org/10.1136/bmjopen-2015-010957]

* Kipping RR, Howe LD, Jago R, Campbell R, Wells S, Chittleborough CR, et al. Effect of intervention aimed at increasing physical activity, reducing sedentary behaviour, and increasing fruit and vegetable consumption in children: active for Life Year 5 (AFLY5) school based cluster randomised controlled trial. BMJ 2014;348:g3256.

Lawlor DA, Howe LD, Anderson EL, Kipping RR, Campbell R, Wells S, et al. The Active for Life Year 5 (AFLY5) school-based cluster randomised controlled trial: Effect on potential mediators. BMC Public Health 2016;16(1):68. [DOI: 10.1186/s12889-016-2734-5]

Lawlor DA, Jago R, Noble SM, Chittleborough CR, Campbell R, Mytton J, et al. The Active for Life Year 5 (AFLY5) school based cluster randomised controlled trial: study protocol for a randomized controlled trial. Trials 2011;12:181. [DOI: 10.1186/1745-6215-12-181]

Lawlor DA, Peters TJ, Howe LD, Noble SM, Kipping RR, Jago R. The Active for Life Year 5 (AFLY5) school-based cluster randomised controlled trial protocol: detailed statistical analysis plan. Trials 2013;14:234. [DOI: 10.1186/1745-6215-14-234]

Klesges 2010 {published data only}

studyIdentifiers

Klesges RC, Obarzanek E, Klesges LM, Stockton MB, Beech BM, Murray DM, Lanctot JQ, Sherrill-Mittleman DA. Memphis Girls health Enrichment Multi-site Studies (GEMS): Phase 2: design and baseline. Contemp Clin Trials 2008;29(1):42-55. [DOI: 10.1016/j.cct.2007.05.001]

* Klesges RC, Obarzanek E, Kumanyika S. The Memphis Girls' health Enrichment Multi-site Studies (GEMS): an evaluation of the efficacy of a 2-year obesity prevention program in African American girls. Archives of Pediatrics & Adolescent Medicine 2010;164(11):1007-14.

Kobel 2017 {published data only}

studyIdentifiers

Dreyhaupt J, Koch J, Wirt B, Schreiber T, Brandstetter A, Kesztyus S, et al. Evaluation of a health promotion program in children: Study protocol and design of the cluster-randomized Baden-Wurttemberg primary school study. BMC Public Health 2012;12:157.

Kesztyüs D, Lauer R, Kesztyüs T, Kilian R, Steinacker JM, on behalf of the “Join the Healthy Boat” Study Group. Costs and effects of a state-wide health promotion program in primary schools in Germany – the Baden-Württemberg Study: A cluster-randomized, controlled trial. PLOS ONE 2017;12(2):e0172332. [DOI: 10.1371/journal.pone.0172332]

Kobel S, Kesztyus D, Steinacker JM. Teacher-Based Health Promotion in Primary School Children in Baden-Wurttemberg: Effects on Endurance Performance and Incidence of Abdominal Obesity. Gesundheitswesen 2019;16:16. [DOI: https://dx.doi.org/10.1055/a-0921-7076]

* Kobel S, Lammle C, Wartha O, Kesztyus D, Wirt T, Steinacker JM. Effects of a Randomised Controlled School-Based Health Promotion Intervention on Obesity Related Behavioural Outcomes of Children with Migration Background. Journal of Immigrant and Minority Health 2017;19(2):254-62. [DOI: 10.1007/s10903-016-0460-9]

Kobel S, Wirt T, Schreiber A, Kesztyus D, Kettner S, Erkelenz N, et al. Intervention effects of a school-based health promotion programme on obesity related behavioural outcomes. Journal of Obesity 2014;2014:476230. [DOI: https://dx.doi.org/10.1155/2014/476230]

Kocken 2016 {published data only}

studyIdentifiers

Kocken PL, Scholten AM, Westhoff E, De Kok BP, Taal EM, Goldbohm RA. Effects of a Theory-Based Education Program to Prevent Overweightness in Primary School Children. Nutrients 2016;8(1):04. [DOI: https://dx.doi.org/10.3390/nu8010012]

Kovalskys 2016 {published data only}

studyIdentifiers

* Kovalskys I, Rausch Herscovici C, Indart P, Zonis Luciana ZL, Anez E, Orellana L. Maintaining levels of physical activity (PA) among 9- 11 y old children is a challenge. Evidence from SALTEN, a school-based obesity prevention intervention in Argentina. Obesity Reviews 2016;17:145. [DOI: http://dx.doi.org/10.1111/obr.12402]

Kovalskys I, Rausch Herscovici C, Indart Rougier P, Anez EV, Zonis LN, Orellana L. Childhood obesity and bullying in schools of Argentina: analysis of this behaviour in a context of high prevalence. Journal of Childhood Obesity 2016;1(3):1-9.

Kriemler 2010 {published data only}

studyIdentifiers

Hartmann T, Zahner L, Puhse U, Puder J. Effects of a school-based physical activity program on physical and psychosocial quality of life in elementary school children: a cluster-randomized trial. Pediatric Exercise Science 2010;22(4):511-22.

* Kriemler S, Zahner L, Schindler C, Meyer U, Hartmann T, Hebestreit H, et al. Effect of school based physical activity programme (KISS) on fitness and adiposity in primary schoolchildren: cluster randomised controlled trial. BMJ (Clinical research ed) 2010;340:c785.

Kriemler S. An active school programme. Sportex health (ISSN: 147-18154) 2011;27:7-9.

Lima RA, Andersen LB, Soares FC, Kriemler S. The causal pathway effects of a physical activity intervention on adiposity in children: The KISS Study cluster randomized clinical trial. Scandinavian Journal of Medicine & Science in Sports 2020;30(9):1685-91. [DOI: https://dx.doi.org/10.1111/sms.13741]

Meyer U, Schindler C, Zahner L, Ernst D, Hebestreit H, van Mechelen W, et al. Long-term effect of a school-based physical activity program (KISS) on fitness and adiposity in children: a cluster-randomized controlled trial. PLoS ONE 2014;9(2):e87929-.

Meyer U. Short- and long-term effects of a multi-component physical activity intervention in primary school. DART-Europe E-theses Portal [www.dart-europe.org] 2012.

Puder JJ, Zahner L, Schindler C, Meyer U, Hebestreit H, Rocca Hb- L, et al. A school-based physical activity program increases fitness and decreases adiposity and cardiovascular risk factors in primary school children: a cluster-randomized trial. Diabetologia 2009;52(S1):S330-1. [DOI: 10.1007/s00125-009-1445-1]

Zahner L, Puder JJ, Roth R, Schmid M, Guldimann R, Puhse U, et al. A school-based physical activity program to improve health and fitness in children aged 6-13 years ("Kinder-Sportstudie KISS"): study design of a randomized controlled trial. BMC Public Health 2006;6:147. [DOI: 10.1186/1471-2458-6-147]

Kubik 2021 {published data only}

studyIdentifiers

Kubik MY, Fulkerson JA, Sirard JR, Garwick A, Temple J, Gurvich O, et al. School-based secondary prevention of overweight and obesity among 8- to 12-year old children: Design and sample characteristics of the SNAPSHOT trial. Contemporary Clinical Trials 2018;75:9-18. [DOI: https://dx.doi.org/10.1016/j.cct.2018.10.011]

* Kubik MY, Lee J, Fulkerson JA, Gurvich OV, Sirard JR. School-Based Secondary Obesity Prevention for 8- to 12-Year-Olds: Results from the Students, Nurses, and Parents Seeking Healthy Options Together Randomized Trial. Childhood Obesity 2021;17(3):185-95. [DOI: http://dx.doi.org/10.1089/chi.2020.0321]

Lau 2016 {published data only}

studyIdentifiers

* Lau PW, Wang JJ, Maddison R. A Randomized-Controlled Trial of School-Based Active Videogame Intervention on Chinese Children's Aerobic Fitness, Physical Activity Level, and Psychological Correlates. Games for health journal 2016;5(6):405-12. [DOI: 10.1089/g4h.2016.0057]

Lau WC, Zhang S, Maddison R. The effect of a school-based active video game intervention on children's aerobic fitness, physical activity level, and exercise related psychological variables: A preliminary RCT trial. Obesity Facts 2015;8:145. [DOI: http://dx.doi.org/10.1159/000382140]

Lazaar 2007 {published data only}

studyIdentifiers

Lazaar N, Aucouturier J, Ratel S, Rance M, Meyer M, Duché P. Effect of physical activity intervention on body composition in young children: influence of body mass index status and gender. Acta Paediatrica 2007;96(9):1315-20.

Lent 2014 {published data only}

studyIdentifiers

Lent MR, Vander Veur SS, McCoy TA, Wojtanowski AC, Sandoval B, Sherman S, et al. A randomized controlled study of a healthy corner store initiative on the purchases of urban, low-income youth. Obesity 2014;22(12):2494-500. [DOI: https://dx.doi.org/10.1002/oby.20878]

Levy 2012 {published data only}

studyIdentifiers

Levy S, Morales Ruan T, Amaya Castellanos C, Salazar Coronel C, Jimenez Aguilar A, Mendez Gomez A, et al. Effectiveness of a diet and physical activity promotion strategy on the prevention of obesity in Mexican school children. BMC Public Health 2012;12:152. [DOI: 10.1186/1471-2458-12-152]

Li 2010 {published data only}

studyIdentifiers

Li YP, Hu XQ, Schouten EG, Liu AL, Du SM, Li LZ, et al. Report on childhood obesity in China (8): effects and sustainability of physical activity intervention on body composition of Chinese youth. Biomedical and Environmental Sciences 2010;23(3):180-7. [DOI: 10.1016/S0895-3988(10)60050-5]

Li 2019 {published data only}

studyIdentifiers

Li B, Liu WJ, Adab P, Pallan M, Hemming K, Frew E, et al. Cluster-randomised controlled trial to assess the effectiveness and cost-effectiveness of an obesity prevention programme for Chinese primary school-aged children: the CHIRPY DRAGON study protocol. BMJ Open 2017;7(11):e018415. [DOI: https://dx.doi.org/10.1136/bmjopen-2017-018415]

Li B, Liu WJ, Cheng KK, Pallan M, Hemming K, Frew E, et al. Development of the theory-based Chinese primary school children physical activity and dietary behaviour changes intervention (CHIRPY DRAGON): Development of a cluster-randomised controlled trial. The Lancet 2016;388 (SPEC.ISS 1):51.

* Li B, Pallan M, Liu WJ, Hemming K, Frew E, Lin R, et al. The CHIRPY DRAGON intervention in preventing obesity in Chinese primary-school--aged children: A cluster-randomised controlled trial. PLoS Medicine 2019;16(11):e1002971. [DOI: https://dx.doi.org/10.1371/journal.pmed.1002971]
Zanganeh M, Adab P, Li B, Pallan M, Liu WJ, Hemming K, et al. Cost-Effectiveness of a School-and Family-Based Childhood Obesity Prevention Programme in China: The "CHIRPY DRAGON" Cluster-Randomised Controlled Trial. International Journal of Public Health 2021;66:1604025. [DOI: 10.3389/ijph.2021.1604025]
Zanganeh M, Adab P, Li B, Pallan M, Liu WJ, Rong L, et al. Relationship Between Weight Status and Health-Related Quality of Life in School-age Children in China. Journal of Health Economics and Outcomes Research 2022;9(1):75-81. [DOI: 10.36469/jheor.2022.32414]

Lichtenstein 2011 {published data only}

studyIdentifiers

Lichtenstein S, Teufel U, Weiland C, Engel N, Engelmann G, Hoffmann GF, et al. Prevention of obesity in primary school: A school-based prevention program reduces the risk for obesity in school children [Adipositasprävention in Grundschulen]. Monatsschrift fur Kinderheilkunde 2011;159(8):751-57.

Liu 2019 {published data only}

studyIdentifiers

Liu Z, Li Q, Maddison R, Ni Mhurchu C, Jiang Y, Wei DM, et al. A School-Based Comprehensive Intervention for Childhood Obesity in China: A Cluster Randomized Controlled Trial. Childhood Obesity 2019;15(2):105-15. [DOI: https://dx.doi.org/10.1089/chi.2018.0251]

Liu 2022 {published data only}

studyIdentifiers

* Liu Z, Gao P, Gao AY, Lin Y, Feng XX, Zhang F, et al. Effectiveness of a Multifaceted Intervention for Prevention of Obesity in Primary School Children in China: A Cluster Randomized Clinical Trial. JAMA Pediatrics 2022;176(1):e214375. [DOI: 10.1001/jamapediatrics.2021.4375]
Liu Z, Wu Y, Niu WY, Feng X, Lin Y, Gao A, et al. A school-based, multi-faceted health promotion programme to prevent obesity among children: protocol of a cluster-randomised controlled trial (the DECIDE-Children study). BMJ open 2019;9(11):e027902. [DOI: 10.1136/bmjopen-2018-027902]
Liu Z, Yue Z, Wen L, Zhao J, Zhou S, Gao A, et al. Time-specific effects of a multifaceted intervention on accelerometer-measured physical activity in primary school children: A cluster-randomized controlled trial. medRxiv 2022:2022.05.06.22274770. [DOI: 10.1101/2022.05.06.22274770]
NCT03665857. Childhood Obesity Intervention Study [A School-based Multicomponent Intervention Study for Preventing Excessive Weight Gain Among Primary School Students]. https://clinicaltrials.gov/show/NCT03665857 (first received 11 September 2018).

Llargues 2012 {published data only}

studyIdentifiers

Llargues E, Franco R, Recasens A, Nadal A, Vila M, Perez MJ, et al. Assessment of a school-based intervention in eating habits and physical activity in school children: the AVall study. Journal of Epidemiology & Community Health 2011;65(10):896-901.
* Llargues E, Recasens A, Franco R, Nadal A, Vila M, Perez MJ, et al. Medium-term evaluation of an educational intervention on dietary and physical exercise habits in schoolchildren: the Avall 2 study. Endocrinologia y Nutricion 2012;59(5):288-95.
Llargués E, Recasens MA, Manresa JM, Jensen BB, Franco R, Nadal A, et al. Four-year outcomes of an educational intervention in healthy habits in schoolchildren: the Avall 3 Trial. European Journal of Public Health 2017;27(1):42-7. [DOI: 10.1093/eurpub/ckw199]
Mora T, Llargues E, Recasens A. Does health education affect BMI? Evidence from a school-based randomised-control trial. Economics and Human Biology 2015;17(C):190-201.
Recasens MA, Xicola-Coromina E, Manresa JM, Ullmo PA, Jensen BB, Franco R, et al. Impact of school-based nutrition and physical activity intervention on body mass index eight years after cessation of randomized controlled trial (AVall study). Clinical Nutrition 2019;24:24. [DOI: https://dx.doi.org/10.1016/j.clnu.2018.12.029]

Lloyd 2018 {published data only}

studyIdentifiers

Creanor S, Lloyd J, Hillsdon M, Dean S, Green C, Taylor RS, et al. Detailed statistical analysis plan for a cluster randomised controlled trial of the Healthy Lifestyles Programme (HeLP), a novel school-based intervention to prevent obesity in school children. Trials 2016;17(1):599. [DOI: https://dx.doi.org/10.1186/s13063-016-1737-y]
Lloyd AB, Lubans DR, Plotnikoff RC, Morgan PJ. Impact of the 'Healthy Dads, Healthy Kids' lifestyle programme on the activity- and diet-related parenting practices of fathers and mothers. Pediatric Obesity

2014;9(6):e149-55. [DOI: https://dx.doi.org/10.1111/ijpo.248]
* Lloyd J, Creanor S, Logan S, Green C, Dean SG, Hillsdon M, et al. Effectiveness of the Healthy Lifestyles Programme (HeLP) to prevent obesity in UK primary-school children: a cluster randomised controlled trial. The Lancet Child and Adolescent Health 2018;2(1):35-45. [DOI: http://dx.doi.org/10.1016/S2352-4642%2817%2930151-7]
Lloyd J, Creanor S, Price L, Abraham C, Dean S, Green C, et al. Trial baseline characteristics of a cluster randomised controlled trial of a school-located obesity prevention programme; the Healthy Lifestyles Programme (HeLP) trial. BMC Public Health 2017;17(1):291. [DOI: https://dx.doi.org/10.1186/s12889-017-4196-9]
Lloyd J, McHugh C, Minton J, Eke H, Wyatt K. The impact of active stakeholder involvement on recruitment, retention and engagement of schools, children and their families in the cluster randomised controlled trial of the Healthy Lifestyles Programme (HeLP): a school-based intervention to prevent obesity. Trials 2017;18(1):378. [DOI: https://dx.doi.org/10.1186/s13063-017-2122-1]
Lloyd J, Wyatt K. Uptake, retention and engagement of children participating in the cluster randomised controlled trial of the Healthy Lifestyles Programme (HeLP). Education & Health 2015;33(4):88-95.
Wyatt K, Lloyd J, Creanor S, Green C, Dean SG, Hillsdon M, et al. Cluster randomised controlled trial and economic and process evaluation to determine the effectiveness and cost-effectiveness of a novel intervention [Healthy Lifestyles Programme (HeLP)] to prevent obesity in school children. Southampton (UK): NIHR Journals Library 2018;6(1):(no pagination). [DOI: 10.3310/phr06010]
Wyatt K, Lloyd J. Development of a novel, school located, obesity prevention programme, the Healthy Lifestyles Programme (HeLP). Education & Health 2013;31(2):89-95.
Wyatt KM, Lloyd JJ. The Healthy Lifestyles Programme (HeLP), a novel school-based intervention to prevent obesity in school children: study protocol for a randomised controlled trial. Trials 2013;14:95-95.

Lynch 2016 {published data only}

studyIdentifiers

Lynch BA, Gentile N, Maxson J, Quigg S, Swenson L, Kaufman T. Elementary School-Based Obesity Intervention Using an Educational Curriculum. Journal of Primary Care & Community Health 2016;7(4):265-71. [DOI: https://dx.doi.org/10.1177/2150131916644888]

Macias-Cervantes 2009 {published data only}

studyIdentifiers

Macias-Cervantes MHMalacara JMGaray-Sevilla MEDiaz-Cisneros FJ. Effect of recreational physical activity on insulin levels in Mexican/Hispanic children. The European Journal of Pediatrics 2009;168:1195-1202.

Madsen 2013 {published data only}

studyIdentifiers

Madsen K, Thompson H, Adkins A, Crawford Y. School-community partnerships: a cluster-randomized trial of an after-school soccer program. JAMA Pediatrics 2013;167(4):321-26.

Magnusson 2012 {published data only}

studyIdentifiers

Hrafnkelsson H, Magnusson KT, Thorsdottir I, Johannsson E, Sigurdsson E. Result of school-based intervention on cardiovascular risk factors. Scandinavian Journal of Primary Health Care 2014;32(4):149-55.
* Magnusson KT, Hrafnkelsson H, Sigurgeirsson I, Johannsson E, Sveinsson T. Limited effects of a 2-year school-based physical activity intervention on body composition and cardiorespiratory fitness in 7-year-old children. Health Education Research 2012;27(3):484-94.
Magnusson KT, Sigurgeirsson I, Sveinsson T, Johannsson E. Assessment of a two-year school-based physical activity intervention among 7-9-year-old children. International Journal of Behavioral Nutrition and Physical Activity 2011;8:138. [DOI: 10.1186/1479-5868-8-138]

Marcus 2009 {published data only}

studyIdentifiers

Eli K, Neovius C, Nordin K, Brissman M, Ek A. Parents' experiences following conversations about their young child's weight in the primary health care setting: a study within the STOP project. BMC Public Health 2022;22(1):1540. [DOI: 10.1186/s12889-022-13803-8]
* Marcus C, Nyberg G, Nordenfelt A, Karpmyr M, Kowalski J, Ekelund U. A 4-year, cluster-randomized, controlled childhood obesity prevention study: STOPP. International Journal of Obesity 2009;33:408-17.
Nyberg G. Physical Activity in 6-10 Year Old Children : Variations over Time, Associations with Metabolic Risk Factors and Role in Obesity Prevention. Vol. 28426890. Ann Arbor: Karolinska Institutet (Sweden), 2009.

Marsigliante 2022 {published data only}

studyIdentifiers

Marsigliante S, Ciardo V, Di Maglie A, My G, Muscella A. Efficacy of school-based intervention programs in reducing overweight: A randomized trial. Front Nutr 2022;9:1001934. [DOI: 10.3389/fnut.2022.1001934]

Martinez-Vizcaino 2014 {published data only}

studyIdentifiers

* Martinez-Vizcaino V, Sanchez-Lopez M, Notario-Pacheco B, Salcedo-Aguilar F, Solera-Martínez M, Franquelo-Morales PL, et al. Gender differences on effectiveness of a school-based physical activity intervention for reducing cardiometabolic risk: A cluster randomized trial. International Journal of Behavioral Nutrition and Physical Activity 2014;11:154.

Martinez-Vizcaino V, Sanchez-Lopez M, Salcedo-Aguilar F, Notario-Pacheco B, Solera-Martinez M, Moya-Martinez P, et al. Protocol of a randomized cluster trial to assess the effectiveness of the MOVI-2 program on overweight prevention in schoolchildren. Revista Española de Cardiología (English Edition) 2012;65(5):427-33. [DOI: 10.1016/j.recesp.2011.12.008]

Martinez-Vizcaino 2020 {published data only}

studyIdentifiers

Alvarez-Bueno C, Cavero-Redondo I, Garrido-Miguel M, Notario-Pacheco B, Martinez-Andres M, Sanchez-Lopez M. 24th European Congress on Obesity (ECO2017), Porto, Portugal, May 17-20, 2017: Abstracts. Obesity Facts 2017;10 Suppl 1(Suppl 1):1-274. [DOI: 10.1159/000468958]

Cavero-Redondo I, Alvarez-Bueno C, Garrido-Miguel M, Martinez-Vizcaino V, Diez-Fernandez A, Fernandez-Infante A. 24th European Congress on Obesity (ECO2017), Porto, Portugal, May 17-20, 2017: Abstracts. Obesity Facts 2017;10(1):1-274. [DOI: 10.1159/000468958]

* Martinez-Vizcaino V, Pozuelo-Carrascosa DP, Garcia-Prieto JC, Cavero-Redondo I, Solera-Martinez M, Garrido-Miguel M, et al. Effectiveness of a school-based physical activity intervention on adiposity, fitness and blood pressure: MOVI-KIDS study. British Journal of Sports Medicine 2020;54(5):279-85. [DOI: https://dx.doi.org/10.1136/bjsports-2018-099655]

Martinez-Vizcaino 2022 {published data only}

studyIdentifiers

Martinez-Vizcaino V, Alvarez-Bueno C, Cavero-Redondo I, Pozuelo-Carrascosa DP, Garrido-Miguel M, Martinez-Hortelano JA, et al. MOVI-daFIT! Intervention: Rationale and design of a cluster randomized controlled trial testing the effects on improving adiposity, cognition, and subclinical atherosclerosis by increasing cardiorespiratory fitness in children. Medicine 2019;98(9):e14737. [DOI: http://dx.doi.org/10.1097/MD.0000000000014737]

* Martinez-Vizcaino V, Soriano-Cano A, Garrido-Miguel M, Cavero-Redondo I, Medio EP, Madrid VM, et al. The effectiveness of a high-intensity interval games intervention in schoolchildren: A cluster-randomized trial. Scandinavian Journal of Medicine & Science in Sports 2022;32(4):765-81. [DOI: 10.1111/sms.14113]

Martínez-Vizcaíno V, Garrido-Miguel M, Redondo-Tébar A, Notario-Pacheco B, Rodríguez-Martín B, Sánchez-López M. The "Fat but Fit" Paradigm from a Children's Health-Related Quality of Life Perspective. Childhood Obesity 2021;17(7):449-456. [DOI: 10.1089/chi.2021.0041]

NCT03236337. Effectiveness of MOVI Interventions on Adiposity, Cognition and Subclinical Atherosclerosis: MOVI-daFit! [Effectiveness of MOVI Interventions on Improving Adiposity, Cognition and Subclinical Atherosclerosis by Increasing Aerobic Cardiorespiratory Fitness: MOVI-daFit]. www.clinicaltrials.gov/study/NCT03236337 (first received 1 August 2017).

Meng 2013 (Beijing) {published data only}

studyIdentifiers

Meng LXu HLiu Avan Raaij JBemelmans WHu XZhang QDu SFang HMa JXu GLi YGuo HDu LMa G. The costs and cost-effectiveness of a school-based comprehensive intervention study on childhood obesity in China. PLoS ONE 2013;8(10):e77971-.

Morgan 2011 {published data only}

studyIdentifiers

* Morgan PJ, Lubans DR, Callister R, Okely AD, Burrows TL, Fletcher R, et al. The 'Healthy Dads, Healthy Kids' randomized controlled trial: efficacy of a healthy lifestyle program for overweight fathers and their children. International journal of obesity 2011;35(3):436-47.

Morgan PJ, Lubans DR, Collins CE, Callister R, Okely AO, Fletcher R, et al. The 'Healthy Dads, Healthy Kids' randomized controlled trial: efficacy of a healthy lifestyle program for overweight fathers and their children. Obesity Reviews 2010;11:447-48. [DOI: 10.1111/j.1467-789X.2010.00763-7.x]

Morgan 2014 {published data only}

studyIdentifiers

* Morgan PJ, Collins CE, Plotnikoff RC, Callister R, Burrows T, Fletcher R, et al. The 'Healthy Dads, Healthy Kids' community randomized controlled trial: a community-based healthy lifestyle program for fathers and their children. Preventive Medicine 2014;61:90-9. [DOI: https://dx.doi.org/10.1016/j.ypmed.2013.12.019]

  Morgan PJ, Lubans DR, Plotnikoff RC, Callister R, Burrows T, Fletcher R, et al. The 'Healthy Dads, Healthy Kids' community effectiveness trial: study protocol of a community-based healthy lifestyle program for fathers and their children [The 'Healthy Dads, Healthy Kids' community effectiveness trial: study protocol of a community-based healthy lifestyle program for fathers and their children]. BMC Public Health 2011;11:876. [DOI: 10.1186/1471-2458-11-876]

  Williams A, de Vlieger N, Young M, Jensen ME, Burrows TL, Morgan PJ, et al. Dietary outcomes of overweight fathers and their children in the Healthy Dads, Healthy Kids community randomised controlled trial [Dietary outcomes of overweight fathers and their children in the Healthy Dads, Healthy Kids community randomised controlled trial]. Journal of Human Nutrition & Dietetics 2018;31(4):523-532. [DOI: https://dx.doi.org/10.1111/jhn.12543]

Morgan 2019 {published data only}

studyIdentifiers

ACTRN12615000022561. Engaging dads and daughters to increase physical activity and social and emotional well-being in pre-adolescent girls: the DADEE (Dads And Daughters Exercising and Empowered) program [Engaging dads and daughters to increase physical activity and social and emotional well-being in pre-adolescent girls: The DADEE (Dads And Daughters Exercising and Empowered) randomised controlled trial]. https://anzctr.org.au/ACTRN12615000022561.aspx (first received 15 January 2015).

ACTRN12616001270404. Engaging Fathers to Increase Physical Activity and Well-being in Girls: the Dads and Daughters Exercising and Empowered (DADEE) Community Trial [Engaging Fathers to Increase Physical Activity and Well-being in Girls: The DADEE Community Randomised Controlled Trial]. https://anzctr.org.au/ACTRN12616001270404.aspx (first received 9 September 2016).

Morgan PJ, Rayward AT, Young MD, Pollock ER, Eather N, Barnes AT, et al. Establishing Effectiveness of a Community-based, Physical Activity Program for Fathers and Daughters: A Randomized Controlled Trial. Annals of Behavioral Medicine 2021;56:698-711. [DOI: 10.1093/abm/kaab056]

* Morgan PJ, Young MD, Barnes AT, Eather N, Pollock ER, Lubans DR. Engaging Fathers to Increase Physical Activity in Girls: The "Dads And Daughters Exercising and Empowered" (DADEE) Randomized Controlled Trial. Annals of Behavioral Medicine 2019;53(1):39-52. [DOI: 10.1093/abm/kay015]

  Young MD, Lubans DR, Barnes AT, Eather N, Pollock ER, Morgan PJ. Impact of a father-daughter physical activity program on girls' social-emotional well-being: A randomized controlled trial [Impact of a father-daughter physical activity program on girls' social-emotional well-being: A randomized controlled trial]. Journal of Consulting and Clinical Psychology 2019;87(3):294-307. [DOI: 10.1037/ccp0000374]

Muller 2016 {published data only}

studyIdentifiers

* Muller UM, Walther C, Adams V, Mende M, Adam J, Fikenzer K, et al. Long term impact of one daily unit of physical exercise at school on cardiovascular risk factors in school children. European Journal of Preventive Cardiology 2016;23(13):1444-52. [DOI: https://dx.doi.org/10.1177/2047487316632966]

  Walther C, Gaede L, Adams V, Gelbrich G, Leichtle A, Erbs S, et al. Effect of increased exercise in school children on physical fitness and endothelial progenitor cells: a prospective randomized trial [Effect of increased exercise in school children on physical fitness and endothelial progenitor cells: a prospective randomized trial]. Circulation 2009;120(22):2251-9. [DOI: 10.1161/circulationaha.109.865808]

  Walther C. [Effects of daily physical exercise at school on cardiovascular risk--results of a 2-year cluster-randomized study]. [German] [[Effects of daily physical exercise at school on cardiovascular risk--results of a 2-year cluster-randomized study]. [German]]. Deutsche Medizinische Wochenschrift 2011;136(46):2348-2354.

Muller 2019 {published data only}

studyIdentifiers

* Muller I, Schindler C, Adams L, Endes K, Gall S, Gerber M, et al. Effect of a Multidimensional Physical Activity Intervention on Body Mass Index, Skinfolds and Fitness in South African Children: Results from a Cluster-Randomised Controlled Trial. International Journal of Environmental Research & Public Health [Electronic Resource] 2019;16(2):15. [DOI: https://dx.doi.org/10.3390/ijerph16020232]

  Yap P, Müller I, Walter C, Seelig H, Gerber M, Steinmann P, et al. Disease, activity and schoolchildren's health (DASH) in Port Elizabeth, South Africa: a study protocol [Disease, activity and schoolchildren's health (DASH) in Port Elizabeth, South Africa: a study protocol]. BMC Public Health 2015;15(1):1285. [DOI: 10.1186/s12889-015-2636-y]

Muzaffar 2019 {published data only}

studyIdentifiers

Muzaffar H, Nickols-Richardson SM. PAWS (Peer-education About Weight Steadiness) club: Rationale and design for a randomized controlled study. FASEB Journal. Conference: Experimental Biology 2016;30:676.2. [DOI: 10.1096/fasebj.30.1_supplement.676.2]

Muzaffar H, Nickols-Richardson SM. Using Process Evaluation Results to Compare Peer and Adult Leader Delivery of the PAWS (Peer-Education about Weight Steadiness) Club Program. Nutrients 2021;13(11):3901. [DOI: 10.3390/nu13113901]

* Muzaffar H, Nikolaus CJ, Ogolsky BG, Lane A, Liguori C, Nickols-Richardson SM. Promoting Cooking, Nutrition, and Physical Activity in Afterschool Settings. American Journal of Health Behavior 2019;43(6):1050-63. [DOI: 10.5993/AJHB.43.6.4]

NCT00224887 2005 {published data only}

studyIdentifiers

NCT00224887. Family-Based Nutrition Intervention for Latino Children [Family-Based Nutrition Intervention for Latino Children]. https://clinicaltrials.gov/show/NCT00224887 (first received 21 September 2005).

NCT02067728 2014 {published data only}

studyIdentifiers

Ihmels MA, Welk GJ, Eisenmann JC, Nusser SM, Myers EF. Prediction of BMI change in young children with the family nutrition and physical activity (FNPA) screening tool [Prediction of BMI change in young children with the family nutrition and physical activity (FNPA) screening tool]. Annals of Behavioral Medicine 2009;38(1):60-8. [DOI: 10.1007/s12160-009-9126-3]

* NCT02067728. Family Nutrition Physical Activity Tool Use During Well Child Visits [Family Nutrition, Physical Activity (FNPA) Tool: a Motivational Interviewing-based Practice Intervention to Address Pediatric Health Behaviors]. https://clinicaltrials.gov/show/NCT02067728 (first received 20 February 2014).

Nemet 2011a {published data only}

studyIdentifiers

* Nemet D, Geva D, Eliakim A. Health promotion intervention in low socioeconomic kindergarten children. Journal of Pediatrics 2011;158(5):796-801.

Nemet D, Geva D, Meckel Y, Eliakim A. Health-related knowledge and preferences in low socio-economic kindergarteners [Health-related knowledge and preferences in low socio-economic kindergarteners]. International Journal of Behavioral Nutrition and Physical Activity 2012;9:1. [DOI: 10.1186/1479-5868-9-1]

Nemet 2011b {published data only}

studyIdentifiers

* Nemet D, Geva D, Pantanowitz M, Igbaria N, Meckel Y, Eliakim A. Health promotion intervention in Arab-Israeli kindergarten children. Journal of Pediatric Endocrinology 2011;24(11-12):1001-7.

Nemet D, Geva D, Pantanowitz M, Igbaria N, Meckel Y, Eliakim A. Long term effects of a health promotion intervention in low socioeconomic Arab- Israeli kindergartens [Long term effects of a health promotion intervention in low socioeconomic Arab- Israeli kindergartens]. BMC Pediatrics 2013;13:45-45.

Newton 2014 {published data only}

studyIdentifiers

Newton RLJr, Marker AM, Allen HR, Machtmes R, Han H, Johnson WD, et al. Parent-Targeted Mobile Phone Intervention to Increase Physical Activity in Sedentary Children: Randomized Pilot Trial. Journal of Medical Internet Research mHealth uHealth 2014;2(4):e48. [DOI: 10.2196/mhealth.3420]

Nicholl 2021 {published data only}

studyIdentifiers

ACTRN12616001642471. The Milky Way Study: Comparing effects of regular fat vs reduced fat dairy products on heart and gut health in young children [Regular fat versus reduced fat dairy consumption: a pilot study of effects on cardiometabolic and gut health in young children]. https://anzctr.org.au/ACTRN12616001642471.aspx (first received 28 November 2016).

* Nicholl A, Deering KE, Evelegh K, Lyons-Wall P, Lawrence D, Mori TA, et al. Whole-fat dairy products do not adversely affect adiposity or cardiometabolic risk factors in children in the Milky Way Study: a double-blind randomized controlled pilot study. American Journal of Clinical Nutrition 2021;114(6):2025-42. [DOI: 10.1093/ajcn/nqab288]

Nollen 2014 {published data only}

studyIdentifiers

Nollen NL, Mayo MS, Carlson SE, Rapoff MA, Goggin KJ, Ellerbeck EF. Mobile technology for obesity prevention: a randomized pilot study in racial- and ethnic-minority girls. American Journal of Preventive Medicine 2014;46(4):404-8.

Nyberg 2015 {published data only}

studyIdentifiers

Malek ME, Nyberg G, Elinder LS, Patterson E, Norman A. Children's experiences of participating in a school-based health promotion parental support programme - a qualitative study [Children's experiences of participating in a school-based health promotion parental support programme - a qualitative study]. BMC Pediatr 2021;21(1):228. [DOI: https://dx.doi.org/10.1186/s12887-021-02694-0]

* Nyberg G, Sundblom E, Norman A, Bohman B, Hagberg J, Elinder LS. Effectiveness of a universal parental support programme to promote healthy dietary habits and physical activity and to prevent overweight and obesity in 6-year-old children: The healthy school start study, a cluster-randomised controlled trial. PLoS ONE 2015;10(2):e0116876.

Nyberg G, Sundblom E, Norman Å, Elinder LS. A healthy school start - Parental support to promote healthy dietary habits and physical activity in children: Design and evaluation of a cluster-randomised intervention [A healthy school start - Parental support to promote healthy dietary habits and physical activity in children: Design and evaluation of a cluster-randomised intervention]. BMC Public Health 2011;11(1):185. [DOI: 10.1186/1471-2458-11-185]

Nyberg 2016 {published data only}

studyIdentifiers

Norman A, Zeebari Z, Nyberg G, Elinder LS. Parental support in promoting children's health behaviours and preventing overweight and obesity - a long-term follow-up of the cluster-randomised healthy school start study II trial. BMC Pediatrics 2019;19(1):104. [DOI: https://dx.doi.org/10.1186/s12887-019-1467-x]

Norman Å. Parental support to promote children's dietary and physical activity behaviours in disadvantaged settings. DART-Europe E-theses Portal [www.dart-europe.org], 2016.

* Nyberg G, Norman A, Sundblom E, Zeebari Z, Elinder LS. Effectiveness of a universal parental support programme to promote health behaviours and prevent overweight and obesity in 6-year-old children in disadvantaged areas, the Healthy School Start Study II, a cluster-randomised controlled trial. International Journal of Behavioral Nutrition & Physical Activity 2016;13:4. [DOI: https://dx.doi.org/10.1186/s12966-016-0327-4]

O'Connor 2020 {published data only}

studyIdentifiers

* O'Connor TM, Beltran A, Musaad S, Perez O, Flores A, Galdamez-Calderon E, et al. Feasibility of Targeting Hispanic Fathers and Children in an Obesity Intervention: Papás Saludables Niños Saludables. Childhood Obesity 2020;16(6):379-92. [DOI: 10.1089/chi.2020.0006]

Perez O, Beltran A, Isbell T, Galdamez-Calderon E, Baranowski T, Morgan PJ, et al. Papás Saludables, Niños Saludables: Perspectives From Hispanic Parents and Children in a Culturally Adapted Father-Focused Obesity Program [Papás Saludables, Niños Saludables: Perspectives From Hispanic Parents and Children in a Culturally Adapted Father-Focused Obesity Program]. Journal of Nutrition Education & Behavior 2021;53(3):246-253. [DOI: 10.1016/j.jneb.2020.11.006]

Paineau 2008 {published data only}

studyIdentifiers

Paineau D. The Longitudinal Study on Health and Diet (ELPAS) Opinion on early prevention of childhood obesity. DART-Europe E-theses Portal [www.dart-europe.org], 2008.

* Paineau DL, Beaufils F, Boulier A, Cassuto DA, Chwalow J, Combris P, et al. Family dietary coaching to improve nutritional intakes and body weight control: a randomized controlled trial. Archives of Pediatrics & Adolescent Medicine 2008;162:34-43.

Pena 2021 {published data only}

studyIdentifiers

Pena S, Carranza M, Cuadrado C, Espinoza P, Muller V, Cerda R Effectiveness of a gamification strategy to prevent childhood obesity in schools: A cluster-randomized controlled trial. In: Proceedings of the Nutrition Society. Conference: 13th European Nutrition Conference, FENS. Vol. 79. 2019. [DOI: http://dx.doi.org/10.1017/S0029665120000932]

* Pena S, Carranza M, Cuadrado C, Parra DC, Villalobos Dintrans P, Castillo C, et al. Effectiveness of a Gamification Strategy to Prevent Childhood Obesity in Schools: A Cluster Controlled Trial. Obesity 2021;17:17. [DOI: https://dx.doi.org/10.1002/oby.23165]

Pindus 2015 {published data only}

studyIdentifiers

Pindus D. The relations between objectively measured moderate-to-vigorous physical activity, chronic aerobic exercise and cognitive control in children and adolescents. Vol. 10079323. Ann Arbor: Loughborough University (United Kingdom), 2015.

Puder 2011 {published data only}

studyIdentifiers

Burgi F, Niederer I, Schindler C, Bodenmann P, Marques-Vidal P, Kriemler S, et al. Effect of a lifestyle intervention on adiposity and fitness in socially disadvantaged subgroups of preschoolers: a cluster-randomized trial (Ballabeina) [Effect of a lifestyle intervention on adiposity and fitness in socially disadvantaged subgroups of preschoolers: a cluster-randomized trial (Ballabeina)]. Preventive Medicine 2012;54(5):335-340.

Niederer I, Bürgi F, Ebenegger V, Marques-Vidal P, Schindler C, Nydegger A, et al. Effects of a lifestyle intervention on adiposity and fitness in overweight or low fit preschoolers (Ballabeina) [Effects of a lifestyle intervention on adiposity and fitness in overweight or low fit preschoolers (Ballabeina)]. Obesity 2013;21(3):E287-E293.

Niederer I, Kriemler S, Zahner L, Bürgi F, Ebenegger V, Hartmann T, et al. Influence of a lifestyle intervention in preschool children on physiological and psychological parameters (Ballabeina): study design of a cluster randomized controlled trial [Influence of a lifestyle intervention in preschool children on physiological and psychological parameters (Ballabeina): study design of a cluster randomized controlled trial]. BMC Public Health 2009;9(1):94. [DOI: 10.1186/1471-2458-9-94]

* Puder JJ, Marques-Vidal P, Schindler C, Zahner L, Niederer I, Bürgi F, et al. Effect of multidimensional lifestyle intervention on fitness and adiposity in predominantly migrant preschool children (Ballabeina): cluster randomised controlled trial. BMJ 2011;343:d6195.

Puder JJ, Marques-Vidal P, Zahner L, Niederer I, Bürgi F, Ebenegger V, et al. A multifactorial approach to prevent adiposity and improve fitness in predominantly migrant preschool children: cluster-randomized controlled trial (the Ballabeina Study) [A multifactorial approach to prevent adiposity and improve fitness in predominantly migrant preschool children: cluster-randomized controlled trial (the Ballabeina Study)]. Obesity Reviews 2010;11:468-. [DOI: 10.1111/j.1467-789X.2010.00763-7.x]

Ramirez-Rivera 2021 {published data only}

studyIdentifiers

Ramirez-Rivera DL, Martinez-Contreras T, Villegas-Valle RC, Henry-Mejia G, Quizan-Plata T, Haby MM, et al. Preliminary Results of the Planet Nutrition Program on Obesity Parameters in Mexican Schoolchildren: Pilot Single-School Randomized Controlled Trial. International Journal of Environmental Research & Public Health [Electronic Resource] 2021;18(2):18. [DOI: https://dx.doi.org/10.3390/ijerph18020790]

Razani 2018 {published data only}

studyIdentifiers

NCT02623855. Stay Healthy In Nature Everyday: Family Nature Outings in a Low Income Population SHINE [Stay Healthy In Nature Everyday: a Randomized Controlled Trial of the Effect of Family Nature Outings on Stress and Physical Inactivity in a Low Income Population]. https://clinicaltrials.gov/show/NCT02623855 (first received 24 November 2015).

Razani N, AKohn M, MWells N, DThompson, HHamilton Flores, WRutherford G. Design and evaluation of a park prescription program for stress reduction and health promotion in low-income families: The Stay Healthy in Nature Everyday (SHINE) study protocol [Design and evaluation of a park prescription program for stress reduction and health promotion in low-income families: The Stay Healthy in Nature Everyday (SHINE) study protocol]. Contemporary Clinical Trials 2016;51:8-14. [DOI: http://dx.doi.org/10.1016/j.cct.2016.09.007]

* Razani N, Morshed S, Kohn MA, Wells NM, Thompson D, Alqassari M, et al. Effect of park prescriptions with and without group visits to parks on stress reduction in low-income parents: SHINE randomized trial. PLoS One 2018;13(2):e0192921. [DOI: 10.1371/journal.pone.0192921]

Rerksuppaphol 2017 {published data only}

studyIdentifiers

Rerksuppaphol LRerksuppaphol S. Internet Based Obesity Prevention Program for Thai School Children- A Randomized Control Trial. Journal of Clinical and Diagnostic Research JCDR 2017;11(3):SC07-SC11. [DOI: https://dx.doi.org/10.7860/JCDR/2017/21423.9368]

Rhodes 2019 {published data only}

studyIdentifiers

Quinlan A, Rhodes RE, Blanchard CM, Naylor PJ, Warburton DER. Family planning to promote physical activity: a randomized controlled trial protocol. BMC Public Health 2015;15(1):1011. [DOI:

10.1186/s12889-015-2309-x]
* Rhodes RE, Blanchard CM, Quinlan A, Naylor PJ, Warburton DER. Family Physical Activity Planning and Child Physical Activity Outcomes: A Randomized Trial [ial]. American Journal of Preventive Medicine 2019;57(2):135-44. [DOI: 10.1016/j.amepre.2019.03.007]

Riiser 2020 {published data only}

studyIdentifiers

NCT02954614. Active Play in After School Programs [Active Play -an After-school-program Intervention to Promote Physical Activity and Health-related Quality of Life in Young Children]. https://clinicaltrials.gov/show/NCT02954614 (first received 26 October 2016).
Riiser K, Helseth S, Ellingsen H, Fallang B, Løndal K. Active Play in After-school Programmes: development of an intervention and description of a matched-pair cluster-randomised trial assessing physical activity play in after-school programmes [Active Play in After-school Programmes: development of an intervention and description of a matched-pair cluster-randomised trial assessing physical activity play in after-school programmes]. BMJ Open 2017;7(8):e016585. [DOI: 10.1136/bmjopen-2017-016585]
* Riiser Kirsti, Richardsen, Rønn Kåre, Haugen, HAnders L, Lund Siv, et al. Active play in ASP -a matched-pair cluster-randomized trial investigating the effectiveness of an intervention in after-school programs for supporting children's physical activity. BMC Public Health 2020;20(1):1-12. [DOI: 10.1186/s12889-020-08645-1]

Robinson 2003 {published data only}

studyIdentifiers

Robinson TN, Killen JD, Kraemer HC, Wilson DM, Matheson DM, Haskell WL, et al. Dance and reducing television viewing to prevent weight gain in African-American girls: the Stanford GEMS pilot study. Ethnicity and Disease 2003;13(Suppl 1):S65-S77.

Robinson 2010 {published data only}

studyIdentifiers

Robinson TN, Kraemer HC, Matheson DM, Obarzanek E, Wilson DM, Haskell WL, et al. Stanford GEMS phase 2 obesity prevention trial for low-income African-American girls: design and sample baseline characteristics [Stanford GEMS phase 2 obesity prevention trial for low-income African-American girls: design and sample baseline characteristics]. Contemporary Clinical Trials 2008;29(1):56-69. [DOI: 10.1016/j.cct.2007.04.007]
* Robinson TN, Matheson DM, Kraemer HC, Wilson DM, Obarzanek E, Thompson NS, et al. A randomized controlled trial of culturally tailored dance and reducing screen time to prevent weight gain in low-income African American girls: Stanford GEMS. Archives of Pediatrics & Adolescent Medicine 2010;164(11):995-1004.

Rosario 2012 {published data only}

studyIdentifiers

Rosario R, Araujo A, Oliveira B, Padrao P, Lopes O, Teixeira V, et al. Impact of an intervention through teachers to prevent consumption of low nutrition, energy-dense foods and beverages: a randomized trial [Impact of an intervention through teachers to prevent consumption of low nutrition, energy-dense foods and beverages: a randomized trial]. Preventive Medicine 2013;57(1):20-25.
Rosario R, Araujo A, Padrao P, Lopes O, Moreira A, Pereira B, et al. Prevention of childhood obesity: Lessons learned from a school-based intervention program [Prevention of childhood obesity: Lessons learned from a school-based intervention program]. Obesity Facts 2017;10:52. [DOI: http://dx.doi.org/10.1159/000468958]
Rosario R, Araujo A, Padro P, Lopes O, Pereira B, Moreira P. Characteristics of a successful program to decrease BMI and LNED intake in school children [Characteristics of a successful program to decrease BMI and LNED intake in school children]. Obesity Facts 2015;8:128. [DOI: http://dx.doi.org/10.1159/000382140]
* Rosario R, Oliveira B, Araujo A, Lopes O, Padrao P, Moreira A, et al. The impact of an intervention taught by trained teachers on childhood overweight. International Journal of Environmental Research & Public Health 2012;9(4):1355-67.
Rosário R. Excesso De Peso e Obesidade Em crianças: implementação e avaliação De Um Programa De Intervenção Na Escola [thesis]. Vol. 28604958. Ann Arbor: Universidade do Minho (Portugal), 2011.

Rosenkranz 2010 {published data only}

studyIdentifiers

NCT00949637. Scouting Nutrition and Activity Program SNAP [A Site-Randomized Controlled Trial for Health Promotion in Girl Scouts: Healthier Troops in a SNAP]. https://clinicaltrials.gov/show/NCT00949637 (first received 21 July 2009).

Rosenkranz RRBehrens TKDzewaltowski DA. A group-randomized controlled trial for health promotion in Girl Scouts: healthier troops in a SNAP (Scouting Nutrition & Activity Program). BMC Public Health 2010;10:81.

Rush 2012 {published data only}

studyIdentifiers

Graham D, Appleton S, Rush E, McLennan S, Reed P, Simmons D. Increasing activity and improving nutrition through a schools-based programme: Project Energize. 1. Design, programme, randomisation and evaluation methodology [Increasing activity and improving nutrition through a schools-based programme: Project Energize. 1. Design, programme, randomisation and evaluation methodology]. Public Health Nutrition 2008;11(10):1076-84. [DOI: 10.1017/S136898000700153X]

Rush E, Cairncross C, Williams MH, Tseng M, Coppinger T, McLennan S, et al. Project Energize: intervention development and 10 years of progress in preventing childhood obesity [Project Energize: intervention development and 10 years of progress in preventing childhood obesity]. BMC Research Notes 2016;9:44. [DOI: https://dx.doi.org/10.1186/s13104-016-1849-1]

Rush E, McLennan S, Obolonkin V, Vandal AC, Hamlin M, Simmons D, et al. Project Energize: whole-region primary school nutrition and physical activity programme; evaluation of body size and fitness 5 years after the randomised controlled trial [Project Energize: whole-region primary school nutrition and physical activity programme; evaluation of body size and fitness 5 years after the randomised controlled trial]. British Journal of Nutrition 2014;111(2):363-71. [DOI: 10.1017/S0007114513002316]

Rush E, Obolonkin V, McLennan S, Graham D, Harris J. Lifetime cost effectiveness of a through-school nutrition and physical programme: Project Energize [Lifetime cost effectiveness of a through-school nutrition and physical programme: Project Energize]. Obesity Research & Clinical Practice 2014;8(2):e115-e122.

* Rush E, Reed P, McLennan S, Coppinger T, Simmons D, Graham D. A school-based obesity control programme: Project Energize. Two-year outcomes. British Journal of Nutrition 2012;107(4):581-7. [DOI: 10.1017/S0007114511003151]

Sacchetti 2013 {published data only}

studyIdentifiers

Sacchetti R, Ceciliani A, Garulli A, Dallolio L, Beltrami P, Leoni E. Effects of a 2-year school-based intervention of enhanced physical education in the primary school. Journal of School Health 2013;83(9):639-46. [DOI: 10.1111/josh.12076]

Safdie 2013 {published data only}

studyIdentifiers

Safdie Kanan M. Childhood obesity prevention intervention and policy in the Mexican school system [tehsis]. Vol. NS28118. Ann Arbor: Queen's University (Canada), 2013.

* Safdie M, Jennings-Aburto N, Levesque L, Janssen I, Campirano-Nunez F, Lopez-Olmedo N, et al. Impact of a school-based intervention program on obesity risk factors in Mexican children. Salud Publica Mex 2013;55 Suppl 3:374-87. [DOI: 10.21149/spm.v55s3.5138]

Sahota 2001 {published data only}

studyIdentifiers

Sahota P, Rudolf MCJ, Dixey R, Hill AJ, Barth JH, Cade J. Evaluation of implementation and effect of primary school based intervention to reduce risk factors for obesity [Evaluation of implementation and effect of primary school based intervention to reduce risk factors for obesity]. BMJ 2001;323:1027-1029.

* Sahota P, Rudolf MCJ, Dixey R, Hill AJ, Barth JH, Cade J. Randomised controlled trial of primary school based intervention to reduce risk factors for obesity. BMJ 2001;323:1029-32.

Sahota P. Obesity: an intervention in the primary school setting [thesis]. Vol. U165432. Ann Arbor: University of Leeds (United Kingdom), 2002.

Sahota 2019 {published data only}

studyIdentifiers

Sahota P, Christian M, Day R, Cocks K. The feasibility and acceptability of a primary school-based programme targeting diet and physical activity: the PhunkyFoods Programme. Pilot and feasibility studies 2019;5(1):159. [DOI: 10.1186/s40814-019-0542-2]

Salmon 2008 {published data only}

studyIdentifiers

Salmon J, Ball K, Crawford D, Booth M, Telford A, Hume C, et al. Reducing sedentary behaviour and increasing physical activity among 10-year-old children: overview and process evaluation of the 'Switch-Play' intervention [Reducing sedentary behaviour and increasing physical activity among 10-year-old

children: overview and process evaluation of the 'Switch-Play' intervention]. Health Promotion International 2005;20(1):7-17.
* Salmon J, Ball K, Hume C, Booth M, Crawford D. Outcomes of a group-randomized trial to prevent excess weight gain, reduce screen behaviours and promote physical activity in 10-year-old children: switch-play. International Journal of Obesity 2008;32(4):601-12. [DOI: 10.1038/sj.ijo.0803805]

Salmon 2022 {published data only}

studyIdentifiers

ISRCTN83725066. Transform-Us!: an intervention promoting children's health [A multi-setting intervention to reduce sedentary behaviour, promote physical activity and improve children's health]. https://anzctr.org.au/ACTRN12609000715279.aspx (first submitted 19 August 2009).
* Salmon J, Arundell L, Cerin E, Ridgers ND, Hesketh KD, Daly RM, et al. Transform-Us! cluster RCT: 18-month and 30-month effects on children's physical activity, sedentary time and cardiometabolic risk markers. British Journal of Sports Medicine 2023;57(5):311-19. [DOI: 10.1136/bjsports-2022-105825]
Salmon J, Arundell L, Hume C, Brown H, Hesketh K, Dunstan DW, et al. A cluster-randomized controlled trial to reduce sedentary behavior and promote physical activity and health of 8-9 year olds: the Transform-Us! study [A cluster-randomized controlled trial to reduce sedentary behavior and promote physical activity and health of 8-9 year olds: the Transform-Us! study]. BMC Public Health 2011;11:759. [DOI: 10.1186/1471-2458-11-759 10.1186/1471-2458-11-759.]
Yildirim M, Arundell L, Cerin E, Carson V, Brown H, Crawford D, et al. What helps children to move more at school recess and lunchtime? Mid-intervention results from Transform-Us! cluster-randomised controlled trial [What helps children to move more at school recess and lunchtime? Mid-intervention results from Transform-Us! cluster-randomised controlled trial]. British Journal of Sports Medicine 2014;48(3):271-7. [DOI: 10.1136/bjsports-2013-092466]

Santos 2014 {published data only}

studyIdentifiers

Nickel NC, Doupe M, Enns JE, Brownell M, Sarkar J, Chateau D, et al. Differential effects of a school-based obesity prevention program: A cluster randomized trial [Differential effects of a school-based obesity prevention program: A cluster randomized trial]. Maternal & Child Nutrition 2021;17(1):1-34. [DOI: 10.1111/mcn.13009]
Santos R, Durksen A, Chanoine JP, Miln AL, Mayer T, McGavock J. Healthy buddies© manitoba: A clustered randomized controlled trial of peer-based healthy living lessons plans on body weight and physical activity in early years students [Healthy buddies© manitoba: A clustered randomized controlled trial of peer-based healthy living lessons plans on body weight and physical activity in early years students]. Canadian Journal of Diabetes 2012;1:S20.
* Santos RG, Durksen A, Rabbanni R, Chanoine JP, Lamboo Miln A, Mayer T, et al. Effectiveness of peer-based healthy living lesson plans on anthropometric measures and physical activity in elementary school students: a cluster randomized trial.[Erratum appears in JAMA Pediatr. 2015 Jan;169(1):96]. JAMA Pediatrics 2014;168(4):330-37.
Stock S, Miranda C, Evans S, Plessis S, Ridley J, Yeh S, et al. Healthy Buddies: a novel, peer-led health promotion program for the prevention of obesity and eating disorders in children in elementary school [Healthy Buddies: a novel, peer-led health promotion program for the prevention of obesity and eating disorders in children in elementary school]. Pediatrics 2007;120(4):e1059-e1068.

Seguin-Fawler 2021 {published data only}

studyIdentifiers

Seguin R, Ammerman A, Hanson K, Kolodinsky J, Pitts SJ, Sitaker M. NP3 Farm Fresh Foods for Healthy Kids: innovative Cost-Offset Community-Supported Agriculture Intervention to Prevent Childhood Obesity and Strengthen Local Agricultural Economies...Society for Nutrition Education and Behavior, 52nd Annual Conference, Nutrition Education: rooted in Food, July 27-30, 2019, Orlando, Florida [NP3 Farm Fresh Foods for Healthy Kids: innovative Cost-Offset Community-Supported Agriculture Intervention to Prevent Childhood Obesity and Strengthen Local Agricultural Economies...Society for Nutrition Education and Behavior, 52nd Annual Conference, Nutrition Education: rooted in Food, July 27-30, 2019, Orlando, Florida]. Journal of Nutrition Education and Behavior 2019;51:S10. [DOI: 10.1016/j.jneb.2019.05.327]
Seguin RA, Morgan EH, Hanson KL, Ammerman AS, Jilcott Pitts SB, Kolodinsky J, et al. Farm Fresh Foods for Healthy Kids (F3HK): An innovative community supported agriculture intervention to prevent childhood obesity in low-income families and strengthen local agricultural economies [Farm Fresh Foods for Healthy Kids (F3HK): An innovative community supported agriculture intervention to prevent childhood obesity in low-income families and strengthen local agricultural economies]. BMC Public Health 2017;17(1):306. [DOI: https://dx.doi.org/10.1186/s12889-017-4202-2]
* Seguin-Fowler RA, Hanson KL, Jilcott Pitts SB, Kolodinsky J, Sitaker M, Ammerman AS, et al. Community supported agriculture plus nutrition education improves skills, self-efficacy, and eating behaviors among low-income caregivers but not their children: a randomized controlled trial. International Journal of Behavioral Nutrition and Physical Activity 2021;18(1):112. [DOI: 10.1186/s12966-021-01168-x]

Sekhavat 2014 {published data only}

studyIdentifiers

Sekhavat A. Efficacy of nutrition and physical activity counseling for pre-adolescent children in a dental setting : a randomized clinical trial [thesis]. University of Toronto, 2014.

Sgambato 2019 {published data only}

studyIdentifiers

Morais LDC, Paravidino VB, Mediano MFF, Benthroldo R, Gonçalves TR, Sgambato MR, et al. Effectiveness of a school-based randomized controlled trial aimed at increasing physical activity time in adolescents [Effectiveness of a school-based randomized controlled trial aimed at increasing physical activity time in adolescents]. European Journal of Public Health 2021;31(2):367-372. [DOI: 10.1093/eurpub/ckab025]

Sgambato MR, Cunha DB, Henriques VT, Estima CC, Souza BS, Pereira RA, et al. PAAPPAS community trial protocol: a randomized study of obesity prevention for adolescents combining school with household intervention [PAAPPAS community trial protocol: a randomized study of obesity prevention for adolescents combining school with household intervention]. BMC Public Health 2016;16(1):809. [DOI: https://dx.doi.org/10.1186/s12889-016-3473-3]

* Sgambato MR, Cunha DB, da Silva Nalin Souza B, Henriques VT, da Rocha Muniz Rodrigues R, et al. Effectiveness of school-home intervention for adolescent obesity prevention: parallel school-randomized study. British Journal of Nutrition 2019;122(9):1073-80. [DOI: https://dx.doi.org/10.1017/S0007114519001818]

Sherwood 2019 {published data only}

studyIdentifiers

JaKa MM, French SA, Wolfson J, Jeffery RW, Lorencatto F, Michie S, et al. Understanding Outcomes in Behavior Change Interventions to Prevent Pediatric Obesity: The Role of Dose and Behavior Change Techniques [Understanding Outcomes in Behavior Change Interventions to Prevent Pediatric Obesity: The Role of Dose and Behavior Change Techniques]. Health Education and Behavior 2019;46(2):312-321.

Sherwood NE, Levy RL, Langer SL, Senso MM, Crain AL, Hayes MG, et al. Healthy Homes/Healthy Kids: a randomized trial of a pediatric primary care-based obesity prevention intervention for at-risk 5-10 year olds [Healthy Homes/Healthy Kids: a randomized trial of a pediatric primary care-based obesity prevention intervention for at-risk 5-10 year olds]. Contemporary Clinical Trials 2013;36(1):228-243.

* Sherwood NE, Levy RL, Seburg EM, Crain AL, Langer SL, JaKa MM, et al. The Healthy Homes/Healthy Kids 5-10 Obesity Prevention Trial: 12 and 24-month outcomes. Pediatric Obesity 2019;14(8):e12523. [DOI: https://dx.doi.org/10.1111/ijpo.12523]

Sichieri 2008 {published data only}

studyIdentifiers

Lima da Cruz V, Mediano MFF, Paravidino VB, Neves FA, de Oliveira Malafaia T, Rodrigues Junior LF, et al. Insulin sensitivity as a predictor of longitudinal changes on body mass index in Brazilian adolescents [Insulin sensitivity as a predictor of longitudinal changes on body mass index in Brazilian adolescents]. American Journal of Human Biology 2022;34(8):e23745. [DOI: 10.1002/ajhb.23745]

* Sichieri RP, Trotte A, de Souza RA, Veiga GV. School randomised trial on prevention of excessive weight gain by discouraging students from drinking sodas. Public Health Nutrition 2009;12:197-202.

de Moraes MM, Mediano MFF, de Souza RAG, Moura AS, da Veiga GV, Sichieri R. Discouraging soft drink consumption reduces blood glucose and cholesterol of Brazilian elementary students: Secondary analysis of a randomized controlled trial [Discouraging soft drink consumption reduces blood glucose and cholesterol of Brazilian elementary students: Secondary analysis of a randomized controlled trial]. Preventive Medicine 2017;100:223-228. [DOI: 10.1016/j.ypmed.2017.04.035]

Siegrist 2013 {published data only}

studyIdentifiers

Siegrist M, Lammel C, Haller B, Christle J, Halle M. Effects of a physical education program on physical activity, fitness, and health in children: the JuvenTUM project. Scandinavian Journal of Medicine & Science in Sports 2013;23(3):323-30.

Siegrist 2018 {published data only}

studyIdentifiers

Siegrist M, Hanssen H, Lammel C, Haller B, Halle M. A cluster randomised school-based lifestyle intervention programme for the prevention of childhood obesity and related early cardiovascular disease (JuvenTUM 3) [A cluster randomised school-based lifestyle intervention programme for the prevention of childhood obesity and related early cardiovascular disease (JuvenTUM 3)]. BMC Public Health 2011;11:258-258.

* Siegrist M, Hanssen H, Lammel C, Haller B, Koch AM, Stemp P, et al. Effects of a cluster-randomized school-based prevention program on physical activity and microvascular function (JuvenTUM 3). Atherosclerosis 2018;278:73-81. [DOI: https://dx.doi.org/10.1016/j.atherosclerosis.2018.09.003]

Simon 2008 {published data only}

studyIdentifiers

Simon C, Kellou N, Dugas J, Platat C, Copin N, Schweitzer B, et al. A socio-ecological approach promoting physical activity and limiting sedentary behavior in adolescence showed weight benefits maintained 2.5 years after intervention cessation [A socio-ecological approach promoting physical activity and limiting sedentary behavior in adolescence showed weight benefits maintained 2.5 years after intervention cessation]. International journal of obesity 2014;38(7):936-943.

Simon C, Schweitzer B, Drai J, Kellou N, Sandalinas F, Reitzer C. Overweight prevention in adolescents by increasing physical activity: 6-year results of the randomized ICAPS study [Overweight prevention in adolescents by increasing physical activity: 6-year results of the randomized ICAPS study]. Obesity Reviews 2011;12:26.

Simon C, Schweitzer B, Oujaa M, Wagner A, Arveiler D, Triby E, et al. Erratum: Successful overweight prevention in adolescents by increasing physical activity: a 4-year randomized controlled intervention [Erratum: Successful overweight prevention in adolescents by increasing physical activity: a 4-year randomized controlled intervention]. International Journal of Obesity 2008;32(10):1606-1606. [DOI: 10.1038/ijo.2008.138]

* Simon C, Schweitzer B, Oujaa M, Wagner A, Arveiler D, Triby E, et al. Successful overweight prevention in adolescents by increasing physical activity: a 4-year randomized controlled intervention. International Journal of Obesity 2008;32(10):1489-98. [DOI: 10.1038/ijo.2008.99]

Simon C, Wagner A, DiVita C, Rauscher E, Klein-Platat C, Arveiler D, et al. Intervention centred on adolescents' physical activity and sedentary behaviour (ICAPS): concept and 6-month results [Intervention centred on adolescents' physical activity and sedentary behaviour (ICAPS): concept and 6-month results]. International Journal of Obesity 2004;28:S96-S103.

Simon C, Wagner A, Platat C, Arveiler D, Schweitzer B, Schlienger JL, et al. ICAPS: a multilevel program to improve physical activity in adolescents. [ICAPS: a multilevel program to improve physical activity in adolescents.]. Diabetes Metab 2006;32(1):41-9.

Spiegel 2006 {published data only}

studyIdentifiers

Spiegel SA, Foulk D. Reducing overweight through a multidisciplinary school-based intervention. Obesity 2006;14(1):88-96.

Stettler 2015 {published data only}

studyIdentifiers

Stettler N, Wrotniak BH, Hill DL, Kumanyika SK, Xanthopoulos MS, Nihtianova S, et al. Prevention of excess weight gain in paediatric primary care: beverages only or multiple lifestyle factors. The Smart Step Study, a cluster-randomized clinical trial. Pediatric Obesity 2015;10(4):267-74. [DOI: 10.1111/ijpo.260]

Stolley 1997 {published data only}

studyIdentifiers

Stolley MR, Fitzgibbon ML. Effects of an obesity prevention program on the eating behaviour of African American mothers and daughters [Effects of an obesity prevention program on the eating behaviour of African American mothers and daughters]. Health Education and Behaviour 1997;24(2):152-164.

* Willet SL. Health risk reduction among African-American females: A one year follow-up. Vol. 9614861. Ann Arbor: Northwestern University, 1995.

Story 2003 {published data only}

studyIdentifiers

Story M, Sherwood NE, Himes JH, Davis M, Jacobs DJr, Cartwright Y, et al. An after-school obesity prevention program for African-American girls: the Minnesota GEMS pilot study. Ethnicity and Disease 2003;13(Suppl 1):S54-S64.

Story 2012 {published data only}

studyIdentifiers

* Story M, Hannan O, Fulkerson JA, Rock BH, Smyth M, Arcan C, et al. Bright Start: Description and main outcomes from a group-randomized obesity prevention trial in American Indian children. Obesity 2012;20(11):2241-49.

Zhang J, Himes JH, Hannan PJ, Arcan C, Smyth M, Rock BH, et al. Summer effects on body mass index (BMI) gain and growth patterns of American Indian children from kindergarten to first grade: a

prospective study [Summer effects on body mass index (BMI) gain and growth patterns of American Indian children from kindergarten to first grade: a prospective study]. BMC Public Health 2011;11(1):951. [DOI: 10.1186/1471-2458-11-951]

Tanskey 2017 {published data only}

studyIdentifiers

Sacheck JM, Wright CM, Amin SA, Anzman-Frasca S, Chomitz VM, Chui KK, et al. The Fueling Learning Through Exercise Study Cluster RCT: impact on Children's Moderate-to-Vigorous Physical Activity [The Fueling Learning Through Exercise Study Cluster RCT: impact on Children's Moderate-to-Vigorous Physical Activity]. American Journal of Preventive Medicine 2021;60(6):e239-49. [DOI: 10.1016/j.amepre.2021.01.002]

* Tanskey LA. An Investigation of Summer Weight Change in Elementary School Students. Vol. 10604315. Ann Arbor: Tufts University, Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, 2017.

Wright CM, Duquesnay PJ, Anzman-Frasca S, Chomitz VR, Chui K, Economos CD, et al. Study protocol: the Fueling Learning through Exercise (FLEX) study - a randomized controlled trial of the impact of school-based physical activity programs on children's physical activity, cognitive function, and academic achievement [Study protocol: the Fueling Learning through Exercise (FLEX) study - a randomized controlled trial of the impact of school-based physical activity programs on children's physical activity, cognitive function, and academic achievement]. BMC Public Health 2016;16(1):1078. [DOI: https://dx.doi.org/10.1186/s12889-016-3719-0]

Telford 2012 {published data only}

studyIdentifiers

Telford RDCunningham RBFitzgerald ROlive LSProsser LJiang XTelford RM. Physical education, obesity, and academic achievement: a 2-year longitudinal investigation of Australian elementary school children. American Journal of Public Health 2012;102(2):368-74.

Tessier 2008 {published data only}

studyIdentifiers

NCT01161212. REGULarity of Physical ActivitieS (REGUL'APS) [Physical Activity, Health-related Quality of Life and Corpulence Among French Schoolchildren]. https://clinicaltrials.gov/show/NCT01161212 (first received 9 July 2010).

Speyer E. Physical activity and health-related quality of life among children and adolescents : approaches in general population and hospital. DART-Europe E-theses Portal [www.dart-europe.org], 2010.

* Tessier S. Beneficial effects of the physical activity on health-related quality of life and the corpulence : epidemiological and evaluative approaches. Université Henri Poincaré - Nancy 1, 2008.

Thivel 2011 {published data only}

studyIdentifiers

Thivel D, Isacco L, Lazaar N, Aucouturier J, Ratel S, Dore E, et al. Effect of a 6-month school-based physical activity program on body composition and physical fitness in lean and obese schoolchildren. European Journal of Pediatrics 2011;170(11):1435-43.

Topham 2021 {published data only}

studyIdentifiers

NCT02659319. Families and Schools for Health FiSH [Intervening in Family and Peer Contexts to Decrease Child Overweigh]. https://clinicaltrials.gov/show/NCT02659319 (first received 7 January 2016).

* Topham GL, Washburn IJ, Hubbs-Tait L, Kennedy TS, Rutledge JM, Page MC, et al. The Families and Schools for Health Project: A Longitudinal Cluster Randomized Controlled Trial Targeting Children with Overweight and Obesity. International Journal of Environmental Research and Public Health 2021;18(16):8744.

Treviño 2004 {published data only}

studyIdentifiers

Treviño RP, Yin Z, Hernandez A, Hale DE, Garcia OA, Mobley C. Impact of the Bienestar school-based diabetes mellitus prevention program on fasting capillary glucose levels: a randomized controlled trial. Archives of Pediatrics & Adolescent Medicine 2004;158(9):911-7. [DOI: 10.1001/archpedi.158.9.911]

van de Berg 2020 {published data only}

studyIdentifiers

Evans A, NRanjit, DHoelscher, CJovanovic, MLopez, AMcIntosh, et al. Impact of school-based vegetable garden and physical activity coordinated health interventions on weight status and weight-related behaviors of ethnically diverse, low-income students: Study design and baseline data of the Texas, Grow! Eat! Go! (TGEG) cluster-randomized controlled trial [Impact of school-based vegetable garden and physical activity coordinated health interventions on weight status and weight-related behaviors of ethnically diverse, low-income students: Study design and baseline data of the Texas, Grow! Eat! Go! (TGEG) cluster-randomized controlled trial]. BMC Public Health 2016;16:973. [DOI: https://dx.doi.org/10.1186/s12889-016-3453-7]

* van den Berg A, Warren JL, McIntosh A, Hoelscher DM, GOry M, CJovanovic, et al. Impact of a Gardening and Physical Activity Intervention in Title 1 Schools: The TGEG Study. Childhood Obesity 2020;16(S1):S-44-54. [DOI: 10.1089/chi.2019.0238]

Viggiano 2018 {published data only}

studyIdentifiers

Viggiano E, Viggiano A, Di Costanzo A, Viggiano A, Viggiano A, Andreozzi E, et al. Healthy lifestyle promotion in primary schools through the board game Kaledo: a pilot cluster randomized trial. European Journal of Pediatrics 2018;177(9):1371-75. [DOI: https://dx.doi.org/10.1007/s00431-018-3091-4]

Vizcaino 2008 {published data only}

studyIdentifiers

Vizcaíno VM, Aguilar FS, Gutiérrez RF, Martínez MS, López MS, Martínez SS, et al. Assessment of an after-school physical activity program to prevent obesity among 9- to 10-year-oldchildren: a cluster randomized trial. International Journal of Obesity 2008;32:12-22.

Wang 2012 {published data only}

studyIdentifiers

Wang Y, Yuan Y, Xu GF. Evaluating the effect of school-based children obesity prevention and control. Chinese Health Service Management 2012;4:317-19.

Wang 2018 {published data only}

studyIdentifiers

* Wang Z, Xu F, Ye Q, Tse LA, Xue H, Tan Z, et al. Childhood obesity prevention through a community-based cluster randomized controlled physical activity intervention among schools in china: the health legacy project of the 2nd world summer youth olympic Games (YOG-Obesity study). International Journal of Obesity 2018;42(4):625-33. [DOI: https://dx.doi.org/10.1038/ijo.2017.243]

Xu F, Wang Z, Ye Q, Ah TL, Xue H, Tan Z, et al. Policy-oriented, school-based physical activity intervention to prevent childhood obesity in China (the health legacy project of the second Summer Youth Olympic Games): A cluster randomised trial [Policy-oriented, school-based physical activity intervention to prevent childhood obesity in China (the health legacy project of the second Summer Youth Olympic Games): A cluster randomised trial]. The Lancet Diabetes and Endocrinology 2016;3:S9. [DOI: http://dx.doi.org/10.1016/S2213-8587%2816%2930364-3]

Warren 2003 {published data only}

studyIdentifiers

* Warren JM, Henry CJ, Lightowler HJ, Bradshaw SM, Perwaiz S. Evaluation of a pilot school programme aimed at the prevention of obesity in children. Health Promotion International 2003;18(4):287-96. [DOI: 10.1093/heapro/dag402]

Warren JM. Strategies for the prevention of obesity in children. British Library - Electronic Theses Online Service (EThOS), 2002.

Wendel 2016 {published data only}

studyIdentifiers

Benden ME, Zhao H, Jeffrey CE, Wendel ML, Blake JJ. The evaluation of the impact of a stand-biased desk on energy expenditure and physical activity for elementary school students [The evaluation of the impact of a stand-biased desk on energy expenditure and physical activity for elementary school students]. International Journal of Environmental Research and Public Health 2014;11(9):9361-75. [DOI: https://dx.doi.org/10.3390/ijerph110909361]

Chubbs C, Wendel ML, Benden ME. STANDING VS SITTING TIME IN STAND-BIASED CLASSROOMS [STANDING VS SITTING TIME IN STAND-BIASED CLASSROOMS]. American Journal of Public Health 2016;107(3):e4-5. [DOI: 10.2105/AJPH.2016.303617]

* Wendel ML, Benden ME, Zhao H, Jeffrey C. Stand-Biased Versus Seated Classrooms and Childhood Obesity: A Randomized Experiment in Texas. American Journal of Public Health 2016;106(10):1849-54. [DOI: https://dx.doi.org/10.2105/AJPH.2016.303323]

White 2019 {published data only}

studyIdentifiers

Hofer E. iCook 4-h: 0 to 24-month accelerometer-derived physical activity and sedentary time in youth. Vol. 10195167. Ann Arbor: South Dakota State University, 2016.

Kattelmann KK, Meendering JR, Hofer EJ, Merfeld CM, Olfert MD, Hagedorn RL, et al. The iCook 4-H Study: Report on Physical Activity and Sedentary Time in Youth Participating in a Multicomponent Program Promoting Family Cooking, Eating, and Playing Together. Journal of Nutrition Education & Behavior 2019;51(3S):S30-S40. [DOI: https://dx.doi.org/10.1016/j.jneb.2018.09.002]

Mathews DR. Development of a 3-pronged approach to evaluation for the iCook 4-H Project [thesis]. The University of Maine, 2015.

Olfert FO, Flanagan S, Smith E. The effect of iCook 4-H, a childhood obesity prevention program, on blood pressure and quality of life in youth and adults: a randomized control trial [The effect of iCook 4-H, a childhood obesity prevention program, on blood pressure and quality of life in youth and adults: a randomized control trial]. Journal of Childhood Obesity 2018;31)4:1-8.

* White AA, Colby SE, Franzen-Castle L, Kattelmann KK, Olfert MD, Gould TA, et al. The iCook 4-H Study: An Intervention and Dissemination Test of a Youth/Adult Out-of-School Program. Journal of Nutrition Education & Behavior 2019;51(3S):S2-20. [DOI: https://dx.doi.org/10.1016/j.jneb.2018.11.012]

Williamson 2012 {published data only}

studyIdentifiers

Hawkins KR, Burton JH, Apolzan JW, Thomson JL, Williamson DA, Martin CK. Efficacy of a school-based obesity prevention intervention at reducing added sugar and sodium in children's school lunches: the LA Health randomized controlled trial [Efficacy of a school-based obesity prevention intervention at reducing added sugar and sodium in children's school lunches: the LA Health randomized controlled trial]. International Journal of Obesity 2018;42(11):1845-1852. [DOI: https://dx.doi.org/10.1038/s41366-018-0214-y]

Newton RL, Thomson JL, Rau KK, Ragusa SA, Sample AD, Singleton NN, et al. Psychometric characteristics of process evaluation measures for a rural school-based childhood obesity prevention study: Louisiana Health [Psychometric characteristics of process evaluation measures for a rural school-based childhood obesity prevention study: Louisiana Health]. American Journal of Health Promotion 2011;25(6):417-21.

* Williamson DA, Champagne CM, Harsha DW, Han H, Martin CK, Newton RL Jr, et al. Effect of an environmental school-based obesity prevention program on changes in body fat and body weight: a randomized trial. Obesity 2012;20(8):1653-61.

Williamson DA, Champagne CM, Harsha DW, Han H, Newton RJr, Stewart TM, et al. Louisiana (LA) Health: design and methods for a childhood obesity prevention program in rural schools [Louisiana (LA) Health: design and methods for a childhood obesity prevention program in rural schools]. Contemporary Clinical Trials 2008;29(5):783-795. [DOI: 10.1016/j.cct.2008.03.004]

Xu 2015 {published data only}

studyIdentifiers

Xin H, Qing Y, Zhiyong W, Huafeng Y, Shengxiang Q, Xupeng C, et al. Effectiveness of lifestyle intervention to prevent obesity among primary school students in Nanjing, China [Effectiveness of lifestyle intervention to prevent obesity among primary school students in Nanjing, China]. Obesity Reviews 2016;17:123-124. [DOI: http://dx.doi.org/10.1111/obr.12402]

Xu F, Wang X, Ware RS, Tse LA, Wang Z, Hong X, et al. A school-based comprehensive lifestyle intervention among Chinese kids against Obesity (CLICK-Obesity) in Nanjing City, China: the baseline data [A school-based comprehensive lifestyle intervention among Chinese kids against Obesity (CLICK-Obesity) in Nanjing City, China: the baseline data]. Asia Pacific Journal of Clinical Nutrition 2014;23(1):48-54. [DOI: 10.6133/apjcn.2014.23.1.04]

* Xu F, Ware RS, Leslie E, Tse LA, Wang Z, Li J, et al. Effectiveness of a Randomized Controlled Lifestyle Intervention to Prevent Obesity among Chinese Primary School Students: CLICK-Obesity Study. PLoS ONE 2015;10(10):e0141421. [DOI: https://dx.doi.org/10.1371/journal.pone.0141421]

Xu F, Ware RS, Tse Lap A, Wang Z, Hong X, Song A, et al. A school-based comprehensive lifestyle intervention among chinese kids against obesity (CLICK-Obesity): rationale, design and methodology of a randomized controlled trial in Nanjing city, China [A school-based comprehensive lifestyle intervention among chinese kids against obesity (CLICK-Obesity): rationale, design and methodology of a randomized controlled trial in Nanjing city, China]. BMC Public Health 2012;12:316-316.

Xu 2017 (5 other cities) {published data only}

studyIdentifiers

Shang X, Li Y, Xu H, Zhang Q, Hu X, Liu A, et al. Effect of multidimensional lifestyle interventions on metabolic risk reduction in children: a cluster randomised controlled trial. Preventive Medicine 2020;133:106010. [DOI: 10.1016/j.ypmed.2020.106010]

Xu H, Ecker O, Zhang Q, Du S, Liu A, Li Y, et al. The effect of comprehensive intervention for childhood obesity on dietary diversity among younger children: Evidence from a school-based randomized controlled trial in China [The effect of comprehensive intervention for childhood obesity on dietary diversity among younger children: Evidence from a school-based randomized controlled trial in China]. PLoS ONE [Electronic Resource] 2020;15(7):e0235951. [DOI: https://dx.doi.org/10.1371/journal.pone.0235951]

Xu H, Li Y, Du S, Zhang Q, Liu A, Sun J, et al. Cost-utility and cost-benefit analyses of school-based obesity prevention program [Cost-utility and cost-benefit analyses of school-based obesity prevention program]. BMC Public Health 2020;20(1):1608. [DOI: https://dx.doi.org/10.1186/s12889-020-09718-x]

Xu H, Li Y, Shang X, Du S, Zhang Q, Liu A, et al. Effect of Comprehensive Interventions Including Nutrition Education and Physical Activity on High Blood Pressure among Children: Evidence from School-Based Cluster Randomized Control Trial in China [Effect of Comprehensive Interventions Including Nutrition Education and Physical Activity on High Blood Pressure among Children: Evidence from School-Based Cluster Randomized Control Trial in China]. International Journal of Environmental Research and Public Health 2020;17(23):01. [DOI: https://dx.doi.org/10.3390/ijerph17238944]

* Xu H, Li Y, Zhang Q, Hu XL, Liu A, Du S, et al. Comprehensive school-based intervention to control overweight and obesity in China: a cluster randomized controlled trial. Asia Pacific Journal of Clinical Nutrition 2017;26(6):1139-51. [DOI: https://dx.doi.org/10.6133/apjcn.112016.05]

Yin 2012 {published data only}

studyIdentifiers

Gutin B, Yin Z, Johnson M, Barbeau P. Preliminary findings of the effect of a 3-year after-school physical activity intervention on fitness and body fat: the Medical College of Georgia Fitkid Project [Preliminary findings of the effect of a 3-year after-school physical activity intervention on fitness and body fat: the Medical College of Georgia Fitkid Project]. International Journal of Pediatric Obesity 2008;3 Suppl 1:3-9.

Wang LY, Gutin B, Barbeau P, Moore JB, Hanes J, Johnson MH, et al. Cost-effectiveness of a school-based obesity prevention program [Cost-effectiveness of a school-based obesity prevention program]. Journal of School Health 2008;78:619-624.

Wang LY, Yang Q, Lowry R, Wechsler H. Economic analysis of a school-based obesity prevention program [Economic analysis of a school-based obesity prevention program]. Obesity Research 2003;11(11):1313-1324.

Yin Z, Gutin B, Johnson MH, Hanes JJr, Moore JB, Cavnar M, et al. An environmental approach to obesity prevention in children: Medical College of Georgia FitKid Project year 1 results [An environmental approach to obesity prevention in children: Medical College of Georgia FitKid Project year 1 results]. Obesity Research 2005;13:2153-2161.

Yin Z, Hanes JJr, Moore JB, Humbles P, Barbeau P, Gutin B. An after-school physical activity program for obesity prevention in children: The Medical College of Georgia FitKid Project [An after-school physical activity program for obesity prevention in children: The Medical College of Georgia FitKid Project]. Evaluation and the Health Professions 2005;28:67-89.

Yin Z, Moore JB, Johnson MH, Barbeau P, Cavnar M, Thornburg J, et al. The Medical College of Georgia FitKid Project: the relations between program attendance and changes in outcomes in year 1 [The Medical College of Georgia FitKid Project: the relations between program attendance and changes in outcomes in year 1]. International Journal of Obesity 2005;29:S40-S45.

* Yin Z, Yin Z. The impact of a 3-year after-school obesity prevention program in elementary school children. Childhood Obesity 2012;8(1):60-70.

Zota 2016 {published data only}

studyIdentifiers

Zota D, Dalma A, Petralias A, Lykou A, Kastorini CM, Yannakoulia M, et al. Promotion of healthy nutrition among students participating in a school food aid program: a randomized trial. International Journal of Public Health 2016;61(5):583-92. [DOI: https://dx.doi.org/10.1007/s00038-016-0813-0]

References to studies excluded from this review

Allender 2021 {published data only}

studyIdentifiers

ACTRN12616000980437. Whole of Systems Trial Of Prevention Strategies for childhood obesity: WHO STOPS childhood obesity [Whole of Systems Trial Of Prevention Strategies for childhood obesity: WHO STOPS childhood obesity]. https://anzctr.org.au/ACTRN12616000980437.aspx (first received 26 July 2016).

Allender S, Millar L, Hovmand P, Bell C, Moodie M, Carter R, et al. Whole of Systems Trial of Prevention Strategies for Childhood Obesity: WHO STOPS Childhood Obesity. International Journal of Environmental Research & Public Health 2016;13(11):16. [DOI: https://dx.doi.org/10.3390/ijerph13111143]

* Allender S, Orellana L, Crooks N, Bolton KA, Fraser P, Brown AD, et al. Four-Year Behavioral, Health-Related Quality of Life, and BMI Outcomes from a Cluster Randomized Whole of Systems Trial of Prevention Strategies for Childhood Obesity. Obesity 2021;29(6):1022-35. [DOI: 10.1002/oby.23130]
Crooks N, Strugnell C, Bell C, Allender S. Establishing a sustainable childhood obesity monitoring system in regional Victoria. Health Promotion Journal of Australia 2017;28(2):96-102. [DOI: 10.1071/HE16020]
Jacobs J, Strugnell C, Allender S, Orellana L, Backholer K, Bolton KA, et al. The impact of a community-based intervention on weight, weight-related behaviours and health-related quality of life in primary school children in Victoria, Australia, according to socio-economic position. BMC Public Health 2021;21(1):2179. [DOI: 10.1186/s12889-021-12150-4]
Sweeney R, Moodie M, Nguyen P, Fraser P, Bolton K, Brown A, et al. Protocol for an economic evaluation of WHO STOPS childhood obesity stepped-wedge cluster randomised controlled trial. BMJ Open 2018;8(5):e020551. [DOI: https://dx.doi.org/10.1136/bmjopen-2017-020551]

Beets 2014 {published data only}

studyIdentifiers

* Beets MW, Glenn Weaver R, Turner-McGrievy G, Huberty J, Ward DS, Freedman DA, et al. Making healthy eating and physical activity policy practice: the design and overview of a group randomized controlled trial in afterschool programs. Contemporary Clinical Trials 2014;38(2):291-303. [DOI: https://dx.doi.org/10.1016/j.cct.2014.05.013]
Beets MW, Weaver RG, Turner-McGrievy G, Huberty J, Ward DS, Pate RR, et al. Physical activity outcomes in afterschool programs: A group randomized controlled trial. Preventive Medicine 2016;90:207-15. [DOI: https://dx.doi.org/10.1016/j.ypmed.2016.07.002]

Braun 2016 {published data only}

studyIdentifiers

Braun M, Cook C, Mukherjea R, Liska AD. A randomized, controlled, parallel study to assess the effects of soy protein on body composition and general health parameters in healthy children. In: FASEB Journal. Conference: Experimental Biology. Vol. 30. 2016.

Braun 2019 {published data only}

studyIdentifiers

Braun A, Hill E, Al-Muhanna K, Stigall N, Lobb J, Rausch J, et al. Garden-Based Intervention for Youth Improves Dietary and Physical Activity Patterns, Quality of Life, Family Relationships, and Indices of Health. Society for Nutrition Education and Behavior 52nd Annual Conference, Nutrition Education: rooted in Food, July 27-30, 2019, Orlando, Florida; NP23. In: Journal of nutrition education and behavior. Vol. 51. 2019:S20. [DOI: 10.1016/j.jneb.2019.05.347]

Christiansen 2013 {published data only}

studyIdentifiers

Christiansen LB, Toftager M, Boyle E, Kristensen PL, Troelsen J. Effect of a school environment intervention on adolescent adiposity and physical fitness. Scandinavian Journal of Medicine & Science in Sports 2013;23(6):e381-89.

Coleman 2005 {published data only}

studyIdentifiers

Brown HS 3rd, Pérez A, Li YP, Hoelscher DM, Kelder SH, Rivera R. The cost-effectiveness of a school-based overweight program. International Journal of Behavioral Nutrition & Physical Activity 2007;4:47. [DOI: 10.1186/1479-5868-4-47]
Coleman KJTiller CLSanchez JHeath EMSy OMilliken Get a l. Prevention of the epidemic increase in child risk of overweight in low-income schools [Prevention of the epidemic increase in child risk of overweight in low-income schools]. Archives of Pedatrics and Adolescent Medicine 2005;159:217-224.
Duong Hao T. Body mass index trajectories and predictors among 3rd to 12th-graders using growth curve mixture modeling the Child and Adolescent Trial for Cardiovascular Health (CATCH) study. Dissertation Abstracts International: Section B: The Sciences and Engineering 2009;70(3-B):1621.
Heath EM, Coleman KJ. Adoption and institutionalization of the Child and Adolescent Trial for Cardiovascular Health (CATCH) in El Paso, Texas. Health Promotion Practice 2003;4:159-164.
Heath EM, Coleman KJ. Evaluation of the institutionalization of the Coordinated Approach to Child Health (CATCH) in a US/Mexico border community. Health Education and Behavior 2002;29:444-600.

De Oliveira 2015 {published data only}

studyIdentifiers

De Oliveira F. Intervention through the curriculum for the prevention of obesity in schoolchildren, a two-year evaluation in urban public and private schools in Mexico [Intervención a través del currículo para la

prevención de obesidad en escolares, evaluación de dos años en escuelas públicas y privadas urbanas de México]. Archivos latinoamericanos de nutrición 2015;65(Suppl 2):76.

Dominguez-Munoz 2021 {published data only}

studyIdentifiers

Dominguez-Munoz A, Carlos-Vivas J, Barrios-Fernandez S, Adsuar JC, Morenas-Martin J, Garcia-Gordillo MA, et al. Pedagogical proposal of tele-exercise based on "square stepping exercise" in preschoolers: Study protocol. International Journal of Environmental Research and Public Health 2021;18 (16):8649. [DOI: http://dx.doi.org/10.3390/ijerph18168649]

Dong 2021 {published data only}

studyIdentifiers

Chen Y, Ma L, Ma Y, Wang H, Luo J, Zhang X, et al. A national school-based health lifestyles interventions among Chinese children and adolescents against obesity: rationale, design and methodology of a randomized controlled trial in China. BMC Public Health 2015;15:210. [DOI: https://dx.doi.org/10.1186/s12889-015-1516-9]

* Dong Y, Zou Z, Wang H, Dong B, Hu P, Ma Y, et al. National School-Based Health Lifestyles Intervention in Chinese Children and Adolescents on Obesity and Hypertension [Intervention on obesity and hypertension]. Frontiers in Pediatrics 2021;9:615283. [DOI: 10.3389/fped.2021.615283]

Fernald 2009 {published data only}

studyIdentifiers

* Fernald LC, Gertler PJ, Neufeld LM. 10-year effect of Oportunidades, Mexico's conditional cash transfer programme, on child growth, cognition, language, and behaviour: a longitudinal follow-up study. Lancet 2009;374(9706):1997-2005. [DOI: 10.1016/s0140-6736(09)61676-7]

ISRCTN11833436. Impact evaluation of Oportunidades [Impact evaluation of Oportunidades]. https://www.isrctn.com/ISRCTN11833436 (first received 8 August 2007).

Gruber 2015 {published data only}

studyIdentifiers

Gruber R, Somerville G. Preliminary results from a multicomponent obesity prevention school based program. Sleep 2015;38:A392-93.

Herscovici 2013 {published data only}

studyIdentifiers

Herscovici CR, Kovalskys I, De Gregorio MJ. Gender differences and a school-based obesity prevention program in Argentina: a randomized trial. Revista Panamericana de Salud Pública 2013;34(2):75-82.

Jones 2020 {published data only}

studyIdentifiers

Jones Paul Remy. The associations of physical activity, sedentary time, and aerobic fitness with lipoprotein particle profile in children. DART-Europe E-theses Portal [www.dart-europe.org] 2020.

Lubans 2011 {published data only}

studyIdentifiers

* Lubans DR, Morgan PJ, Aguiar EJ, Callister R. Randomized controlled trial of the Physical Activity Leaders (PALs) program for adolescent boys from disadvantaged secondary schools. Preventive medicine 2011;52(3-4):239-46.

Lubans DR, Morgan PJ, Callister R. Potential moderators and mediators of intervention effects in an obesity prevention program for adolescent boys from disadvantaged schools. Journal of Science & Medicine in Sport 2012;15(6):519-25.

Madsen 2015 {published data only}

studyIdentifiers

* Madsen K, Linchey J, Gerstein D, Ross M, Myers E, Brown K, et al. Energy Balance 4 Kids with Play: Results from a Two-Year Cluster-Randomized Trial. Childhood Obesity 2015;11(4):375-83. [DOI: https://dx.doi.org/10.1089/chi.2015.0002]

Myers EF, Gerstein DE, Foster Myers EF. Energy balance for kids with play: design and implementation of a multi-component school-based obesity prevention program. Childhood Obesity 2014;10(3):251-59.

Madsen 2021 {published data only}

studyIdentifiers

Madsen KA, Linchey J, Ritchie L, Thompson HR. The Fit Study: Design and rationale for a cluster randomized trial of school-based BMI screening and reporting. Contemporary Clinical Trials 2017;58:40-46. [DOI: https://dx.doi.org/10.1016/j.cct.2017.05.005]

* Madsen KA, Thompson HR, Linchey J, Ritchie LD, Gupta S, Neumark-Sztainer D, et al. Effect of School-Based Body Mass Index Reporting in California Public Schools: A Randomized Clinical Trial. JAMA Pediatrics 2021;175(3):251-59. [DOI: 10.1001/jamapediatrics.2020.4768]

Mattos 2018 {published data only}

studyIdentifiers

Mattos LB, Mattos MB, Barbosa APO, Bauer MDS, Strack MH, Rosario P, et al. Promoting Self-Regulation in Health Among Vulnerable Brazilian Children: Protocol Study. Frontiers in Psychology 2018;9:651. [DOI: https://dx.doi.org/10.3389/fpsyg.2018.00651]

Meng 2020 {published data only}

studyIdentifiers

Cunningham-Sabo L, Lohse B, Smith S, Browning R, Strutz E, Nigg C, et al. Fuel for Fun: a cluster-randomized controlled study of cooking skills, eating behaviors, and physical activity of 4th graders and their families. BMC Public Health 2016;16:444. [DOI: https://dx.doi.org/10.1186/s12889-016-3118-6]

Lohse B, Cunningham-Sabo L. Quantifying parent engagement in the randomized Fuel for Fun impact study identified design considerations and BMI relationships. BMC Medical Research Methodology 2021;21(1):205. [DOI: 10.1186/s12874-021-01398-4]

* Meng Y, Lohse B, Cunningham-Sabo L. Sex modifies the association between the CLOCK variant rs1801260 and BMI in school-age children. PLoS One 2020;15(8):e0236991. [DOI: 10.1371/journal.pone.0236991]

Muckelbauer 2010 {published data only}

studyIdentifiers

Muckelbauer R, Libuda L, Clausen K, Kersting M. Approaches for the prevention of overweight through modified beverage consumption in the elementary school setting. The "trinkfit" study [Ansätze der Übergewichtsprävention durch verbessertes Trinkverhalten im Setting Grundschule. Die „trinkfit“-Studie]. Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz 2011;54(3):339-48.

* Muckelbauer R, Libuda L, Clausen K, Toschke A. Immigrational background affects the effectiveness of a school-based overweight prevention program promoting water consumption. Obesity 2010;18(3):528-34.

Muckelbauer R, Libuda L, Clausen K, Toschke AM, Reinehr T, Kersting M. Promotion and Provision of Drinking Water in Schools for Overweight Prevention: randomized, Controlled Cluster Trial. Nutrition Today 2012;47:S27. [DOI: 10.1097/NT.0b013e318264ef5b]

Muckelbauer R, Libuda L, Clausen K, Toschke AM, Reinehr T, Kersting M. Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics 2009;123(4):e661-7. [DOI: 10.1542/peds.2008-2186]

NCT00061165 2003 {published data only}

studyIdentifiers

NCT00061165. Obesity Prevention in African American School Children [Obesity Prevention in African American School Children]. https://clinicaltrials.gov/show/NCT00061165 (first received 21 May 2003).

NCT01845480 2013 {published data only}

studyIdentifiers

NCT01845480. The Wildcat Wellness Coaching Trial [The Wildcat Wellness Coaching Trial: Home-based Obesity Prevention and Health Promotion in Children and Adolescents]. https://clinicaltrials.gov/show/NCT01845480 (first received 29 April 2013).

NCT03069274 2017 {published data only}

studyIdentifiers

NCT03069274. Sugar-sweetened Beverage Intake Substitution by Water to Prevent Overweight in Mexican Children [Impact of a Randomized School-based Intervention on Sugar-sweetened Beverage Intake Substitution by Water to Prevent Excessive Weight in Mexican Scholars]. https://clinicaltrials.gov/show/NCT03069274 (first received 28 February 2017).

NCT03422926 2018 {published data only}

studyIdentifiers

NCT03422926. ChildObesity180 - Social Marketing Campaign to Encourage Healthful Eating in Restaurants for Children CO180 [ChildObesity180 - Social Marketing Campaign to Encourage Healthful Eating in Restaurants for Children]. https://clinicaltrials.gov/show/NCT03422926 (first received 24 April 2017).

NCT03469752 2018 {published data only}

studyIdentifiers

NCT03469752. Latino Fathers Promoting Healthy Youth Behaviors [Latino Fathers Promoting Healthy Youth Behaviors]. https://clinicaltrials.gov/show/NCT03469752 (first received 8 March 2018).

NCT03479658 2018 {published data only}

studyIdentifiers

NCT03479658. Dose-effect of HIIT on Cardiovascular Health of Children [Dose-effect of HIIT on Cardiovascular Health of Children Aged 9 to 10 Years Old Participating in a School Based Multidisciplinary Intervention Program: a Pilot Study]. https://clinicaltrials.gov/show/NCT03479658 (first received 20 February 2018).

NCT03885115 2019 {published data only}

studyIdentifiers

NCT03885115. Lace Up and Move: Structured After School Intervention for Hispanic and African American Youth LUAM [Lace Up and Move: structured After School Intervention for Hispanic and African American Youth]. https://clinicaltrials.gov/show/NCT03885115 (first received 19 March 2019).

NCT04863040 2021 {published data only}

studyIdentifiers

NCT04863040. The Impact of Activity Breaks on Cognitive Function, Adiposity and Fitness in Preschoolers MOVI-HIIT [The Impact of a Classroom-based Physical Activity Breaks on Cognitive Function, Adiposity and Fitness in Preschool Children (MOVI-HIIT)]. https://clinicaltrials.gov/show/NCT04863040 (first received 20 March 2021).

NCT04864574 2021 {published data only}

studyIdentifiers

NCT04864574. Childcare Outdoor Learning Environments as Active Food Systems COLEAFS [Childcare Outdoor Learning Environments as Active Food Systems: Effectiveness of the Preventing Obesity by Design (POD) Gardening Component]. https://clinicaltrials.gov/show/NCT04864574 (first received 10 April 2021).

NCT05358444 2022 {published data only}

studyIdentifiers

NCT05358444. Family Diabetes Prevention Program Pilot Study [Family Diabetes Prevention Program Pilot Study]. https://clinicaltrials.gov/show/NCT05358444 (first received 27 April 2022).

NCT05417347 2022 {published data only}

studyIdentifiers

NCT05417347. Full-fat Dairy Products, Body Weight Control and Metabolic Health [The Role of Full-fat Dairy Products on Body Weight Control and Metabolic Health in Adults and Children]. https://clinicaltrials.gov/show/NCT05417347 (first received 8 April 2022).

NCT05468216 2022 {published data only}

studyIdentifiers

NCT05468216. Movement Integration in Primary Schools' Lessons MovIn-Lessons [he Effect of MovIn-Lessons Project on Physical Activity Levels, Executive Functions, Academic Performance and On-task Behaviour in Primary Schools: Study Protocol for a Cluster-randomized Controlled Trial]. https://clinicaltrials.gov/show/NCT05468216 (first received 9 May 20220.

Nezami 2020 {published data only}

studyIdentifiers

Nezami B, Power J, Hurley L, Tate D. A randomized controlled trial of two diet monitoring approaches in a mobile weight loss intervention. Obesity 2020;28 (SUPPL 2):43. [DOI: http://dx.doi.org/10.1002/oby.23063]

Parkinson 2015 {published data only}

studyIdentifiers

Parkinson KN, Jones AR, Tovee MJ, Ells LJ, Pearce MS, Araujo-Soares V, et al. A cluster randomised trial testing an intervention to improve parents' recognition of their child's weight status: study protocol. BMC Public Health 2015;15:549. [DOI: https://dx.doi.org/10.1186/s12889-015-1882-3]

Perry 2021 {published data only}

studyIdentifiers

NCT02932813. Translational Health After School Program on Health-Related Knowledge/Behaviors and Exercise Perception THINK [The Effects of a Translational Health After School Program on Health-Related Knowledge/Behaviors and Exercise Perception in Minority Children]. https://clinicaltrials.gov/show/NCT02932813 (first received 1 September 2016).

* Perry AC, Flanagan EW, Velasquez C, Bolon KD, Zito GC, Ahn S. The Effects of a Science-Based Community Intervention on Health Outcomes in Minority Children: The Translational Health in Nutrition and Kinesiology Program. Journal of Physical Activity and Health 2021;18(9):1074-81. [DOI: 10.1123/jpah.2020-0622]

Polonsky 2019 {published data only}

studyIdentifiers

Foster GD. Error in Statistical Code in Cluster Randomized Trial on the Effect of a Breakfast in the Classroom Initiative on Obesity in Urban, School-aged Children. JAMA Pediatrics 2019;173(7):703-4. [DOI: 10.1001/jamapediatrics.2019.1589]

* Polonsky HM, Bauer KW, Fisher JO, Davey A, Sherman S, Abel ML, et al. Effect of a Breakfast in the Classroom Initiative on Obesity in Urban School-aged Children: A Cluster Randomized Clinical Trial. JAMA Pediatrics 2019;173(4):326-333. [DOI: https://dx.doi.org/10.1001/jamapediatrics.2018.5531]

Polonsky HM, Bauer KW, Fisher JO, Davey A, Sherman S, Abel ML, et al. Errors in the Abstract, Results Section, and Table 2. JAMA Pediatrics 2019;173(7):704. [DOI: 10.1001/jamapediatrics.2019.1770]

Polonsky HM. Effects of a Breakfast in the Classroom Initiative on Childhood Obesity in Low-Income Ethnically Diverse Youth: A Randomized Control Trial. ProQuest LLC 2017;10262670:52.

Prina 2014 {published data only}

studyIdentifiers

Prina S, Royer H. The importance of parental knowledge: evidence from weight report cards in Mexico. Journal of Health Economics 2014;37:232-47. [DOI: https://dx.doi.org/10.1016/j.jhealeco.2014.07.001]

Reed 2008 {published data only}

studyIdentifiers

Naylor P, Macdonald H, Reed K, McKay HA. Action Schools BC: a socio-ecological approach to modifying disease risk factors in elementary school children. Preventing Chronic Disease 2006;3(2):A6017-19.

Naylor P, Macdonald HM, Zebedee JA, Reed KE, McKay HA. Lessons learned from Action Schools BC: an active schools model to promote physical activity in elementary schools. Journal of Science and Medicine in Sport 2006;9(5):413-19.

* Reed KE, Warburton DE, Macdonald HM, Naylor PJ, McKay HA. Action Schools! BC: a school-based physical activity intervention designed to decrease cardiovascular disease risk factors in children. Preventive Medicine 2008;46(6):525-31.

Robbins 2006 {published data only}

studyIdentifiers

Robbins LB, Gretebeck KA, Kazanis AS, Pender NJ. Girls on the move program to increase physical activity participation. Nursing Research 2006;55(3):206-16.

Sallis 1993 {published data only}

studyIdentifiers

Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Hovell MF, Nader PR. Project SPARK. Effects of physical education on adiposity in children. Annals of the New York Academy of Sciences 1993;699:127-36.

Sevinc 2011 {published data only}

studyIdentifiers

Sevinc O, Bozkurt AI, Gundogdu M, Bas Aslan U, Agbuga B, Aslan S, Dikbas E, Gokce Z. Evaluation of the effectiveness of an intervention program on preventing childhood obesity in Denizli, Turkey. Turkish Journal of Medical Sciences 2011;41(6):1097-1105.

Waters 2017 {published data only}

studyIdentifiers

Waters E, Gibbs L, Tadic M, Ukoumunne OC, Magarey A, Okely AD, de Silva A, Armit C, Green J, O'Connor T, Johnson B, Swinburn B, Carpenter L, Moore G, Littlecott H, Gold L. Cluster randomised trial of a school-community child health promotion and obesity prevention intervention: findings from the evaluation of fun 'n healthy in Moreland! BMC Public Health 2017;18(1):92. [DOI: https://dx.doi.org/10.1186/s12889-017-4625-9]

Zafiropulos 2015 {published data only}

studyIdentifiers

Zafiropulos V, Chatzi V, Dimitropoulakis P, Markaki A, Fthenakis ZG, Thalassinos N, et al. T7:PO.036 Preliminary results of a dietary intervention among primary school children. In: Obesity Facts. Vol. 8. 2015:133. [DOI: http://dx.doi.org/10.1159/000382140]

References to studies awaiting assessment

Larruy-Garcia 2022 {published data only}

studyIdentifiers

* Larque E. Changes in body composition after one year of lifestyle intervention in children at risk of obesity: Preliminary results Melipop study. XXXI Congress of the Spanish Nutrition Society (SEN) Cartagena (Spain), 15th to 17th September 2022. Topic: Personalized Nutrition and Health; OC012. In: Ann Nutr Metab. 20220901 edition. Vol. 78 Suppl 3. 2022:1-63. [DOI: 10.1159/000526374]

NCT04597281. MEditerranean LIfestyle in Pediatric Obesity Prevention MELI-POP [MEditerranean LIfestyle in Pediatric Obesity Prevention]. https://clinicaltrials.gov/show/NCT04597281 (first received 28 September 2022).

Widhalm 2022 {published data only}

studyIdentifiers

Widhalm K, Hauer R, Tschan H, Porjesova K. Effects of an 9-months Nutritional and Sports-intervention in Elementary School Children 8–11 years of Age: EDDY-Young Study [Effekte einer Ernährungs- und Sportintervention bei Volkschulkindern im Alter von 8–11 Jahren nach neunmonatiger Intervention: EDDY Young Studie]. Aktuelle Ernährungsmedizin 2022;47(2):101-10. [DOI: 10.1055/a-1628-0562]

References to ongoing studies

ACTRN12620001101976 2020 {published data only}

studyIdentifiers

ACTRN12620001101976. The Pasifika Preventing Diabetes Programme: a lifestyle intervention through community activation and peer support among Pasifika people [The Pasifika Preventing Diabetes Programme: A stepped wedge cluster randomised trial investigating the effect of a lifestyle intervention involving community activation and peer support, on HbA1c levels among Pasifika people]. https://anzctr.org.au/ACTRN12620001101976.aspx (first received 23 October 2020).

ACTRN12622000906752 2022 {published data only}

studyIdentifiers

ACTRN12622000906752. An Aotearoa New Zealand Diet for Metabolic Health and Whanau Wellbeing: he Rourou Whai Painga [An Aotearoa New Zealand Diet for Metabolic Health and Whanau Wellbeing: He Rourou Whai Painga (HRWP); a randomised controlled trial of a dietary pattern in adults at metabolic risk and their whanau and the effect on metabolic syndrome z score]. https://www.isrctn.com/ISRCTN89011056 (first received 14 June 2022).

Andino 2022 {published data only}

studyIdentifiers

Andino J, Park-Mroch J, Francis SL, O'Shea AMJ, Engebretsen B, Rice S, et al. A randomized controlled trial of a community-based obesity intervention utilizing motivational interviewing and community resource mobilization for low-income families: Study protocol and baseline characteristics. Contemporary Clinical Trials 2022;112:106626. [DOI: 10.1016/j.cct.2021.106626]

Barragan 2022 {published data only}

studyIdentifiers

* Barragan M, Luna V, Hammons AJ, Olvera N, Greder K, Drumond Andrade FC, et al. Reducing Obesogenic Eating Behaviors in Hispanic Children through a Family-Based, Culturally-Tailored RCT: Abriendo Caminos. International Journal of Environmental Research & Public Health 2022;19(4):1917. [DOI: 10.3390/ijerph19041917]
Hammons AJ, Hannon BA, Teran-Garcia M, Barragan M, Villegas E, Wiley A, et al. Effects of Culturally Tailored Nutrition Education on Dietary Quality of Hispanic Mothers: A Randomized Control Trial [Effects of Culturally Tailored Nutrition Education on Dietary Quality of Hispanic Mothers: A Randomized Control Trial]. Journal of Nutrition Education & Behavior 2019;31:31. [DOI: https://dx.doi.org/10.1016/j.jneb.2019.06.017]
Hannon BA, Teran-Garcia M, Nickols-Richardson SM, Musaad SMA, Villegas EM, Hammons A, et al. Implementation and Evaluation of the Abriendo Caminos Program: A Randomized Control Trial Intervention for Hispanic Children and Families [Implementation and Evaluation of the Abriendo Caminos Program: A Randomized Control Trial Intervention for Hispanic Children and Families]. Journal of Nutrition Education and Behavior 2019;51(10):1211-19. [DOI: http://dx.doi.org/10.1016/j.jneb.2019.08.011]
NCT03479658. Dose-effect of HIIT on Cardiovascular Health of Children [Dose-effect of HIIT on Cardiovascular Health of Children Aged 9 to 10 Years Old Participating in a School Based Multidisciplinary Intervention Program: a Pilot Study]. https://clinicaltrials.gov/show/NCT03479658 (first received 20 February 2018).

Brooks 2022 {published data only}

studyIdentifiers

ACTRN12619001019190. The Strong Families Trial: Randomised controlled trial of a family strengthening program to prevent unhealthy weight gain among 5- to 11-year old children from at risk families [The Strong Families Trial: Randomised controlled trial of a family strengthening program to prevent unhealthy weight gain among 5- to 11-year old children from at risk families]. https://anzctr.org.au/ACTRN12619001019190.aspx (first received 16 July 2019).
Brooks C, Helson C, McCormack M, Baur LA, Gill T, Green J, et al. Protocol for a randomised controlled trial of a family strengthening program to prevent unhealthy weight gain among 5 to 11-year-old children from at-risk families: the Strong Families Trial. BMC Public Health 2022;22(1):1215. [DOI: 10.1186/s12889-022-13452-x]

Bustos 2016 {published data only}

studyIdentifiers

Bustos N, Olivares S, Leyton B, Cano m, Albala C. Impact of a school-based intervention on nutritional education and physical activity in primary public schools in Chile (KIND) programme study protocol: cluster randomised controlled trial. BMC Public Health 2016;16(1):1217. [DOI: https://dx.doi.org/10.1186/s12889-016-3878-z]

Byrd-Bredbenner 2022 {published data only}

studyIdentifiers

* Byrd-Bredbenner C, Santiago E, Eck KM, Delaney CL, Quick VM, Pozzoli A, et al. HomeStyles-2: Randomized controlled trial protocol for a web-based obesity prevention program for families with children in middle childhood. Contemporary Clinical Trials 2022;112:106644. [DOI: 10.1016/j.cct.2021.106644]
Carman K, O'Neal LJ, Byrd-Bredbenner C, Olfert MD, Shelnutt KP. HomeStyles-2 for SNAP-Ed families with children in middle childhood: Cluster randomized trial protocol [HomeStyles-2 for SNAP-Ed families with children in middle childhood: Cluster randomized trial protocol]. Contemporary Clinical Trials 2022;117:106771. [DOI: 10.1016/j.cct.2022.106771]
NCT04802291. HomeStyles-2: Shaping HOME Environments and LifeSTYLES to Prevent Childhood Obesity HomeStyles-2 [HomeStyles-2: shaping HOME Environments and LifeSTYLES to Prevent Childhood Obesity]. https://clinicaltrials.gov/show/NCT04802291 (first received 14 March 2021).
NCT05019339. HomeStyles-2: Shaping HOME Environments and LifeSTYLES to Prevent Childhood Obesity in SNAP-Education [HomeStyles-2: Shaping HOME Environments and LifeSTYLES to Prevent Childhood Obesity in SNAP-Education]. https://clinicaltrials.gov/show/NCT05019339 (first received 11 August 2021).
Shelnutt K, Olfert MD, Byrd-Bredbenner C. NP21 Advancing and Expanding HomeStyles: shaping HOME Environments and LifeSTYLES to Prevent Childhood Obesity. Society for Nutrition Education and Behavior 52nd Annual Conference, Nutrition Education: rooted in Food, July 27-30, 2019, Orlando, Florida. Journal of Nutrition Education and Behavior 2019;51:S19. [DOI: 10.1016/j.jneb.2019.05.345]

Cespedes 2021 {published data only}

studyIdentifiers

Cespedes LG, Fretes G, Rios P, Estigarribia G, Viveros G, Aguilar G, et al. Design of a multi-component controlled randomized community study for obesity prevention in school children: Research protocol.

[Spanish]. Revista Espanola de Nutricion Humana y Dietetica 2021;24(4):389-97. [DOI: http://dx.doi.org/10.14306/RENHYD.24.4.1024]

ChiCTR2000033945 2020 {published data only}

studyIdentifiers

ChiCTR2000033945. Reducing the intake of beverages among primary school students [Intervention among primary school students reducing beverages in Nanjing]. http://www.chictr.org.cn/showproj.aspx?proj=55267 (first received 18 June 2020).

ChiCTR-IOR-16009997 2016 {published data only}

studyIdentifiers

ChiCTR-IOR-16009997. Application of technique on early diagnosis and comprehensive prevention for children nutritious risk based on mobile platform [Application of technique on early diagnosis and comprehensive prevention for children nutritious risk based on mobile platform]. http://www.chictr.org.cn/showproj.aspx?proj=17009 (first received 24 November 2016).

ChiCTR-PRC-08000053 2008 {published data only}

studyIdentifiers

ChiCTR-PRC-08000053. School Based Child Obesity Prevention Study in Urban Beijing, China [School Based Child Obesity Prevention Study in Urban Beijing, China]. http://www.chictr.org.cn/showproj.aspx?proj=9472 (first received 14 February 2008).

ChiCTR-TRC-12001880 2012 {published data only}

studyIdentifiers

ChiCTR-TRC-12001880. A novel intervention to modify dietary behaviors related to childhood obesity based on behavior modification theory: a cluster randomized controlled trial [Study on the intervention strategy of dietary behaviors related to childhood obesity based on behavior modification theory]. http://www.chictr.org.cn/showproj.aspx?proj=7668 (first received 14 January 2012).

CTRI/2020/10/028700 2020 {published data only}

studyIdentifiers

CTRI/2020/10/028700. Health promotion against Non-communicable diseases risk factors [Vitalizing Community against Non-communicable diseases (V-CaN): a cluster field trial for health promotion against Non-communicable diseases risk factors in rural India - V-CaN]. http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=47597 (first received 28 October 2020).

Cunha 2017 {published data only}

studyIdentifiers

* Cunha DB, Verly Junior E, Paravidino VB, Araujo MC, Mediano MFF, Sgambato MR, et al. Design of a school randomized trial for nudging students towards healthy diet and physical activity to prevent obesity: PAAPAS Nudge study protocol. Medicine 2017;96(50):e8898. [DOI: https://dx.doi.org/10.1097/MD.0000000000008898]

NCT03136016. Nudging, Healthy Diet and Physical Activity [Design of a School Randomized Trial for Nudging Students Towards Healthy Diet and Physical Activity]. https://clinicaltrials.gov/show/NCT03136016 (first received 27 April 2017).

DRKS00023824 2020 {published data only}

studyIdentifiers

DRKS00023824. Fitness and health status of primary school children in the greater Klagenfurt area [Fitness and health status of primary school children in the greater Klagenfurt area]. http://drks.de/en/trial/DRKS00023824 (first received 30 December 2020).

DRKS00025515 2021 {published data only}

studyIdentifiers

DRKS00025515. The daily sports activity hour in primary school in the greater Klagenfurt area [The daily sports activity hour in primary school in the greater Klagenfurt area]. http://drks.de/en/trial/DRKS00025515 (first received 8 June 2021).

Dukhi 2020 {published data only}

studyIdentifiers

Dukhi N, Sartorius B, Taylor M. A behavioural change intervention study for the prevention of childhood obesity in South Africa: protocol for a randomized controlled trial. BMC Public Health 2020;20(1):179. [DOI: https://dx.doi.org/10.1186/s12889-020-8272-1]

Elinder 2018 {published data only}

studyIdentifiers

Elinder LS, Patterson E, Nyberg G, Norman A. A Healthy School Start Plus for prevention of childhood overweight and obesity in disadvantaged areas through parental support in the school setting - study protocol for a parallel group cluster randomised trial. BMC Public Health 2018;18(1):459. [DOI: https://dx.doi.org/10.1186/s12889-018-5354-4]

Elinder 2021 {published data only}

studyIdentifiers

* Elinder LS, Wiklund CA, Norman A, Stattin NS, Andermo S, Patterson E, et al. IMplementation and evaluation of the school-based family support PRogram a Healthy School Start to promote child health and prevent OVErweight and obesity (IMPROVE) - study protocol for a cluster-randomized trial. BMC Public Health 2021;21(1):1630. [DOI: https://dx.doi.org/10.1186/s12889-021-11663-2]

NCT04984421. IMplementation of the Family Support PRogramme A Healthy School Start to Prevent OVErweight and Obesity (IMPROVE) [IMplementation and Evaluation of the School-based Family Support PRogramme A Healthy School Start to Promote Child Health and Prevent OVErweight and Obesity (IMPROVE) - Study Protocol for a Cluster-randomized]. https://clinicaltrials.gov/show/NCT04984421 (first received 12 July 2021).

Friedrich 2015 {published data only}

studyIdentifiers

* Friedrich RR, Caetano LC, Schiffner M, BWagner MD, Schuch I. Design, randomization and methodology of the TriAtiva Program to reduce obesity in school children in Southern Brazil. BMC Public Health 2015;15:363. [DOI: https://dx.doi.org/10.1186/s12889-015-1727-0]

RBR-2xx2z4. Effect of an intervention program for nutrition education and physical activity in the prevention of obesity in schoolchildren [Effect of an intervention program with nutrition education and physical activity in the prevention of obesity in school children: a randomized controlled trial]. http://ensaiosclinicos.gov.br/rg/RBR-2xx2z4 (first received 14 August 2014).

Gerber 2020 {published data only}

studyIdentifiers

* Gerber M, Ayekoé SA, Beckmann J, Bonfoh B, Coulibaly JT, Daouda D, et al. Effects of school-based physical activity and multi-micronutrient supplementation intervention on growth, health and well-being of schoolchildren in three African countries: the KaziAfya cluster randomised controlled trial protocol with a 2 × 2 factorial design. Trials 2020;21(1):22. [DOI: 10.1186/s13063-019-3883-5]

Long KZ, Beckmann J, Lang C, Seelig H, Nqweniso S, Probst-Hensch N, et al. Associations of Growth Impairment and Body Composition among South African School-Aged Children Enrolled in the KaziAfya Project. Nutrients 2021;13(8):2735. [DOI: 10.3390/nu13082735]

Gittelsohn 2017 {published data only}

studyIdentifiers

Estrade M, van Dongen EJI, Trude ACB, Poirier L, Fleischhacker S, Wensel CR, et al. Exposure to a Multilevel, Multicomponent Obesity Prevention Intervention (OPREVENT2) in Rural Native American Communities: Variability and Association with Change in Diet Quality. International Journal of Environmental Research and Public Health 2021;18(22):12128. [DOI: 10.3390/ijerph182212128]

Gittelsohn J, Jock B, Poirier L, Wensel C, Pardilla M, Fleischhacker S, et al. Implementation of a multilevel, multicomponent intervention for obesity control in Native American communities (OPREVENT2): challenges and lessons learned. Health Education Research 2020;35(3):228-42. [DOI: 10.1093/her/cyaa012]

* Gittelsohn J, Jock B, Redmond L, Fleischhacker S, Eckmann T, Bleich SN, et al. OPREVENT2: Design of a multi-institutional intervention for obesity control and prevention for American Indian adults. BMC Public Health 2017;17(1):105. [DOI: https://dx.doi.org/10.1186/s12889-017-4018-0]

Glazebrook 2012 {published data only}

studyIdentifiers

* Glazebrook C, Batty M, Mullan N, Sayal K, Nathan D, McWilliams L, et al. 48 Cluster-Randomised Trial of a Targeted Intervention to Promote Exercise Self-Efficacy and Reduce Bmi in Children at Risk of Obesity. Archives of Disease in Childhood 2012;97(Suppl 2):A13. [DOI: 10.1136/archdischild-2012-302724.0048]

Glazebrook C. Evaluating the effectiveness of a schools-based programme to promote exercise self-efficacy in children and young people with risk factors for obesity: steps to active kids (STAK) [Evaluating the effectiveness of a schools-based programme to promote exercise self-efficacy in children and young people with risk factors for obesity: steps to active kids (STAK)]. BMC Public Health 2011;11:830-830.

IRCT2014042315797N3 2014 {published data only}

studyIdentifiers

IRCT2014042315797N3. Effect of health promotion interventions on nutritional behaviors [Effect of community-based health promotion interventions on nutritional behaviors of households in Hamadan city by applying the combined model]. http://en.irct.ir/trial/14955 (first received 12 July 2014).

IRCT2016012626078N2 2016 {published data only}

studyIdentifiers

IRCT2016012626078N2. Prevention of obesity in children [Development and evaluation of intervention based on enabling mothers for prevention of obesity in 4 to 6 years old children]. http://en.irct.ir/trial/21710 (first received 12 February 2016).

ISRCTN06248443 2014 {published data only}

studyIdentifiers

ISRCTN06248443. Obesity Prevention Tailored for Health II [Obesity Prevention Tailored for Health II: a randomized study]. http://isrctn.com/ISRCTN06248443 (first received 30 January 2014).

ISRCTN11371954 2020 {published data only}

studyIdentifiers

ISRCTN11371954. VisezEauÂ® (ReachforWater): a project to learn how to increase drinking of tap water and reduce drinking of bottled and sugary drinks among primary school children, with the aim of encouraging healthy weight and protecting the environment [The VisezEau® (ReachforWater) intervention trial in primary school: shifting towards normalization of non-bottled tap water consumption for preventing excess weight gain and for environmental protection]. http://isrctn.com/ISRCTN11371954 (first received 28 December 2019).

ISRCTN12378125 2021 {published data only}

studyIdentifiers

ISRCTN12378125. Can embedding the MapMe intervention, a tool to improve parental acknowledgement and understanding of childhood overweight and obesity, in the National Child Measurement Programme lead to improved child weight outcomes at one year? [The MapMe intervention, a tool to improve parental acknowledgement and understanding of childhood overweight and obesity, embedded in the National Child Measurement Programme to improve child weight outcomes at one year]. https://www.isrctn.com/ISRCTN12378125 (first received 10 August 2021).

ISRCTN52180050 2022 {published data only}

studyIdentifiers

ISRCTN52180050. An in-classroom physical activity breaks program to improve academic achievement, movement behaviors and health outcomes in grade five students in Sri Lanka [Classroom-based physical activity breaks to improve academic achievement, behavioral health and health outcomes among primary school children in Badulla District Sri Lanka]. https://www.isrctn.com/ISRCTN52180050 (first received 5 August 2022).

ISRCTN76013675 2014 {published data only}

studyIdentifiers

ISRCTN76013675. A physical activity and family-based intervention in pediatric obesity prevention in the school setting [A Physical activity and family-based intervention in pediatric obesity prevention in the school setting: a randomised controlled trial]. http://isrctn.com/ISRCTN76013675 (first received 7 November 2014).

JPRN-UMIN000014896 2014 {published data only}

studyIdentifiers

JPRN-UMIN000014896. Study on the medical checkup system for prevention of lifestyle diseases including diabetes in underage groups, especially infants, elementary and junior high school children {Study on the Prevention and Treatment of Obesity by Behavioral Approach (Lifestyle modification approach) for Elementary School Children} [Study on the medical checkup system for prevention of lifestyle diseases

including diabetes in underage groups, especially infants, elementary and junior high school children {Study on the Prevention and Treatment of Obesity by Behavioral Approach (Lifestyle modification approach) for Elementary School Children} - STOP Obesity Project for Elementary School Children]. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000017197 (first received 18 August 2014).

JPRN-UMIN000014992 2014 {published data only}

studyIdentifiers

JPRN-UMIN000014992. Impact of a life style intervention in incident and prevalence of overweight and obesity among secondary school children in Hanoi [Impact of a life style intervention in incident and prevalence of overweight and obesity among secondary school children in Hanoi - Impact of a life style intervention in incident and prevalence of overweight and obesity among secondary school children in Hanoi]. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000017426 (first received 289 August 2014).

JPRN-UMIN000036544 2019 {published data only}

studyIdentifiers

JPRN-UMIN000036544. Challenge and New Strategy of Health Promotion for Health and Longevity in Okinawa Residents 2: yui Kenko Project 2 [Challenge and New Strategy of Health Promotion for Health and Longevity in Okinawa Residents 2: Yui Kenko Project 2 - Yui Kenko Project 2]. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000041437 (first received 30 June 20190.

JPRN-UMIN000039773 2020 {published data only}

studyIdentifiers

JPRN-UMIN000039773. Evaluation of a community-based football-driven nutrition education program among primary school children [Evaluation of a community-based football-driven nutrition education program among primary school children - Community-based football-driven nutrition education program among primary school children]. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000045358 (first received 11 March 2020).

Lane 2018 {published data only}

studyIdentifiers

Lane HG, Deitch R, Wang Y, Black MM, Dunton GF, Aldoory L, et al. "Wellness Champions for Change," a multi-level intervention to improve school-level implementation of local wellness policies: Study protocol for a cluster randomized trial. Contemporary Clinical Trials 2018;75:29-39. [DOI: https://dx.doi.org/10.1016/j.cct.2018.10.008]

Laroche 2020 {published data only}

studyIdentifiers

Laroche H, O'Shea A, Andino J, Engebretsen B, Rice S, Dejear M, et al. A family obesity intervention combining motivation interviewing and resource mobilization. Obesity 2020;28 (SUPPL 2):42. [DOI: http://dx.doi.org/10.1002/oby.23063]

Leung 2018 {published data only}

studyIdentifiers

DeFrank G, Singh S, Mateo KF, Harrison L, Rosenthal A, Gorman A, et al. Key recruitment and retention strategies for a pilot web-based intervention to decrease obesity risk among minority youth. Pilot & Feasibility Studies 2019;5:109. [DOI: https://dx.doi.org/10.1186/s40814-019-0492-8]

Dublin M, Mateo K, Gamoso W, Harrison L, Verdaguer S, Leung M. Goal-setting for Healthy Eating In Intervention INC: a Web-Based Interactive Comic Tool to Decrease Obesity Risk Among Urban Minority Preadolescents...Food & Nutrition Conference & Expo, 26-29 October 2019, Philadelphia, PA. Journal of the Academy of Nutrition & Dietetics 2019;119(9):A-75.

* Leung MM, Mateo KF, Verdaguer S, Wyka K. Testing a Web-Based Interactive Comic Tool to Decrease Obesity Risk Among Minority Preadolescents: Protocol for a Pilot Randomized Control Trial. JMIR Research Protocols 2018;7(11):e10682. [DOI: https://dx.doi.org/10.2196/10682]

Magalhaes 2020 {published data only}

studyIdentifiers

Magalhaes P, Silva C, Pereira B, Figueiredo G, Guimaraes A, Pereira A, et al. An online-based intervention to promote healthy eating through self-regulation among children: Study protocol for a randomized controlled trial. Trials 2020;21(1):786. [DOI: 10.1186/s13063-020-04685-5]

Marcos-Pasero 2022 {published data only}

studyIdentifiers

* Marcos-Pasero H, Aguilar-Aguilar E, de la Iglesia R, Espinosa-Salinas I, Molina S, Colmenarejo G, et al. "GENYAL" Study to Childhood Obesity Prevention: Methodology and Preliminary Results. Frontiers in Nutrition 2022;9:777384. [DOI: 10.3389/fnut.2022.777384]

NCT03419520. GENYAL Study to Childhood Obesity Prevention [Detection of Genetic Polymorphisms Associated With Obesity and Its Complications in Schoolchildren Within the Madrid Community, and Evaluation of Health Actions for Reducing the Risk]. https://clinicaltrials.gov/show/NCT03419520 (first received 19 January 2018).

Marrero 2021 {published data only}

studyIdentifiers

Marrero DG, Blew RM, Palmer KNB, James K, Roe DJ, Hingle MD. Rationale and design of a type 2 diabetes prevention intervention for at-risk mothers and children at a Federally Qualified Healthcare Center: EPIC El Rio Families Study Protocol. BMC public health 2021;21(1):346. [DOI: 10.1186/s12889-021-10392-w]

McWhannell 2018 {published data only}

studyIdentifiers

McWhannell N, Foweather L, Graves LEF, Henaghan JL, Ridgers ND, Stratton G. From Surveillance to Intervention: Overview and Baseline Findings for the Active City of Liverpool Active Schools and SportsLinx (A-CLASS) Project. International Journal of Environmental Research & Public Health 2018;15(4):23. [DOI: https://dx.doi.org/10.3390/ijerph15040582]

Mehdizadeh 2018 {published data only}

studyIdentifiers

Mehdizadeh A, Nematy M, Khadem-Rezaiyan M, Ghayour-Mobarhan M, Sardar MA, Leis A, et al. A Customized Intervention Program Aiming to Improve Healthy Eating and Physical Activity Among Preschool Children: Protocol for a Randomized Controlled Trial (Iran Healthy Start Study). JMIR Research Protocols 2018;7(12):e11329. [DOI: https://dx.doi.org/10.2196/11329]

Metayer 2018 {published data only}

studyIdentifiers

Metayer N, Boulos R, Tovar A, Gervis J, Abreu J, Hval E, et al. Recruitment of New Immigrants Into a Randomized Controlled Prevention Trial: The Live Well Experience. Journal of Primary Prevention 2018;39(5):453-68. [DOI: https://dx.doi.org/10.1007/s10935-018-0519-6]

Moreno 2021 {published data only}

studyIdentifiers

* Moreno GD, Schmidt LA, Ritchie LD, McCulloch CE, Cabana MD, Brindis CD, et al. A cluster-randomized controlled trial of an elementary school drinking water access and promotion intervention: Rationale, study design, and protocol. Contemporary Clinical Trials 2021;101:106255. [DOI: https://dx.doi.org/10.1016/j.cct.2020.106255]

NCT03181971. School Water Access, Food and Beverage Intake, and Obesity [The Impact of the School Water Access on Child Food and Beverage Intake and Obesity]. https://clinicaltrials.gov/show/NCT03181971 (first received 3 June 2017).

Moreno 2022 {published data only}

studyIdentifiers

Moreno JP, Dadabhoy H, Musaad S, Baranowski T, Thompson D, Alfano CA, et al. Evaluation of a Circadian Rhythm and Sleep-Focused Mobile Health Intervention for the Prevention of Accelerated Summer Weight Gain Among Elementary School-Age Children: Protocol for a Randomized Controlled Feasibility Study. JMIR Research Protocols 2022;11(5):e37002. [DOI: 10.2196/37002]

NCT04445740. The i Heart Rhythm Project: Healthy Sleep and Behavioral Rhythms for Obesity Prevention [Feasibility, Acceptability, and Preliminary Efficacy of the i Heart Rhythm Project]. https://clinicaltrials.gov/show/NCT04445740 (first received 26 May 2020).

NCT00005750 2000 {published data only}

studyIdentifiers

NCT00005750. School and Family-Based Obesity Prevention for Children [School and Family-Based Obesity Prevention for Children]. https://clinicaltrials.gov/show/NCT00005750 (first received 25 May 2000).

NCT00185770 2005 {published data only}

studyIdentifiers

NCT00185770. Reducing Television Viewing to Prevent Childhood Obesity [Reducing Television Viewing to Prevent Childhood Obesity]. https://clinicaltrials.gov/show/NCT00185770 (first received 12 September 2005).

NCT00185978 2005 {published data only}

studyIdentifiers

NCT00185978. Obesity Prevention for Pre-Adolescents [School- and Family-Based Obesity Prevention for Children]. https://clinicaltrials.gov/show/NCT00185978 (first received 12 September 2005).

NCT00476775 2007 {published data only}

studyIdentifiers

NCT00476775. Ethnic Dance and Screen Time Reduction to Prevent Weight Gain in Latina Girls ECHALE [Ethnic Dance and Screen Time Reduction to Prevent Weight Gain in Latina Girls]. https://clinicaltrials.gov/show/NCT00476775 (first received 18 May 2007).

NCT00747513 2008 {published data only}

studyIdentifiers

NCT00747513. A Multi-component Program to Reduce Obesity in Children [A Multi-component Program to Improve Lifestyle Habits and Reduce Obesity in Children]. https://clinicaltrials.gov/show/NCT00747513 (first received 4 September 2008).

NCT00787709 2008 {published data only}

studyIdentifiers

NCT00787709. Translational Obesity Research [Translational Research: Applying Drug Prevention to Obesity Prevention]. https://clinicaltrials.gov/show/NCT00787709 (first received 6 Novemebr 2008).

NCT00797615 2008 {published data only}

studyIdentifiers

NCT00797615. Project Diabetes: weight Gain Prevention in Hispanic Girls (GEMAS Study) GEMAS [Project Diabetes: weight Gain Prevention in Hispanic Girls (GEMAS Study)]. https://clinicaltrials.gov/show/NCT00797615 (first received 21 November 2008).

NCT00944164 2009 {published data only}

studyIdentifiers

NCT00944164. Primary Care Obesity Prevention and Treatment [Test the Feasibility of Primary Care Obesity Prevention and Treatment - Pilot Study]. https://clinicaltrials.gov/show/NCT00944164 (first received 9 July 2009).

NCT01373307 2011 {published data only}

studyIdentifiers

NR. Ongoing study. March 2010 (date of first enrolment). Contact author for more information.

NCT01513343 2012 {published data only}

studyIdentifiers

NCT01513343. Promoting The Self-Regulation Of Energy Intake SEEDs [Promoting The Self-Regulation Of Energy Intake In African American And Latino Preschoolers: A Family Focused Obesity Prevention Program]. https://clinicaltrials.gov/show/NCT01513343 (first received 17 January 2012).

NCT01626807 2012 {published data only}

studyIdentifiers

NCT01626807. Evaluation of a Walking School Bus Program [Evaluation of a Walking School Bus Program: A Cluster Randomized Controlled Trial]. https://clinicaltrials.gov/show/NCT01626807 (first received 21 June 2012):NCT01626807.

NCT02104973 2014 {published data only}

studyIdentifiers

NCT02104973. Obesity Prevention in Schoolchildren CRECES [Design and Evaluation of a Strategy to Prevent Overweight and Obesity in Schoolchildren in Mexico City]. https://clinicaltrials.gov/show/NCT02104973 (first received 24 January 2014).

NCT02161809 2014 {published data only}

studyIdentifiers

NCT02161809. Turn up the HEAT - Healthy Eating and Activity Time in Summer Day Camps HEPA [Turn up the HEAT - Healthy Eating and Activity Time in Summer Day Camps]. https://clinicaltrials.gov/show/NCT02161809 (first received 10 June 2014).

NCT02197390 2014 {published data only}

studyIdentifiers

NCT02197390. An Ecological Approach to Addressing Childhood Obesity Issues in Imperial County Our Choice [An Ecological Approach to Addressing Childhood Obesity Issues in Imperial County]. https://clinicaltrials.gov/show/NCT02197390 (first received 11 July 2014).

NCT02425046 2014 {published data only}

studyIdentifiers

NCT02425046. Family Obesity Intervention: motivational Interviewing and Community Support [Family Obesity Intervention: motivational Interviewing and Community Support]. https://clinicaltrials.gov/show/NCT02425046 (first received 11 December 2014).

NCT02721602 2016 {published data only}

studyIdentifiers

NCT02721602. Families Preventing Diabetes Together [Families Preventing Diabetes Together]. https://clinicaltrials.gov/show/NCT02721602 (first received 16 February 2016).

NCT03186508 2018 {published data only}

studyIdentifiers

NCT03186508. Enhancing Sleep Duration: Effects on Children's Eating and Activity Behaviors-Renewal [Enhancing Sleep Duration: Effects on Children's Eating and Activity Behaviors-Renewal]. https://clinicaltrials.gov/show/NCT03186508 (first received 33 March 2017):NCT03186508.

NCT03524183 2018 {published data only}

studyIdentifiers

NCT03524183. Virtual Fitness Buddy Ecosystem [he Virtual Fitness Buddy Ecosystem: Using Digital Technology to Promote and Sustain Moderate-to-Vigorous Intensity Physical Activity in Children]. https://clinicaltrials.gov/show/NCT03524183 (first received 1 May 2018).

NCT03766191 2018 {published data only}

studyIdentifiers

NCT03766191. Genetic Predisposition to Food Cue Reactivity in Children [The Relation of Genetic Factors, Food Cues, and Self-Regulation With Excess Consumption and Adiposity in Children]. https://clinicaltrials.gov/show/NCT03766191 (first received 4 December 2018).

NCT03805295 2019 {published data only}

studyIdentifiers

NCT03805295. Implementation and Evaluation of a Before School Physical Activity Program in Revere, MA [Implementation and Evaluation of a Before School Physical Activity Program in Revere, MA]. https://clinicaltrials.gov/show/NCT03805295 (first received 11 January 2019).

NCT03817021 2019 {published data only}

studyIdentifiers

NCT03817021. ONE PATH: Optimizing Nutrition Education for Parents and Teachers for Healthy Growth ONE PATH [ONE PATH: Optimizing Nutrition Education for Parents and Teachers for Healthy Growth]. https://clinicaltrials.gov/show/NCT03817021 (first received 18 January 2019).

NCT03980262 2019 {published data only}

studyIdentifiers

NCT03980262. Church, Extension and Academic Partners Empowering Healthy Families EHF [Church, Extension and Academic Partners Empowering Healthy Families]. https://clinicaltrials.gov/show/NCT03980262 (first received 3 June 2019).

NCT03996109 2019 {published data only}

studyIdentifiers

NCT03996109. Living Green and Healthy for Teens [Living Green and Healthy for Teens (LiGHT) - a Randomized Trial Evaluating Behaviour Change Using a Gamified Healthy Living App for Youth and Their Families]. https://clinicaltrials.gov/show/NCT03996109 (first received 24 June 2019).

NCT04072549 2018 {published data only}

studyIdentifiers

NCT04072549. Reducing Health Disparities in Childhood Obesity [Reducing Health Disparities in Childhood Obesity Using Financial Incentives in Low-income Households]. https://clinicaltrials.gov/show/NCT04072549 (first received 26 August 2019).

NCT04608188 2020 {published data only}

studyIdentifiers

NCT04608188. Preventing Weight Gain and Unhealthy Behaviors in Children [An Intervention to Prevent Weight Gain and Unhealthy Behaviors in Children From Economically Disadvantaged Circumstances]. https://clinicaltrials.gov/show/NCT04608188 (first received 21 October 2020). [UNITED: States]

NCT04644224 2020 {published data only}

studyIdentifiers

NCT04644224. Parent and Family Oriented Support Interventions for the Facilitation of Weight Loss in African American Families [A Peer and Family-Based Approach to Obesity in African American Families]. https://clinicaltrials.gov/show/NCT04644224 (first received 21 October 2020).

NCT04772859 2021 {published data only}

studyIdentifiers

NCT04772859. Evaluation of an Online Lifestyle Intervention in Mexican School Children During COVID-19 Pandemic [Evaluation of a 4-month Online Lifestyle Intervention on the BMI Z-score of Mexican School Children During COVID-19 Pandemic: Randomized Controlled Pilot Trial]. https://clinicaltrials.gov/show/NCT04772859 (first received 13 February 2021).

NCT04886817 2021 {published data only}

studyIdentifiers

NCT04886817. Intervention to Reduce Sugar-Sweetened Beverage (SSB) Consumption in Children and Families SCOPE-IT [A Health Systems Intervention to Reduce Sugar-Sweetened Beverage Consumption in Young Children and Families]. https://clinicaltrials.gov/show/NCT04886817 (first received 11 May 2021).

NCT04905966 2021 {published data only}

studyIdentifiers

NCT04905966. Effect of a Physical Activity and Nutrition Education Intervention on Obesity Prevalence in Schoolchildren [Effect of a Physical Activity and Nutrition Education Intervention on Obesity Prevalence in Schoolchildren From Caaguazu Department, Paraguay: A Clustered Randomized Controlled Trial]. https://clinicaltrials.gov/show/NCT04905966 (first received 25 May 2021).

NCT04915092 2021 {published data only}

studyIdentifiers

NCT04915092. Evaluation of the Efficacy of an App for Parents to Promote Healthy Life-styles in Children: the CoSIE Trial [Co-creation of Service Innovation - Evaluation of the Efficacy of an App for Parents to Prevent Childhood Obesity and Promote Healthy Life-styles: CoSIE Randomized Controlled Trial]. https://clinicaltrials.gov/show/NCT04915092 (first received 16 November 2021).

NCT04971044 2021 {published data only}

studyIdentifiers

NCT04971044. Competency Based Approaches for Community Health 2 COACH [COACH: Competency Based Approaches for Community Health 2]. https://clinicaltrials.gov/show/NCT04971044 (first received

26 October 2021).

NCT05112185 2021 {published data only}

studyIdentifiers

NCT05112185. Childcare Healthy Beverage Access, Food and Beverage Intake, and Obesity [Healthy Drinks, Healthy Futures: The Impact of a Childcare-based Healthy Beverages Intervention on Young Children's Food and Beverage Intake and Obesity]. https://clinicaltrials.gov/show/NCT05112185 (first received 27 October 2021).

NCT05334420 2022 {published data only}

studyIdentifiers

NCT05334420. Efficacy Trial Healthy Dads, Healthy Kids for Hispanic Fathers and Children HDHK [Efficacy Trial of a Program for Weight Loss for Hispanic Fathers and Increased Physical Activity for Their Children: Healthy Dads, Healthy Kids]. https://clinicaltrials.gov/show/NCT05334420 (first received 4 April 2022).

NCT05350267 2022 {published data only}

studyIdentifiers

NCT05350267. Changing Health and Lifestyle Behaviors of Offspring Following Maternal Bariatric Surgery HALO-2 [Changing Health and Lifestyle Behaviors of Offspring Following Maternal Bariatric Surgery]. https://clinicaltrials.gov/ct2/show/NCT05350267 (first received 22 April 2022).

NCT05395364 2022 {published data only}

studyIdentifiers

NCT05395364. A Health Promotion Intervention for Vulnerable School BeE-school [A Health Promotion Intervention for Vulnerable School - Children and Families: a Cluster-randomized Trial]. https://clinicaltrials.gov/show/NCT05395364 (first received 16 May 2022).

NCT05424107 2022 {published data only}

studyIdentifiers

NCT05424107. A Mediterranean Intervention on Prediabetic Children INTKIDMEDPRED [Nutritional Status of South Spanish Children: A Mediterranean Diet Nutritional Intervention of Children With Insulin Resistance From a Rural Area]. (first received 9 June 2022).

NCT05461703 2022 {published data only}

studyIdentifiers

NCT05461703. Efficacy of a School-based Obesity Prevention Program in Mexican Schoolchildren: Cluster Randomized Controlled Trial ["Efficacy of a School-based Obesity Prevention Program Delivery by Nutrition and Physical Activity Advanced Students or School Teachers on the BMI Z-score and Body Fat at 6 Months of Mexican Children: a Cluster Randomized Controlled Trial"]. https://clinicaltrials.gov/show/NCT05461703 (first received 13 July 2022).

NCT05482165 2022 {published data only}

studyIdentifiers

NCT05482165. Optimizing Intervention Effects in Children and Adolescents [Optimizing Intervention Effects in Children and Adolescents in Ningbo City]. https://clinicaltrials.gov/ct2/show/NCT05482165 (first received 28 July 2022).

Porter 2019 {published data only}

studyIdentifiers

NCT02672748. Growing Resilience in Wind River Indian Reservation GR [Growing Resilience: an RCT on the Health Impact of Gardens With Wind River Indian Reservation]. https://clinicaltrials.gov/ct2/show/NCT02672748 (first received 9 November 2015).

Naschold F, Porter CM. BMI Status and Trends among Native American Family Members Participating in the Growing Resilience Home Garden Study [BMI Status and Trends among Native American Family Members Participating in the Growing Resilience Home Garden Study]. Current Developments in Nutrition 2022;6(7):nzac100. [DOI: 10.1093/cdn/nzac100]

Porter CM, Wechsler AM, Naschold F, Hime SJ, Fox L. Assessing health impacts of home food gardens with Wind River Indian Reservation families: protocol for a randomised controlled trial. BMJ Open 2019;9(4):e022731. [DOI: https://dx.doi.org/10.1136/bmjopen-2018-022731]

Ramírez-Rivera 2021 {published data only}

studyIdentifiers

Ramírez-Rivera DL, Martínez-Contreras R, Ruelas AL, Henry-Mejía G, Quizán-Plata T, Esparza-Romero J, et al. Effect of an online lifestyle intervention on the BMI z-score of Mexican school children: a protocol for an outcome assessor-blinded pilot randomized controlled trial during the COVID-19 pandemic. Revista Española de Nutrición Humana y Dietética 2021;25 (Supl. 2):e1320. [DOI: 10.14306/renhyd.25.S2.1320]

Rashid 2022 {published data only}

studyIdentifiers

NCT04711525. i-MaCHeL Study is a Two-group, Cluster-RCT, Involves 460 Preschool's Child-parent Dyads, to Prevent Childhood Obesity [Interactive Malaysian Childhood Healthy Lifestyle Program (i-MaCHeL) Intervention for Preschool's Child-parent Dyads to Prevent Childhood Obesity: A Cluster-randomized Controlled Trial]. https://clinicaltrials.gov/show/NCT04711525 (first received 2 January 2021).

Rashid AF, Wafa SW, Abd Talib R, Abu Bakar NM. An interactive Malaysian Childhood Healthy Lifestyle (i-MaCHeL) intervention programme to change weight-related behaviour in preschool child-parent dyads: Study protocol of a cluster randomised controlled trial. PLoS One 2022;17(10):e0276843. [DOI: 10.1371/journal.pone.0276843]

RBR-9crqgt {published data only}

studyIdentifiers

RBR-9crqgt. Differences between two types of nutritional education programs [Internet - based nutrition education versus conventional nutrition education: A randomized clinical trial]. http://ensaiosclinicos.gov.br/rg/RBR-9crqgt (first received 10 October 2019).

Sánchez-Gómez 2012 {published data only}

studyIdentifiers

Sánchez-Gómez LM, Fernández-Luque MJ, Ruiz-Díaz L, Sánchez-Alcalde R, Sierra-García B, Mayayo-Vicente S, et al. A cluster-randomised clinical trial comparing two cardiovascular health education strategies in a child population: the Savinghearts project. BMC Public Health 2012;12(1):1024. [DOI: 10.1186/1471-2458-12-1024]

Sanchez-Lopez 2019 {published data only}

studyIdentifiers

NCT03236363. Effectiveness of MOVI Interventions on Adiposity, Cognition and Motor Competence: mOVI-da10! [Effectiveness of MOVI Interventions on Improving Adiposity, Cognition and Motor Competence by Increasing Aerobic Cardiorespiratory Fitness: MOVI-da10!]. https://clinicaltrials.gov/show/NCT03236363 (first received 21 July 2017).

* Sanchez-Lopez M, Ruiz-Hermosa A, Redondo-Tebar A, Visier-Alfonso ME, Jimenez-Lopez E, Martinez-Andres M, et al. Rationale and methods of the MOVI-da10! Study -a cluster-randomized controlled trial of the impact of classroom-based physical activity programs on children's adiposity, cognition and motor competence. BMC Public Health 2019;19(1):417. [DOI: https://dx.doi.org/10.1186/s12889-019-6742-0]

Swindle 2022 {published data only}

studyIdentifiers

Swindle T, Rutledge JM, Selig JP, Painter J, Zhang D, Martin J, et al. Obesity prevention practices in early care and education settings: an adaptive implementation trial. Implementation Science 2022;17(1):25. [DOI: 10.1186/s13012-021-01185-1]

Szeszulski 2020 {published data only}

studyIdentifiers

Szeszulski J, Vega-Lopez S, Todd M, Ray F, Behar A, Campbell M, et al. Athletes for life: rationale and methodology of a community- and family-based randomized controlled trial to promote cardiovascular fitness among primarily Latino families. Contemporary Clinical Trials 2020;91:105956. [DOI: 10.1016/j.cct.2020.105956]

Takehara 2019 {published data only}

studyIdentifiers

JPRN-UMIN000031062. The effectiveness of exercise intervention on academic achievement, cognitive function and physical health among children in Mongolia: a cluster RCT study [The effectiveness of exercise intervention on academic achievement, cognitive function and physical health among children in Mongolia: a cluster RCT study - The effectiveness of exercise intervention on academic achievement,

cognitive function and physical health among children in Mongolia: a cluster RCT study]. https://center6.umin.ac.jp/cgi-open-bin/ctr_e/ctr_view.cgi?recptno=R000035467 (first received 1 February 2018).
* Takehara K, Ganchimeg T, Kikuchi A, Gundegmaa L, Altantsetseg L, Aoki A, Fukuie T, Suwabe K, Bat-Erdene S, Mikami M, Mori R, Soya H. The effectiveness of exercise intervention for academic achievement, cognitive function, and physical health among children in Mongolia: a cluster RCT study protocol. BMC Public Health 2019;19(1):697. [DOI: https://dx.doi.org/10.1186/s12889-019-6986-8]

Thompson 2013 {published data only}

studyIdentifiers

Callender C, Liu Y, Moore CE, Thompson D. The baseline characteristics of parents and African American girls in an online obesity prevention program: A feasibility study [The baseline characteristics of parents and African American girls in an online obesity prevention program: A feasibility study]. Preventive Medicine Reports 2017;7:110-15. [DOI: 10.1016/j.pmedr.2017.05.011]
* Thompson D, Mahabir R, Bhatt R, Boutte C, Cantu D, Vazquez I, et al. Butterfly Girls; promoting healthy diet and physical activity to young African American girls online: rationale and design. BMC Public Health 2013;13:709. [DOI: https://dx.doi.org/10.1186/1471-2458-13-709]

Trost 2021 {published data only}

studyIdentifiers

Trost SG, Byrne R, Williams KE, Johnson BJ, Bird A, Simon K, et al. Study protocol for Healthy Conversations @ Playgroup: a multi-site cluster randomized controlled trial of an intervention to promote healthy lifestyle behaviours in young children attending community playgroups. BMC Public Health 2021;21(1):1757. [DOI: 10.1186/s12889-021-11789-3]

Walters 2012 {published data only}

studyIdentifiers

Walters KL. Project Healthy Hearts Across Generations: development and evaluation design of a tribally based cardiovascular disease prevention intervention for American Indian families. Journal of Primary Prevention 2012;33(4):197-207.

Wang 2021 {published data only}

studyIdentifiers

NCT04265794. A Cluster Randomized Trial of the H2GO! Program [Preventing Childhood Obesity Through Youth Empowerment: A Cluster RCT of the H2GO! Program]. https://clinicaltrials.gov/show/NCT04265794 (first received 10 February 2020).
Wang ML, Sprague Martinez LS, Weinberg J, Alatorre S, Lemon SC, Rosal MC. A youth empowerment intervention to prevent childhood obesity: design and methods for a cluster randomized trial of the H₂GO! program. BMC Public Health 2021;21(1):1675. [DOI: https://dx.doi.org/10.1186/s12889-021-11660-5]

Whelan 2022 {published data only}

studyIdentifiers

Whelan J, Hayward J, Nichols M, Brown AD, Orellana L, Brown V, et al. Reflexive Evidence and Systems interventions to Prevention Obesity and Non-communicable Disease (RESPOND): protocol and baseline outcomes for a stepped-wedge cluster-randomised prevention trial. BMJ Open 2022;12(9):e057187. [DOI: 10.1136/bmjopen-2021-057187]

Additional references

Adab 2018

Adab P, Pallan M, Whincup PH. Is BMI the best measure of obesity? BMJ 2018;360:k1274.

Adams 2016

Adams J, Mytton O, White M, Monsivais P. Why are some population interventions for diet and obesity more equitable and effective than others? The role of iIndividual agency. PLoS Med 2016;13(4):e1001990. [DOI: 10.1371/journal.pmed.1001990]

Al-Khudairy 2017

Al-Khudairy L, Loveman E, Colquitt JL, Mead E, Johnson RE, Fraser H, et al. Diet, physical activity and behavioural interventions for the treatment of overweight or obese adolescents aged 12 to 17 years.

Cochrane Database of Systematic Reviews 2017, Issue 6. Art. No: CD012691. [DOI: 10.1002/14651858.CD012691]

Allen-Scott 2014

Allen-Scott LK, Hatfield JM, McIntyre L. A scoping review of unintended harm associated with public health interventions: towards a typology and an understanding of underlying factors. International Journal of Public Health 2014;59(1):3-14.

Ballon 2018

Ballon M, Botton J, Charles MA, Carles S, de Lauzon-Guillain B, Forhan A, et a l, on behalf of the Eden Mother-Child Cohort Study Group. Socioeconomic inequalities in weight, height and body mass index from birth to 5 years. International Journal of Obesity 2018;42:1671-9.

Bell 2018

Bell JA, Carslake D, O'Keeffe LM, Frysz M, Howe LD, Hamer M, et al. Associations of body mass and fat indexes with cardiometabolic traits. Journal of the American College of Cardiology 2018;72(24):3142-54.

Bhaskaran 2014

Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon D A, Smeeth L. Body-mass index and risk of 22 specific cancers: a population-based cohort study of 5.24 million UK adults. Lancet 2014;384(9945):755-65.

Brown 2019

Brown T, Moore TH, Hooper L, Gao Y, Zayegh A, Ijaz S, et al. Interventions for preventing obesity in children. Cochrane Database of Systematic Reviews 2019, Issue 6. Art. No: CD001871. [DOI: 10.1002/14651858.CD001871]

Buoncristiano 2021

Buoncristiano M, Williams J, Simmonds P, Nurk E, Ahrens W, Nardone P, et al. Socioeconomic inequalities in overweight and obesity among 6- to 9-year-old children in 24 countries from the World Health Organization European region. Obesity Reviews 2021;22(S6):e13213.

Chen 2019

Chen C, Ye Y, Zhang Y, Pan X, Pan A. Weight change across adulthood in relation to all cause and cause specific mortality: prospective cohort study. BMJ 2019/10/16;367:l5584. [DOI: 10.1136/bmj.l5584]

Clarke 2017

Clarke JL, Pallan MJ, Lancashire ER, Adab P. Obesity prevention in English primary schools: headteacher perspectives. Health Promotion International 2017;32(3):490-9.

Covidence [Computer program]

Covidence. Version accessed at 22 June 2022. Melbourne, Australia: Veritas Health Innovation, 2022. Available at covidence.org.

Craigie 2011

Craigie AM, Lake AA, Kelly SA, Adamson AJ, Mathers JC. Tracking of obesity-related behaviours from childhood to adulthood: A systematic review. Maturitas 2011;70(3):266-284. [DOI: 10.1016/j.maturitas.2011.08.005]

Daly-Smith 2020

Daly-Smith A, Quarmby T, Archbold VSJ, Corrigan N, Wilson D, Resaland GK, et al. Using a multi-stakeholder experience-based design process to co-develop the Creating Active Schools Framework. International Journal of Behavioral Nutrition and Physical Activity 2020;17(1):13.

de Onis 2010

de Onis M, Blossner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. American Journal of Clinical Nutrition 2010;92(5):1257-64.

Deeks 2019

Deeks JJ, Higgins JP, Altman DG, Statistical Methods Group. Chapter 10: Analysing data and undertaking meta-analyses. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s).

Cochrane Handbook for Systematic Reviews of Interventions 2nd Edition. Chichester: John Wiley & Sons, 2019., 2019.

Durlak and DuPre 2008

Durlak JA, DuPre EP. Implementation Matters: A Review of Research on the Influence of Implementation on Program Outcomes and the Factors Affecting Implementation. American Journal of Community Psychology 2008/06/01;41(3-4):327. [DOI: https://doi.org/10.1007/s10464-008-9165-0]

Dwan 2010

Dwan K, Gamble C, Kolamunnage-Dona R, Mohammed S, Powell C, Williamson PR. Assessing the potential for outcome reporting bias in a review: a tutorial. Trials 2010/05/12;11(1):52. [DOI: 10.1186/1745-6215-11-52]

Eldridge 2021

Eldridge S, Campbell MK, Campbell MJ, Drahota AK, Giraudeau B, Reeves BC, et al. Revised Cochrane risk of bias tool for randomized trials (RoB 2) Additional considerations for cluster-randomized trials (RoB 2 CRT); 2021. Available at: www.riskofbias.info/welcome/rob-2-0-tool/rob-2-for-cluster-randomized-trials.

Emmett 2015

Emmett PM, Jones LR. Diet, growth, and obesity development throughout childhood in the Avon Longitudinal Study of Parents and Children. Nutrition Reviews 2015;73(suppl_3):175-206.

Faught 2017

Faught EL, Gleddie D, Storey KE, Davison CM, Veugelers PJ. Healthy lifestyle behaviours are positively and independently associated with academic achievement: An analysis of self-reported data from a nationally representative sample of Canadian early adolescents. PLOS ONE 2017/07/28;12(7):e0181938.

Freedman 1999

Freedman DS, Dietz WH, Srinivasan SR, Berenson GS. The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. Pediatrics 1999;103(6 Pt 1):1175-82.

Government Office for Science 2007

Government Office for Science. Foresight. Tackling obesities: future choices. Project Report. 2nd edition. London: Government Office for Science, HMSO, 2007.

Griffin 2021

Griffin N, Phillips SM, Hillier-Brown F, Wistow J, Fairbrother H, Holding E, et al. A critique of the English national policy from a social determinants of health perspective using a realist and problem representation approach: the 'Childhood Obesity: a plan for action' (2016, 2018, 2019). BMC Public Health 2021;21:2284. [DOI: 10.1186/s12889-021-12364-6]

Haines 2006

Haines J, Neumark-Sztainer D. Prevention of obesity and eating disorders: a consideration of shared risk factors. Health Education Research 2006;21(6):770-82.

Higgins 2008

Higgins JP, White IR, Anzures-Cabrera J. Meta-analysis of skewed data: combining results reported on log-transformed or raw scales. Statistics in Medicine 2008;27(29):6072-92. [DOI: doi: 10.1002/sim.3427]

Higgins 2011

Higgins JP, Altman DG, Gøtzsche PC, Jüni P, Moher D, Oxman AD, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. BMJ 2011;343:d5928.

Higgins 2019a

Higgins JP, Eldridge S, Li T. Chapter 23: Including variants on randomized trials. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane Handbook for Systematic Reviews of Interventions. 2nd edition. Chichester, UK: John Wiley & Sons, 2019.

Higgins 2019b

Higgins JP, Li T, Deeks J J. Chapter 6: Choosing effect measures and computing effects of interest. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane

Handbook for Systematic Reviews of Interventions. 2nd edition. Chichester, UK: John Wiley & Sons, 2019.

Higgins 2022

Higgins JPT, Savović J, Page MJ, Elbers RG, Sterne JAC. Chapter 8: Assessing risk of bias in a randomized trial. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane Handbook for Systematic Reviews of Interventions. 6th edition. John Wiley & Sons, 2022.

Hillier-Brown 2014

Hillier-Brown FC, Bambra CL, Cairns-Nagi JM, Kasim A, Moore HJ, Summerbell CD. A systematic review of the effectiveness of individual, community and societal level interventions at reducing socioeconomic inequalities in obesity amongst children. BMC Public Health 2014;14:830.

Hochlaf 2020

Hochlaf D, Thomas C. The Whole Society Approach: making a giant leap on childhood health. IPPR; August 2020. Available at: www.ippr.org/research/publications/the-whole-society-approach.

Hodder 2022

Hodder RK, O'Brien KM, Lorien S, Wolfenden L, Moore TH, Hall A, et al. Interventions to prevent obesity in school-aged children 6-18 years: an update of a Cochrane systematic review and meta-analysis including studies from 2015-2021. eClinicalMedicine 2022;54:101635. [DOI: 10.1016/j.eclinm.2022.101635]

IFPRI 2020

International Food Policy Research Iinstitute. Virtual Event - The New Nutrition Reality: Time to Recognize and Tackle the Double Burden of Malnutrition! Policy seminar; December 2020. www.ifpri.org/event/virtual-event-new-nutrition-reality-time-recognize-and-tackle-double-burden-malnutrition. [URL: https://www.ifpri.org/event/virtual-event-new-nutrition-reality-time-recognize-and-tackle-double-burden-malnutrition]

Jiwani 2019

Jiwani SS, Carrillo-Larco RM, Hernández-Vásquez A, Barrientos-Gutiérrez T, Basto-Abreu A, Gutierrez L, et al. The shift of obesity burden by socioeconomic status between 1998 and 2017 in Latin America and the Caribbean: a cross-sectional series study. Lancet Global Health 2019;7(12):e1644-54.

Kirkham 2010

Kirkham JJ, Dwan KM, Altman DG, Gamble C, Dodd S, Smyth R, Williamson PR. The impact of outcome reporting bias in randomised controlled trials on a cohort of systematic reviews. BMJ 2010 2010;240:c365.

Knai 2018

Knai C, Lobstein T, Petticrew M, Rutter H, Savona N. England’s childhood obesity action plan II. BMJ 2018;362:bmj.k3098.

Li 2008

Li, Y, Yang, X, Zhai, F, Piao, J, Zhao, W, Zhang, J aet al. Childhood obesity and its health consequence in China. Obesity Reviews 2008;9:82-6. [DOI: https://doi.org/10.1111/j.1467-789X.2007.00444.x]

Li 2019

Li T, Higgins JP, Deeks JJ. Chapter 5: Collecting data. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane Handbook for Systematic Reviews of Interventions. 2nd edition. Chichester, UK: John Wiley & Sons, 2019.

Lobstein 2004

Lobstein T, Bauer L, Uauy R. Obesity in children and young people: a crisis in public health. Obesity Reviews 2004;5 Suppl 1:1-104.

McGill 2015

McGill R, Anwar E, Orton L, Bromley H, Lloyd-Williams F, O'Flaherty M, et al. Are interventions to promote healthy eating equally effective for all? Systematic review of socioeconomic inequalities in impact. BMC Public Health 2015;15:457. [DOI: 10.1186/s12889-015-1781-7]

McNulty 2019

McNulty M, Smith JD, Villamar J, Burnett-Zeigler I, Vermeer W, Benbow N et al. Implementation ResearchMethodologies for Achieving Scientific Equity and Health Equity. Ethnicity & Disease 2019;29(Suppl 1):83-92. [DOI: 10.18865/ed.29.S1.83]

Mead 2017

Mead E, Brown T, Rees K, Azevedo L B, Whittaker V, Jones D, et a l. Diet, physical activity and behavioural interventions for the treatment of overweight or obese children from the age of 6 to 11 years. Cochrane Database of Systematic Reviews 2017, Issue 6. Art. No: CD012651. [DOI: 10.1002/14651858.CD012651]

Mitchell, Muftakhidinov and Winchen 2020 [Computer program]

Engauge Digitizer Software markummitchell/engaugedigitizer:Nonrelease (v1221). Mitchell M, Muftakhidinov B, Winchen T, Wilms A, van Schaik B, badshah400, et al. Zenodo, 2020. [DOI: https://doiorg/105281/zenodo3941227]

Monteiro 2004

Monteiro CA, Conde WL, Lu B, Popkin BM. Obesity and inequities in health in the developing world. International Journal of Obesity and Related Metabolic Disorders 2004;28(9):1181-6.

Ng 2014

Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2014;384(9945):766-81.

NHS 2014

NHS England. Health Survey for England 2014. The Joint Health Surveys Unit of NatCen Social Research and the Research Department of Epidemiology and Public Health at University College London 2014.

NHS Digital 2020

NHS Digital. Overweight and Obesity in Adults and Children. Health Survey for England 2019 [NS]; published 15 December 2020. //digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019.

NICE 2014

National Clinical Guideline Centre. Obesity: Identification, Assessment and Management of Overweight and Obesity in Children, Young People and Adults: Partial Update of CG43. (NICE Clinical Guidelines, No. 189.); 2014. Available from: www.ncbi.nlm.nih.gov/books/NBK264165/.

Nobles 2021

Nobles J, Summerbell C, Brown T, Jago R, Moore T. A secondary analysis of the childhood obesity prevention Cochrane Review through a wider determinants of health lens: implications for research funders, researchers, policymakers and practitioners. International Journal of Behavioral Nutrition and Physical Activity 2021;18(1):22.

Noel-Storr 2020

Noel-Storr AH, Dooley G, Wisniewski S, Glanville J, Thomas J, Cox S, et al. Cochrane Centralised Search Service showed high sensitivity identifying randomized controlled trials: A retrospective analysis. Journal of Clinical Epidemiology 2020;127:142-150.

O'Neill 2014

O'Neill J, Tabish H, Welch V, Petticrew M, Pottie K, Clarke M, et al. Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. Journal of Clinical Epidemiology 2014;67(1):56-64.

Okunogbe 2021

Okunogbe A, Nugent R, Spencer G, Ralston J, Wilding J. Economic impacts of overweight and obesity: current and future estimates for eight countries. BMJ Global Health 2021;6(10):e006351.

Page 2019

Page MJ, Higgins JP, Sterne JA. Chapter 13: Assessing risk of bias due to missing results in a synthesis. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane Handbook for Systematic Reviews of Interventions. 2nd edition. Chichester, UK: John Wiley & Sons, 2019.

Page 2020

Page MJ, Sterne JA, Boutron I, Hróbjartsson A, Kirkham JJ, Li T, et al. Risk Of Bias due to Missing Evidence (ROB-ME): a new tool for assessing risk of non-reporting biases in evidence syntheses; 24 October 2020. Available from www.riskofbias.info/welcome/rob-me-tool.

Page 2021

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020statement: an updated guideline for reporting systematic reviews. British Medical Journal 2021;372:71. [EMBASE: 10.1136/bmj.n71]

Papoutsakis 2013

Papoutsakis C, Priftis KN, Drakouli M, Prifti S, Konstantaki E, Chondronikola M, et al. Childhood overweight/obesity and asthma: is there a link? A systematic review of recent epidemiologic evidence. Journal of the Academy of Nutrition and Dietetics 2013;113(1):77-105.

Paulis 2014

Paulis WD, Silva S, Koes BW, van Middelkoop M. Overweight and obesity are associated with musculoskeletal complaints as early as childhood: a systematic review. Obesity Reviews 2014;15(1):52-67.

PHE 2022

Public Health England. Childhood Obesity: Applying all our Health. www.gov.uk/government/publications/childhood-obesity-applying-all-our-health/childhood-obesity-applying-all-our-health Accessed June 29 2022.

Pitayatienanan 2014

Pitayatienanan P, Butchon R, Yothasamut J, Aekplakorn W, Teerawattananon Y, Suksomboon N, et al. Economic costs of obesity in Thailand: a retrospective cost-of-illness study. BMC Health Services Research 2014;14(1):146.

Power 2021

Power M, Pybus KJ, Pickett KE, Doherty B. "The reality is that on Universal Credit I cannot provide the recommended amount of fresh fruit and vegetables per day for my children": Moving from a behavioural to a systemic understanding of food practices. Emerald Open Research 2021;3(3):14062. [DOI: 10.35241/emeraldopenres.14062.1]

Rankin 2016

Rankin J, Matthews L, Cobley S, Han A, Sanders R, Wiltshire HD, et al. Psychological consequences of childhood obesity: psychiatric comorbidity and prevention. Adolescent Health, Medicine and Therapeutics 2016;7:125-46.

Rutter 2016

Rutter H, Glonti K. In: The Lancet. S6 edition. Vol. 388. 2016. [DOI: DOI:https://doi.org/10.1016/S0140-6736(16)32243-7]

Rutter 2017

Rutter H, Savona N, Glonti K, Bibby J, Cummins S, Finegood DT, et al. The need for a complex systems model of evidence for public health. Lancet 2017;390(10112):2602-4.

Schünemann 2019

Schünemann HJ, Higgins JP, Vist GE, Glasziou P, Akl EA, Skoetz N, et al. Chapter 14: 'Summary of findings' tables and grading the certainty of the evidence. In: Higgins JP, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, editors(s). Cochrane Handbook for Systematic Reviews of Interventions. 2nd edition. Chichester: John Wiley & Sons, 2019.

Simmonds 2016

Simmonds M, Llewellyn A, Owen CG, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. Obesity Reviews 2016;17(2):95-107.

Sommer 2018

Sommer A, Twig G. The impact of childhood and adolescent obesity on cardiovascular risk in adulthood: a systematic review. Current Diabetes Reports 2018;18(10):91.

Spiga TBD

Spiga F, Tomlinson E, Davies A, Moore THM, Dawson S, Breheny K, et al. Interventions to prevent obesity in children aged 12 to 18 years old. Cochrane Database of Systematic Reviews TBD, Issue TBD. Art. No: CD015330. [DOI: 10.1002/14651858.CD015330.pub2]

Staatz 2021

Staatz CB, Kelly Y, Lacey RE, Hardy R. Area-level and family-level socioeconomic position and body composition trajectories: longitudinal analysis of the UK Millennium Cohort Study. Lancet Public Health 2021;6(8):e598-e607.

Sterne 2019

Sterne JA, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ 2019;366:l4898.

Tibbitts 2021

Tibbitts B, Willis K, Reid T, Sebire SJ, Campbell R, Kipping RR, et al. Considerations for individual-level versus whole-school physical activity interventions: stakeholder perspectives. International Journal of Environmental Research and Public Health 2021;18(14):7628. [DOI: 10.3390/ijerph18147628]

Umer 2017

Umer A, Kelley GA, Cottrell LE, Giacobbi P, Innes KE, Lilly CL. Childhood obesity and adult cardiovascular disease risk factors: a systematic review with meta-analysis. BMC Public Health 2017;17(1):683.

United Nations 2018

United Nations. Sustainable development goals. Goal 3: ensure healthy lives and promote well-being for all at all ages; 2018. Available at: www.who.int/sdg/targets/en/.

WHO 2016

World Health Organization. Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: report of the ad hoc working group on science and evidence for ending childhood obesity; 2016. apps.who.int/iris/handle/10665/206549. [ISBN: 9789241565332]

WHO 2017

World Health Organization. Report of the Commission on Ending Childhood Obesity. Implementation plan: executive summary; 2017. apps.who.int/iris/bitstream/handle/10665/259349/WHO-NMH-PND-ECHO-17.1-eng.pdf.

WHO 2020

World Health Organization. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO. www.who.int/publications/i/item/9789240015128.

WHO 2021a

World Health Organization. Nutrition action in schools: a review of evidence related to the nutrition-friendly schools initiative; 2021. www.who.int/publications/i/item/9789241516969 January 2021:166.

WHO 2021b

World Health Organization. Youth-centred digital health interventions: a framework forplanning, developing and implementing solutions with and for young people. www.who.int/publications/i/item/9789240011717: July 2021:80.

WHO 2022

World Health Organization. European Regional Obesity Report. Copenhagen: WHO Regional Office for Europe 2022; Licence: CC BY-NC-SA 3.0 IGO.www.who.int/publications/i/item/9789289057738 2022.

Wolfenden 2022

Wolfenden L, McCrabb S, Barnes C, O'Brien KM, Ng KW, Nathan NK, Sutherland R, Hodder RK, Tzelepis F, Nolan E, et al. Strategies for enhancing the implementation of school-based policies or practices targeting

diet, physical activity, obesity, tobacco or alcohol use. Cochrane Database of Systematic Reviews 2022, Issue 8. Art. No: CD011677. [DOI: 10.1002/14651858.CD011677.pub3]

World Bank 2021

World Bank. The World by Income and Region. https://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html Accessed 24 November 2021.

World Obesity Atlas 2023

World Obesity Federation. World Obesity Atlas 2023. https://data.worldobesity.org/publications/?cat=19. 2023.

Yatsuya 2010

Yatsuya H, Folsom AR, Yamagishi K, North KE, Brancati FL, Stevens J. Race- and sex-specific associations of obesity measures with ischemic stroke incidence in the Atherosclerosis Risk in Communities (ARIC) study. Stroke 2010;41(3):417-425.

Zemrani 2021

Zemrani B, Gehri M, Masserey E, Knob C, Pellaton R. A hidden side of the COVID-19 pandemic in children: the double burden of undernutrition and overnutrition. International Journal for Equity in Health 2021;20(1):44.

References to other published versions of this review

Moore 2022

Moore THM, Tomlinson E, Spiga F, Higgins JPT, Gao Y, Caldwell DM, et al. Interventions to prevent obesity in children aged 12 to 18 years old. Cochrane Database of Systematic Reviews 2022, Issue 7. Art. No: CD015330. [DOI: 10.1002/14651858.CD015330]

Additional tables

Table 1

Further details of the population

Comparison: Dietary intervention vs Control						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Chai 2019	zBMI short; BMI short	Y	Y	Children that required medication that influences growth, weight or appetite; or required a therapeutic (i.e. texture modified) diet, or with significant learning difficulties were excluded	N	n/a
Coleman 2012	zBMI medium; zBMI long	NR	NR		Y	The study is set in a low-income district and 100% of the children receive free or reduced-price school meals
Cunha 2013	BMI medium	N	N		Y	The study was set in one of the poorest areas in Brazil and most students were from low socioeconomic level families
Damsgaard 2014	zBMI short	Y	Y	Children with diseases or conditions that might obstruct the measurements were excluded	N	n/a
Davis 2021		Y	Y		Y	

	zBMI medium; BMI medium; Percentile medium			Children classified as special education in a wheelchair were excluded		Eligible schools had a high proportion of Hispanic children (>50%) and high proportion of children participating in the free and reduced lunch program (>50%)
de Ruyter 2012	zBMI short; zBMI medium; zBMI long	Y	Y	Children with the following were excluded: Diabetes, growth disorders, celiac disease, or serious gastro-enterologic diseases (for example inflammatory bowel disease), medical history or surgery known to interfere with the study, physical disabilities that hamper the measurements	N	n/a
Fulkerson 2010	zBMI short; Percentile short	Y	Y	Children with conditions that would affect intervention program participation were excluded	N	n/a
Fulkerson 2015	zBMI medium; zBMI long	Y	Y	Children with a medical condition prohibiting participation (e.g. extreme food allergies) were excluded	N	n/a
Han 2006	zBMI long	NR	NR		N	n/a
Hendrie 2011	zBMI short; BMI short	N	N		N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
James 2004	zBMI medium; zBMI long; BMI medium; BMI long	NR	NR		N	n/a
Keshani 2016	BMI medium	Y	Y	Children were excluded if they had a chronic illness or disorder	N	n/a
Lent 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	N	N		Y	Eligible schools had: (1) >50% of students qualifying for free/reduced meals (income ≤185% of the poverty level adjusted for household size). Students from 10 schools in low-income neighbourhoods in Philadelphia were eligible to participate.
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Students who suffer from serious illnesses, such as congenital heart disease, the body carried out fixation or joint replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded	N	n/a
NCT00224887 2005	BMI medium	Y	Y	Children with chronic conditions or eating disorders were excluded	Y	The study recruited mothers and their second or third grade children from sixteen low-wealth elementary schools. Only children whom mother is of Mexican descent and identifies with the Mexican-American community were included in the study.

Nicholl 2021	zBMI short; BMI short; Percentile short	Y	N	Children with diagnosis of or medications for cardiometabolic or gastrointestinal dysfunction were excluded from the study	N	n/a
Paineau 2008	zBMI short; BMI short	Y	Y		N	n/a
Seguin-Fawler 2021	Percentile short	N	N		Y	Trial aimed at low-income families: households were eligible if they met guidelines for low income (< 185% federal poverty level).
Sichieri 2008	BMI short	Y	N	Children with physical disabilities preventing anthropometric measurement were excluded	Y	The study setting was public schools in which most students were from families of low socioeconomic level
Stettler 2015	zBMI medium; BMI medium	y	y		N	n/a
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Viggiano 2018	zBMI short; zBMI long	NR	NR		N	n/a
Comparison: Activity intervention vs Control						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Barbeau 2007	BMI medium	N	N		N	n/a
Barnes 2015	zBMI short	N	N		N	n/a
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Breheny 2020	zBMI short; zBMI medium	Y	Y	Pupils that had a disability preventing them running or walking for 15 min and those that were unable to have their height and/or weight measured at baseline were excluded	N	n/a
Clemes 2020	BMI short	Y	Y	Children with known physical contraindications to standing were invited to participate and use the sit-stand desk in a seated posture for inclusivity but these individuals were excluded from the analysis. Children with disabilities or injuries or illnesses that prevented them from going about their usual routine were excluded	Y	The intervention was set in Bradford and was chosen because " the study location given its ethnic composition (predominantly South Asian and White British) and high levels of deprivation, health inequalities and childhood morbidity
De Bock 2013	BMI short; BMI medium	Y	N	Children with physical malformations, and severe physical disabilities were excluded	N	n/a
de Greeff 2016	BMI short	NR	NR		N	n/a
Diaz-Castro 2021	zBMI short; BMI short	NR	NR	One participant was excluded because he had a chronic disease (diabetes)	N	n/a
Donnelly 2009	BMI long	NR	NR		Y	From the study protocol: The targeted enrolment into the study was to have 27% of the students classified as minorities and 50% of the students will be

						receiving free or reduced meals.
Drummy 2016	BMI short	NR	NR		N	n/a
Farmer 2017	zBMI medium; zBMI long; BMI medium; BMI long	Y	Y	From trial registration: children unable to participate in physical activity were excluded	N	n/a
Ford 2013	BMI short	NR	NR		N	n/a
Ha 2021	BMI short; BMI medium	Y	Y	Participants will be excluded from the study if they if they were deemed to be unfit for taking part in physical activity	N	n/a
Howe 2011	BMI medium	Y	N	Children with physical impairment that would limit their participation in regular physical activity were excluded from the study	N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
Jones 2015	zBMI short; zBMI medium; BMI short; BMI medium	NR	NR		Y	Children were recruited from low-income areas of Wollongong, Australia. The intervention took place in elementary school within a disadvantaged area, with focus on low-income communities.
Ketelhut 2022	BMI short	Y	N	Children with physical limitations to exercise were excluded	Y	The study sample was recruited from an elementary school located in a socially disadvantaged area
Khan 2014	zBMI medium; BMI medium	Y	Y	Participants with disabilities that could limit participation in the after-school program were excluded	N	n/a
Kovalskys 2016	zBMI long	Y	Y	Children with severe intellectual difficulties, with limitations to engage in physical activity, suffering from illnesses that compromise nutrition or food selection, or taking medication known to affect body weight, were excluded from the analysis	N	n/a
Kriemler 2010	BMI medium; BMI long	Y	N	Children suffering from chronic disease that prohibited the physical activity program, i.e. cyanotic heart disease or severe motor handicaps, were excluded	N	n/a
Lau 2016	BMI short	NR	NR		N	n/a
Lazaar 2007	zBMI short; BMI short	Y	Y	Children with any disease were excluded	N	n/a
Li 2010	zBMI medium; zBMI long; BMI medium; BMI long	NR	NR		N	n/a
Martinez-Vizcaino 2014	BMI medium	Y	Y	Children were excluded if they presented: serious learning difficulties or physical and mental disorders identified by parents and teachers, which could impede participation in the scheduled activities;	N	n/a

				chronic disease that, as judged by their paediatrician or family doctor, would preclude participation in MOVI-2		
Martinez-Vizcaino 2020	zBMI short; BMI short	Y	Y	Participants with serious physical or mental disorders identified by parents or teachers which would impede participation in the program's activities were excluded	N	n/a
Martinez-Vizcaino 2022	zBMI medium; BMI medium	Y	Y	Children with chronic disorder such as heart disease, diabetes, or asthma or serious physical or mental disorders which could impede participation in the activities of the program	N	n/a
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Students who suffer from serious illnesses, such as congenital heart disease, the body carried out fixation or joint replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded	N	n/a
Morgan 2019	zBMI medium	N	N		N	n/a
Muller 2016	zBMI medium; zBMI long; Percentile long	Y	Y	The trial registration reported condition precluding exercise as exclusion criteria	N	n/a
Muller 2019	zBMI medium	Y	Y	Children suffering from medical conditions preventing participation in a maximum exercise test, as determined by qualified medical personnel, were excluded	N	n/a
Newton 2014	zBMI short; BMI short; Percentile short	Y	NR	Children were excluded is they were not physically capable of exercise	N	n/a
Rhodes 2019	BMI short	N	n		N	n/a
Sacchetti 2013	BMI long	NR	NR		N	n/a
Salmon 2008	zBMI long	N	N		N	n/a
Simon 2008	zBMI long; BMI medium; BMI long	NR	NR		N	n/a
Tanskey 2017	zBMI medium; BMI medium	N	N		Y	The 24 schools enrolled represent a low-income, ethnically diverse population spanning urban, peri-urban, and suburban settings
Telford 2012	BMI long	NR	NR		N	n/a
Thivel 2011	BMI short	Y	Y	Children had to be free of any known disease to be included	N	n/a
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Vizcaino 2008	BMI medium	Y	Y	Participating children were free of serious learning difficulties or physical or mental disorders that could impede participation in scheduled physical activities	N	n/a
Wang 2018	zBMI medium; BMI medium	NR	NR		N	n/a

Wendel 2016	BMI long; Percentile long	NR	NR		N	n/a
Yin 2012	zBMI medium; zBMI long	NR	NR		Y	The study setting was a school district where 65% qualified for reduced price or free school lunches
Comparison: Dietary and Activity intervention vs Control						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Adab 2018	zBMI long	N	N		N	n/a
Annesi 2016	BMI short; BMI medium; Percentile medium	NR	NR		N	n/a
Annesi 2017	BMI short; BMI medium	NR	NR		N	n/a
Baranowski 2003	BMI short	Y	Y	Children were excluded if they had medical condition or taking medications affecting growth, and had conditions that would limit the girl's ability to participate in the intervention or measurement assessments	N	n/a
Baranowski 2011	zBMI short; Percentile short	Y	Y	Children were excluded if had medical condition that influenced diet or physical activity, the ability to complete questionnaire or a seizure disorder	Y	Children were recruited from ethnic minority communities (African-American, Hispanic) and were predominantly low-income
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Beech 2003	BMI short	Y	Y	Children were excluded if they had medical condition or taking medications affecting growth, or had conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Y	The Memphis study specifically targeted low-income participants
Bohnert 2013	zBMI short	NR	NR		Y	All schools were located in underserved, urban low-income communities
Brandstetter 2012	BMI long	NR	NR		N	n/a
Brown 2013	zBMI short; BMI short; Percentile short	NR	NR		Y	Northern Plains Indian youth 10-14 years old living on 2 American Indian reservations in north-central and south-western Montana were recruited for the study
Caballero 2003	BMI long	NR	NR		Y	The study was set in public schools serving American Indian communities
Cao 2015	zBMI medium; zBMI long	Y	Y	Students with serious physical or mental disorders that could impede participation in scheduled physical activity were excluded	N	n/a
Chen 2010	BMI short	Y	N	Children with chronic health problems that	N	n/a

				included any dietary modifications or activity limitations (e.g. diabetes, exercise-induced asthma) were excluded		
Choo 2020	zBMI short	Y	Y	Children with mental and physical disabilities were excluded	Y	The study targeted socioeconomically vulnerable children (defined as those registered in the public welfare system of community child centers, which serve children from: (1) families receiving benefits from the National Basic Livelihood Security System and (2) non-traditional families including grandparent-grandchild and single-parent families).
Crespo 2012	zBMI medium; zBMI long; Percentile medium; Percentile long	Y	Y	Children on a medically prescribed restricted diet or with a condition that limited their physical activity were excluded	N	n/a
De Heer 2011	BMI short; Percentile short	Y	Y	Children that had condition that would endanger their own or others' safety were excluded	Y	The study target is low-income predominantly Hispanic children
Duncan 2019	BMI short	N	N		N	n/a
Elder 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	Y	Y	Children were excluded if they had a medical and/or psychological condition that affected their diet, physical activity, or weight	N	n/a
Fairclough 2013	zBMI short; BMI short	Y	Y	Children with a medical condition that precluded them from taking part in the programme were excluded	Y	The study was set in an area of high deprivation and health inequalities
Foster 2008	zBMI long; BMI long	NR	NR		Y	The study was implemented in schools that had 50% of children eligible for federally subsidized, free, or reduced-price meals
Fulkerson 2022	zBMI medium	Y	Y	Children with a medical condition(s) or food allergies contraindicating intervention program participation were excluded	N	n/a
Gentile 2009	BMI short; BMI medium	Y	Y	Children unable to adhere to project procedures were excluded	N	n/a
Greve 2015	BMI long	NR	NR		N	n/a
Griffin 2019	zBMI short	NR	NR		Y	The study aims to assess intervention in a socioeconomically deprived ethnically diverse UK setting; Quote: "In 2017, both areas were ranked in the most deprived 20% of areas in the UK, with high ethnic diversity."
Grydeland 2014	zBMI long; BMI long	NR	NR		N	n/a
Habib-Mourad 2014	BMI short	N	N		N	n/a
Habib-Mourad 2020	zBMI long	N	N		N	n/a
	zBMI short	NR	NR		N	n/a

Haire-Joshu 2010						
HEALTHY Study Group 2010	zBMI long	Y	Y	Students with diabetes or any condition that would preclude regular participation in physical education were excluded	Y	The eligibility criteria for school inclusion were middle school student body with at least 50% minority (defined as African American, Hispanic/Latino, and/or Native American) and/or greater than 50% eligible for free or reduced lunch.
Hendy 2011	Percentile short	NR	NR		N	n/a
Hopper 2005	BMI short	NR	NR		N	n/a
Hull 2018	zBMI short; zBMI long; BMI short; BMI long	Y	Y	Children were excluded if they had a BMI > 35 kg/m^2, a medical condition or take medications that affect growth or had conditions or other circumstances that could interfere with participation in the measurements or the interventions	N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
Jansen 2011	BMI short	N	N		Y	The targeted population consisted of children attending primary schools in the more deprived, inner-city areas of Rotterdam with high proportions of immigrant children where prevalence rates of overweight and obesity are relatively high
Kain 2014	zBMI medium; BMI medium	NR	NR		Y	The trial targets low-income students.
Keller 2009	zBMI medium	N	N		N	n/a
Kipping 2008	BMI short	NR	NR	Special schools including learning disabilities schools were excluded but it is not specified if children with disabilities were excluded from the study	N	n/a
Kipping 2014	zBMI short; zBMI long	Y	Y	Special schools (for children whose additional needs cannot be met in a mainstream setting) were excluded because they were unlikely to be teaching the standard UK National Curriculum and the children may not have been able to take part in all the measurements	N	n/a
Klesges 2010	BMI medium; BMI long	Y	Y	Children with conditions limiting participation in the interventions or measurements were not included in the study (e.g. unable to participate in routine physical education classes at school; developmental or physical disability preventing participation in interventions)	Y	The intervention is delivered in a low-income community setting
Kobel 2017	BMI medium; Percentile	NR	NR		N	n/a

	medium					
Kocken 2016	zBMI short; zBMI long	NR	NR		N	n/a
Kubik 2021	zBMI medium; zBMI long; BMI medium; BMI long	Y	Y	Children with food allergies, physical limitations, medical conditions or emotional health conditions limiting their ability to participate in physical activity were excluded	N	n/a
Levy 2012	zBMI short	Y	Y	Children with disabilities for whom anthropometric measurements could not be performed were excluded	N	n/a
Li 2019	zBMI medium	Y	Y	Children were excluded if parents (or guardians) believe they should not participate in this study for any medical reasons	N	n/a
Lichtenstein 2011	zBMI medium; zBMI long	NR	NR		N	n/a
Liu 2019	zBMI short; zBMI medium; BMI short; BMI medium	Y	Y	Individuals suffering from or having a history of any cardiovascular and metabolic diseases, asthma, and disabilities that could limit their ability to perform physical activity were excluded	N	n/a
Liu 2022	zBMI short; zBMI medium; BMI short; BMI medium	Y	Y	Children with the following medical conditions were excluded from the study: medical history of heart disease, hypertension, diabetes, tuberculosis, asthma, hepatitis or nephritis; (2) obesity caused by endocrine diseases or side effects of drugs; (3) abnormal physical development like dwarfism or gigantism; (4) physical deformity such as severe scoliosis, pectus carinatum, limp, obvious O-leg or X-leg; (5) inability to participate in school sport activities; and (6) a loss in weight by vomiting or taking drugs during the past 3 months	N	n/a
Llargues 2012	BMI long	Y	N	Children with physical activity incapacity were excluded	N	n/a
Lloyd 2018	zBMI long; BMI long	NR	NR		N	n/a
Magnusson 2012	BMI long	NR	NR		N	n/a
Marcus 2009	zBMI long	N	N		N	n/a
Morgan 2011	zBMI short	N	N		N	n/a
Morgan 2014	zBMI short; BMI short	N	N		Y	The study setting is two local government areas with high rates of mining and shift work-based employment (Australian Bureau of Statistics, 2009), which are linked to increased risks of obesity and associated health complications
NCT02067728 2014	zBMI short	Y	Y	Participants with chronic medical conditions or developmental delays that preclude age-appropriate nutrition and	N	n/a

				physical activity habits were excluded		
Nemet 2011a	BMI medium; Percentile medium	NR	NR		Y	The study included 30 kindergartens from low socioeconomic status communities
Nemet 2011b	BMI medium; BMI long; Percentile medium; Percentile long	NR	NR		Y	The study included graduates from 11 kindergartens from low socioeconomic status areas
Nollen 2014	BMI short	N	N		Y	Study targeted low-income, racial/ethnic minority girls
Nyberg 2015	zBMI short; zBMI medium	N	N		Y	The study is set in a medium to low socioeconomic status area
Nyberg 2016	zBMI short; zBMI medium	NR	NR		Y	The study was conducted in three areas in Stockholm County with low employment and low educational level, and with the highest prevalence of overweight and obesity among children in the county. These areas are also targeted specifically by the government to support socioeconomic development.
O'Connor 2020	zBMI short	Y	Y	Participants were excluded if a medical clearance was deemed necessary and not provided, or if the child or parent had a disease affecting their dietary intake, physical activity, cognitive functioning, or psychiatric functioning, which could affect their ability to take part in group classes of exercise	Y	The study targeted low-income Hispanic children and fathers
Pena 2021	zBMI short; BMI short	N	N		N	n/a
Puder 2011	BMI medium	Y	Y	Children with severe chronic disease (restricting physical activity) were excluded	Y	n/a
Ramirez-Rivera 2021	zBMI short	Y	NR	Children that had a medical condition or were taking medication or receiving an intervention that can affect body weight or prevents physical activity (cardiovascular, respiratory, muscular, osteoarticular, etc.) at baseline or during the study were excluded.	N	n/a
Rerksuppaphol 2017	zBMI short; BMI short	Y	Y	Children with a known history of chronic illness and children who could not stand upright or bear weight on their legs for measuring actual height and weight were excluded	N	n/a
Rosario 2012	zBMI short; BMI short	N	N		N	n/a
Rosenkranz 2010	zBMI short; BMI short; Percentile short	N	N		N	n/a
Rush 2012	zBMI long	N	N		N	n/a
Safdie 2013	BMI short; BMI medium; BMI long	N	N		Y	Schools were considered for inclusion if were classified by the Ministry of

						Education as having students of low socioeconomic status and receiving benefits from the Federal School Breakfast Program served at schools
Sahota 2001	zBMI medium	NR	NR		N	n/a
Sahota 2019	zBMI long	NR	NR		N	n/a
Santos 2014	zBMI medium	Y	Y	Children with a condition that limited participation in physical activity were excluded	N	n/a
Sekhavat 2014	zBMI medium; BMI medium	Y	N		N	n/a
Sgambato 2019	BMI short	Y	Y	Childrens that were disabled were not included	Y	The study setting was one of the poorest municipalities in the state of Rio de Janeiro with most students at public schools having a low socioeconomic status
Sherwood 2019	zBMI medium; zBMI long; Percentile medium; Percentile long	Y	Y	Children were excluded if they had any medical problems that would preclude study participation (eg, a chromosomal abnormality, kidney disease, Type I diabetes, lupus, or cancer)	N	n/a
Siegrist 2013	zBMI medium; BMI medium	N	N		N	n/a
Siegrist 2018	BMI long	N	N		N	n/a
Spiegel 2006	zBMI short	NR	NR		N	n/a
Stettler 2015	zBMI medium; BMI medium	Y	Y		N	n/a
Stolley 1997	BMI short; BMI medium	NR	NR		Y	Culturally specific obesity-prevention programme for low-income, inner-city African American, preadolescent girls and their mothers
Story 2003	BMI short	Y	Y	Children were excluded if they had medical condition or taking medications affecting growth; and having conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Y	The target population was 8- to 10- year-old, pre-adolescent, African American girls, at risk of developing obesity. The Minnesota study specifically targeted low-income participants;
Story 2012	zBMI long; BMI long	NR	NR		Y	The study setting was within a American Indian reservation
Topham 2021	zBMI long	N	N		N	n/a
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Wang 2012	zBMI medium	NR	NR		N	n/a
White 2019	zBMI short; zBMI medium; zBMI long	Y	Y	Eligible children were free from life-threatening medical illnesses	Y	Recruiting was targeted at ethnic diversity mostly among rural, low-income communities
Williamson 2012	zBMI long	N	N		Y	81.7% of the total student population in the 33 schools was classified as low to moderate socioeconomic status
Xu 2015	zBMI medium; BMI medium	N	N		N	n/a
Xu 2017 (5 other cities)	zBMI medium; BMI medium	Y	Y	Students who suffer from serious illnesses, such as congenital heart disease, the body carried out fixation or joint	N	n/a

				replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded		
Comparison: Activity intervention vs Dietary intervention						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Students who suffer from serious illnesses, such as congenital heart disease, the body carried out fixation or joint replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded	N	n/a
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Comparison: Dietary and Activity intervention vs Dietary						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
Stettler 2015	zBMI medium; BMI medium	Y	Y		N	n/a
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Comparison: Dietary and Activity intervention vs Activity						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**

					disadvantaged area?	
Barnes 2021	zBMI medium; BMI medium	N	N		N	n/a
Ickovics 2019	Percentile long	NR	NR		Y	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean=71.4%).
Robinson 2003	BMI short	Y	Y	Children were excluded if they had medical condition or taking medications affecting growth; and having conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Y	The Stanford study specifically targeted low-income participants
Robinson 2010	zBMI long; BMI long	Y	Y	Children were excluded if they had a condition limiting their participation in the interventions or assessments or were unable to understand or complete informed consent	Y	The target of the trial are lower socioeconomic status African-American girls, recruited low-income, predominantly African-American neighbourhoods in Oakland, CA.
van de Berg 2020	Percentile medium	N	N		Y	The trial specifically targeted schools serving children from low-income households
Studies not included in the meta-analyses						
Study ID	**Comparison**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Anand 2007	Dietary and Activity vs Control	n/a	Y	Participants were excluded if they had a serious medical illness which prevent them from making dietary and exercise changes	Y	The study recruited participants from the Six Nation. "The Six Nations people may be disproportionately affected by obesity because of their rapid change from a physically active to a relatively sedentary lifestyle, as well as their dietary transition from lower energy non-processed to energy-dense processed foods, all of which is compounded by the relatively low socio-economic status of this community".
Branscum 2013	Dietary and Activity vs Dietary and Activity	n/a	NR		N	n/a
Carlin 2021	Dietary and Activity vs Control	n/a	NR	Participants were asked to notify the research team of any related issues that might affect participation in the intervention	Y	All families in phase 1 were from low socioeconomic class
Di Maglie 2022	Activity vs Control	n/a	Y	Children were healthy and free of any disability or musculoskeletal, cardiological,	N	n/a

				neurological or respiratory diseases, or dysfunctions		
Epstein 2001	Dietary and Activity vs Dietary and Activity	n/a	Y	Children with dietary or activity restriction or with current psychiatric problem were excluded	N	n/a
Gortmaker 1999	Dietary and Activity vs Control	n/a	NR		N	n/a
Hannon 2018	Dietary and Activity vs Dietary and Activity	n/a	NR		Y	With attention to the generalizability of the study, the population recruited is overrepresented by women of minority status and from lower income groups
Hooft van Huysduynen 2014	Dietary vs Control	n/a	NR		N	n/a
Huys 2020	Dietary and Activity vs Control	n/a	N		Y	Trial was set in low socioeconomic status municipalities: In Flanders (Belgium), 11 municipalities from the tertile with the highest unemployment rates (5.2–12.5%) were randomly selected.
Johnston 2013	Dietary and Activity vs Control	n/a	NR		N	n/a
Lynch 2016	Dietary and Activity vs Control	n/a	NR		N	n/a
Macias-Cervantes 2009	Activity vs Control	n/a	Y	Children with osteomuscular alterations that impair physical activity, chronic illness, or who received medications that alter body composition or insulin secretion were not included	N	n/a
Madsen 2013	Activity vs Control	n/a	Y	Children unable to participate in moderate physical activity were excluded	Y	Not explicitly reported, but the intervention is aimed at students that participate in after-school programs that preferentially enrol students who qualify for free or reduced-price meals
Marsigliante 2022	Dietary vs Control	n/a	Y	Children were healthy and free of any disability or musculoskeletal, cardiological, neurological or respiratory diseases, or dysfunctions	N	n/a
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	n/a	N		N	n/a
Pindus 2015	Activity vs Control	n/a	Y	Children with physical disabilities, learning difficulties, the use of medication that could affect metabolism or cognitive function, and the presence of neurological or psychiatric disorders, including clinical diagnosis of the attention deficit and hyperactivity disorder (ADHD; as disclosed by parents) were excluded from the study	N	n/a
Razani 2018	Activity vs Activity	n/a	Y	Children unable to walk or be otherwise physically active, attend the	Y	The target population was low-income families living in urban areas

				intervention park outings or complete two follow-up visits over three months were excluded		
Riiser 2020	Activity vs Control	n/a	N		N	n/a
Salmon 2008	Activity vs Control	n/a	N		Y	The selected schools were located in low socioeconomic suburbs of Melbourne
Tessier 2008	Activity vs Activity	n/a	N		N	n/a
Treviño 2004	Dietary and Activity vs Control	n/a	NR		Y	The study targets students from economically disadvantaged households
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	zBMI long	NR		N	n/a
Zota 2016	Dietary vs Control	n/a	NR		Y	The study targeted students attending both elementary and secondary schools in areas of low socioeconomic status

Abbreviations: N: no; n/a: not applicable; NR: not reported; SES: socioeconomic status; Y: yes.

Table 2

Description of the interventions

Comparison: Dietary intervention *vs* Control				
Study ID	**Meta-analysis outcome(s)**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**
Barnes 2021	zBMI medium; BMI medium	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and learning resources).
Chai 2019	zBMI short; BMI short	-Web-based family telehealth nutrition intervention. Telehealth dietitian consultation: Semi-structured telehealth consultations delivered by an accredited practising dietitian during scheduled clinic appointments. Website. The Back2Basics Family website contained information on various nutrition topic sand purpose-built healthy cooking videos. Facebook group for parents to exchange ideas and information related to the B2BF website. '-Web-based family telehealth nutrition intervention with additional text messages: a series of SMS targeting healthy eating for children was delivered to both parents (e.g. mother and father) of the child in 4-	Non-active intervention	The control group received no intervention for 3 months and was given access to all intervention components (the same as Telehealth + SMS) after the week-12 assessments

		weekly rotations of decreasing frequency. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Coleman 2012	zBMI medium; zBMI long	Intervention goals were to eliminate unhealthy foods and beverages on campus and at home, to deliver active nutrition education to children and nutrition messages to parents, to develop nutrition services as the main source on campus for healthful eating, and to promote school staff modelling of healthful eating (teachers and school staff not consuming unhealthy foods/beverages). The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	NR
Cunha 2013	BMI medium	The intervention focused on encouraging students to change their eating habits and food consumption. Trained nutritionists gave monthly 1-h sessions in the classrooms. These sessions included playing games, staging of theatre sketches, watching movies and puppet shows, and writing and drawing contests. A set of messages were sent to the families in the form of illustrated booklets and recipes. The families also received small gifts such as buttons and magnets. In addition, teachers were encouraged to work with the children on the topics addressed in each intervention session. The themes of the intervention sessions were as follows: healthy eating, native Brazilian eating habits, excessive sugar in processed food, marriage of the rice and beans, the beauty of fruits, super water: a super-hero, cookies, minimarket, and food advertisements. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received a one-hour section of orientation on general health and advice on healthy eating, at the end of the study
Damsgaard 2014	zBMI short	During the 3-month New Nordic Diet (NND) period, the children were served a mid-morning snack, an ad libitum hot lunch meal and an afternoon snack, and twice a week dessert, consisting either of fresh fruit or of a fruit-based snack. Prior to study start, the class teachers were given a box of teaching materials about the human body, the clinical measurements, and taste sensorics, including background information about NND and suggestions for related educational activities and games. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	The control group received the usual packed lunch from home. The teachers were instructed not to use the material about NND during the control period
Davis 2021				

	zBMI medium; BMI medium; Percentile medium	Garden Leadership Committees (GLC) were formed at each intervention school and were comprised of teachers, parents, community members, school staff, and students. GLCs assisted with physical garden design, to build hosting several garden workdays and with the development and implementation of long-term garden maintenance and sustainability plan. Gardens were built in every intervention school in the spring prior to the academic year of baseline measurements. The parents' curriculum paralleled the nutrition and gardening topics/activities taught to the children and had a strong emphasis on cooking components and focused on growing and cooking foods that are culturally relevant. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control schools received a delayed intervention (identical intervention as described above) in the year after the post-testing for that wave. Every control school received a garden, identical in size and structure to the intervention schools
de Ruyter 2012	zBMI short; zBMI medium; zBMI long	Children were provided with 1 can per day of a noncaloric, artificially sweetened, noncarbonated beverage or a sugar-containing noncarbonated beverage. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Attention control	The control group children were provided with a sugar-containing non-carbonated beverage
Fulkerson 2010	zBMI short; Percentile short	Sessions were held at rented space in a church and community center (with kitchen and dining facilities) within close proximity to participants' homes in the early evening (6–7:30 pm). Families participated in five 90-minute intervention sessions in a multiple family-group format (3–8 families at one time). Each session included a healthy snack, separate parent and child group time, family meal preparation, interactive nutrition education activities, a group meal, homework assignment, take home materials, and session evaluations. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Families randomized to the control condition participated in home assessments only and were sent written intervention materials at the end of the study
Fulkerson 2015	zBMI medium; zBMI long	The intervention included ten monthly group sessions and five brief goal-setting telephone calls. Families received a guidebook with session topics, strategies to promote behavior change and study goals, recipes and community resources. All family members were invited to attend sessions and transportation and childcare were provided, if needed. The goalsetting calls (~20 minutes) were completed by dietitians trained in motivational interviewing who tailored each call to the family-selected behavioral goal(s). Calls included the same behavior change techniques as in person sessions but followed an interview format, utilized motivational interviewing techniques and provided opportunities to discuss behaviors/goals that complemented the group session topics. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no	Attention control	Control group participants received a monthly family-focused newsletter and did not receive the HOME Plus intervention program

		The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Han 2006	zBMI long	Based on the Precede-proceed" model, the intervention included: healthy lunch to students; set up regulations for lunch in the intervention schools and lunch providers; improvement of canteen's environment; appointment of nutritionists in the lunch providers to supervise and monitor lunch provision, as well as act as a 'bridge' among school, family, and community; training of the nutritionists in lunch providers and relevant teachers in the schools; delivery of newspapers (about nutritional knowledge) to students and teachers; improvement of the environment near the schools; a variety of education means adopted by residents near the schools (including blackboard, broadcast, cooking training course, leaflets); supervisions of local community health centres and local centres for disease control to the schools and lunch providers. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	NR
Hendrie 2011	zBMI short; BMI short	Parents received individualized nutrition education from a research dietitian about the importance of dairy foods for children and the need to change their children from regular- to reduced- or low-fat dairy foods. Parents were guided through a standard written intervention booklet by the research dietitian that also included an extensive pictorial shopping guide of appropriate reduced- and low-fat dairy products available in supermarkets. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Parental education on reducing children's screen time. NB: Screen time was encouraged to be replaced with other sedentary beahviour to avoid an increase in physical activity
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group	Attention control	For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial

		The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no		
James 2004	zBMI medium; zBMI long; BMI medium; BMI long	The intervention was conducted over one school year, with four sessions of focused education promoting a healthy diet and discouraging the consumption of carbonated drinks. The initial session focused on the balance of good health and promotion of drinking water. The children tasted fruit to learn about the sweetness of natural products. In addition, each class was given a tooth immersed in a sweetened carbonated cola to assess its effect on dentition. The second and third sessions comprised a music competition; each class was given a copy of a song (Ditch the Fizz) and challenged to produce a song or a rap with a healthy message. The final session involved presentations of art and a classroom quiz based on a popular television game show. The children were also encouraged to access further information through the project's website (www.b-dec.com). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	NR
Keshani 2016	BMI medium	Six nutrition education sessions for students and 4 sessions for mothers were held during one year in four intervention schools, using a similar method. Strategies/techniques used in the sessions included, lecture, problem solving, goal setting, games, entertainment and competition, watching nutrition related animations, making story and targeted snacks. Also, some posters related to the objectives of the nutrition education were hanged to the classes' wall. Four short (5-10 minutes) animations with nutrition and physical activity content were presented to the students. Then they were asked to write story, draw painting or make wall newspaper about healthy eating, obesity and related topics so they could enrol in a competition. In addition, they were served with some healthy snacks like low salt puffed wheat and soy nuts, raisins, low fat milk, and cheese and cucumber sandwich in the nutrition education sessions. The schools' buffets were also checked, and some healthy food items were suggested to be available for the students use. Four nutrition education sessions (each about 2 hours) were considered for the parents. The purpose of these sessions was increasing the awareness of parents about the benefits of healthy eating and physical activity, making them familiar with the program, and convincing them to collaborate with the students at home. Pamphlets and booklets on children healthy eating were prepared for parents, and some nutritional messages were sent to them via text messaging. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	No training was considered for the control group, except the routine school trainings
Lent 2014	zBMI medium; zBMI long;	Healthy corner store intervention was designed to promote healthier snack and beverage purchases in students shopping in corner stores. Intervention has 3	Non-active intervention	The control group students were still intercepted and asked what they

	BMI medium; BMI long; Percentile medium; Percentile long	components: (1) classroom-based nutrition lessons (7 x 45-min); (2) a branded social marketing campaign with messaging on healthy eating and well-being + Snackin' Fresh logo giveaways and banners and displayed in corner stores + Web site, comic book & video; (3) healthy corner store (store owner trainings + adding healthier items and signage for them). The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes		bought in their non-intervention corner stores
Meng 2013 (Beijing)	zBMI medium; BMI medium	Group 1: Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Class on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students at school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. Group 2: Students conducted "Happy 10" led by teachers to do a 10-minute segment moderate intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	No intervention was taken place in the control schools
NCT00224887 2005	BMI medium	In-home family-based behavioral counselling using in-person and video interventions delivered by community health advisors. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group received standard nutrition education curriculum consisting of video and lesson plans based on USDA Food Guide pyramid
Nicholl 2021	zBMI short; BMI short; Percentile short	Children were requested an ongoing intake of ≥1 serving of reduced-fat dairy per day (where a serving comprised a 250-mL glass of milk, 40 g cheese, or a 200-g tub of yogurt), with no order limits. Children continued their habitual diet but replaced all dairy with the study dairy products, provided at no cost. Study dairy products were all purchased at local supermarkets, relabelled by independent researchers, packaged for optimum cold storage, and, after the first on-site collection, delivered regularly to most families at home. Apart from fat content, each product pair was closely matched for brand and nutrient content to minimize product variations, including differences in bovine diet and sugar content. The intervention includes a home activity: no The intervention is delivered: individually	Non-active intervention	The control group received the usual full-fat dairy diet

		The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes		
Paineau 2008	zBMI short; BMI short	Monthly telephone counselling by a trained dietician dedicated to analysing food habits of the participants according to their last food records and determining pragmatic advice to reach their specific dietary targets. Intervention A: advice on how to reduce dietary fats (<35% of total energy intake) and how to increase complex carbohydrates (>50% of total energy intake). Intervention B: advice on how to reduce both dietary fats (35% of total energy intake) and sugars (–25% of initial crude intake) and how to increase complex carbohydrates (>50% of total energy intake). The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	Participants in the control group received general information about nutrition, but no individualized advice, to maintain motivation and to avoid a high dropout level. They were followed at the same intervals as participants in the intervention groups and were asked to record their diets in an identical fashion
Seguin-Fawler 2021	Percentile short	The focus of the F3HK intervention was a summer Community Supported Agricolture membership of 15–24 weeks length (CO-CSA) plus nutrition education. Nine farms offered multiple CSA share sizes from which caregivers could select the option that best suited their needs and preferences. Shares were offered at half-price and caregivers paid weekly. Families in the CO-CSA plus nutrition education group were offered kitchen tools and education classes. Caregivers selected 2–4 larger kitchen tools from among the following: food processor, crockpot, stockpot, large cutting board, chef's knife, salad spinner, and reusable grocery bag. Adults and children also were invited, but not required, to attend nine in-person CSA-tailored education classes offered locally. Classes featured seasonal produce via food tasting, demonstrations, hands-on cooking activities, handouts, and recipes; two of the lessons involved field-based learning via grocery store and farm tours; and three lessons taught the use of a vegetable peeler, vegetable scrub brush, or paring knife which participants were allowed to keep. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group received the delayed intervention starting at year 2
Sichieri 2008	BMI short	The intervention evaluated in the present study focused on the reduction in consumption of sugar-sweetened carbonated beverages by students. A healthy lifestyle education programme was implemented using simple message encouraging water consumption instead of sugar-sweetened carbonated beverages. Education was delivered via classroom activities. All children in the intervention classes were taught the importance of drinking water and asked to make drawings and songs about water and how much the body needs it. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no	Attention control	The control group received only two one-hour general sessions on health issues and printed general advice regarding healthy diets

		– provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Stettler 2015	zBMI medium; BMI medium	Parents and children in this program participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Group 1: Beverages-Only Intervention aimed progressively reduce intake of beverages with high sugar content (e.g. regular soda, sweetened iced teas and lemonade, fruit drinks with less than 100% fruit juice, and sports drinks) to ≤ 1 to 2 12-oz. serving/day and progressively increase intake of water, fat-free milk, and 1% milk to ≥ 6 12-oz. servings of per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	Parents and children in this program participate in a series of consultations aimed at bullying prevention that are designed to help children learn strategies to make and keep friends, to express feelings appropriately, and to successfully decrease conflicts that often occur at school among children.
van de Berg 2020	Percentile medium	Multi-arms study Group 1: WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programs The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Delayed intervention control
Viggiano 2018	zBMI short; zBMI long	One play session (15–30 min) with the board game Kaledo, every week for 20 weeks. A game session represents a journey through daily meals of the Mediterranean diet. At the start, each player receives four chips and sets the energy expenditure of his/her kaleidoscope on the value corresponding to his/her BMR (BMR is obtained by consulting a simple table on the kaleidoscope which is based on age and weight). The game allows each player to personalize the BMR according to the sex, the weight, and the age. During a game session, the players move their pawns on the 59 boxes on the board and, consequently, they receive nutrition cards (common food items of Mediterranean diet) or activity cards (common daily activity) as indicated in the destination boxes. A player can refuse to take a card by leaving one chip. In this way, he can try to balance the total energy intake (EI) given by the nutrition cards with the total energy expenditure (EE) given by the activity cards and the BMR. At the end of the game, the winner is the person with maximum points calculated on the bases of energy balance (maximum 5 points), best food items (maximum 4	Non-active intervention	The children of the control group did not play with Kaledo

		points), and food variety (maximum 1 point). Seven special boxes on the board act as a punishment or a reward during the game and they are associated with specific dietary behavior in real life (e.g., a fast food lunch). Therefore, Kaledo could affect dietary behavior by a knowledge-based nutrition education and/or a behaviorally focused nutrition education. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no		
Comparison: Activity intervention vs Control				
Study ID	**Meta-analysis outcome(s)**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**
Barbeau 2007	BMI medium	The intervention consisted of 30 minutes of homework time during which the subjects were provided with a healthy snack free of charge, and 80 minutes of physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Subjects in the control group received no intervention.
Barnes 2015	zBMI short	The MADE4Life program involved mothers and daughters attending weekly after-school 90-minute sessions over 8-weeks. The major focus of the mother-daughter PA sessions were fun active games, health-related fitness zumba, aerobics, pilates, yoga, rough and tumble play, and fundamental movement skills. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group was composed of a 6-month wait-list
Barnes 2021	zBMI medium; BMI medium	PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or	Non-active intervention	Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and learning resources).

		more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no		
Breheny 2020	zBMI short; zBMI medium	The Daily Mile involves children doing an extra 15 min of activity by running or walking around a track within the school grounds. Schools map out a route or track in their school grounds. The intervention was carried out in lesson time at a time to suit each class during the school day, children left the classroom to run or walk around a predefined route within the school grounds for 15 min (on average equivalent to a distance of around 1 mile). The intervention was carried out in all but severe adverse weather conditions and required no change of clothing or footwear and was not a substitute for PE or break-times. Whilst advised as a daily activity, the frequency and duration were at the class teacher's discretion. Class teachers delivered the intervention and were permitted to adapt it for implementation, using motivational material such as certificates, or using it to facilitate learning within another subject area such as Maths. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Only the usual school health and wellbeing activities were implemented in the control group
Clemes 2020	BMI short	Six sit-stand desks replaced three standard desks (sitting 6 children) in the intervention classrooms. Teachers were encouraged to use a rotation system to ensure all pupils were exposed to the sit-stand desks for > 1 h/day on average. The training included a presentation on the benefits of regular physical activity and reductions in sedentary time. Teachers received a Professional Development Manual (available on request) and a series of nudging prompt cards containing information on the health benefits of reducing prolonged sitting and on correct posture when standing at the desks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The four schools assigned to the control condition were asked to continue with their usual practice and took part in the study measurements at the same two time points using the same measures as those in the intervention condition. Upon completion of the study, control schools were offered a report summarising the collected data of their pupils.
De Bock 2013	BMI short; BMI medium	A complex intervention designed to engage parents, preschool teachers, and other members of the preschool community and aimed at motivating parents to develop and implement their own project ideas for promoting children's physical activities. It included access to an intervention-specific website (www.ene-mene-fit. de); an introductory video; and a printed book with 15 project ideas. The external gym trainers in intervention schools received additional training and served as intervention facilitators helping to coordinate parent activities (e.g., by proposing timelines) and encouraging participation. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no	Non-active intervention	The control group received the state sponsored programme initiated in 2006 to encourage physical activity among children in Baden-Württemberg. As part of this programme, specially trained external PA teachers deliver 40 standardized one-hour gym lessons over a six-month period (i.e. twice weekly) in preschools that participate in the programme

		– change the social environment of the child: yes – change the physical environment of the child: no		
de Greeff 2016	BMI short	The intervention program contains lessons that include simple, individual physical exercises during routine learning activities such as mathematics, spelling, and reading tasks in the classroom. At the start of each lesson the children stood behind or beside their school desk. During each lesson, 10-15 minutes were spent on solving math problems followed by 10- 15 minutes on solving language problems. For example, the children had to solve a mathematical problem by giving the answer with the correct number of jumps (2 times 3 is 6 jumps) or words had to be spelled by jumping in place for every mentioned letter. Learning activities were matched with the regular learning activities, resulting in a different program for second- and third-grade children. The physical exercises were aimed to be of moderate to vigorous intensity, yet relatively easy to perform, for example marching, jogging, or hopping in place. The interactive whiteboard played an important role in the lessons. Every lesson was supported by a presentation on the board where upon the mathematical and language tasks became visible. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	NR
Diaz-Castro 2021	zBMI short; BMI short	The intervention consisted of a 6 months physical activity programme delivered by the physical education teacher with specific elements of additional vigorous physical activity to the standard classes(control group): first month: 10 extra minutes of warm up (70 min/day, 3 days/week); second month: 25 min of aerobic work per session were added to the protocol developed in the first month (85 min /day, 3 days/week); third month: 15 min of aerobic work per session were added to the protocol developed in the second month (100 min/day, 3 days/week); fourth month: one extra day per week was added to the exercise protocol (100 min/day, 4 days/week); fifth and sixth month: one additional day per week was added to the exercise plan (100 min/day/5 days/week). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		The control group received the usual physical activity curriculum Training classes for 60 min/day, 3 days per week that consists of three parts: 1. warm-up (10 min); 2. main part of the exercise (45 min): technique exercises (15 min): passes, catches, drives, feints, dribbles, shots on goal, control exercises, skill circuits, tactic drills (15 min): rounds, defence drills, attack drills, counterattacks, set plays, superior attack, ball possession drills, pressures, field positions, lines, set pieces, real game situation "match" (15 min); 3. cool down (5 min): stretching
Donnelly 2009	BMI long	Physical Activity Across the Curriculum (PAAC) intervention was delivered via moderate-intensity PA (3–6 METs) intermittently throughout the day. The goal was for students to accumulate 90–100 min of PA a week (~20 min per day) through the instruction of academic lessons that incorporated PA. Students also participated in their regular physical education classes (~60 min per week). Students were shown that they do not need to report to a special location, wear special exercise clothes, or interrupt their normal routine. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received the regular classroom instruction without physically active lessons

Drummy 2016	BMI short	Teachers in the intervention group were asked to lead a 5-min activity break three times per day for 12 weeks. The activity break began with gentle jogging on the spot as a warmup for less than 1 min, followed by moderate–vigorous intensity exercises such as hopping, jumping and running on the spot, scissor kicks. The teachers could select which exercises to include in each activity break. They were encouraged to vary the activities each day. The children participated in the activity break in the classroom beside their desks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control groups continued with their normal daily routine throughout the 12-week period
Farmer 2017	zBMI medium; zBMI long; BMI medium; BMI long	The researchers, playworker and school community worked together to develop a playground action plan that met the needs of each school community. Following baseline evaluations of their play space, each intervention school was provided with a list of tailored suggestions for improvements. This was specific to each school but could include the addition of more interactive play equipment, and alterations to school rules and policies that may limit risk-taking during play (for example, no tree climbing, separation of older and younger children into physically separate play areas), with all alterations meeting playground safety standards. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Control schools were asked to not change their play environment
Ford 2013	BMI short	The walkers took part in the accumulated brisk walking programme during school time, which involved walking at a brisk intensity around the school grounds for 15 min in the morning and afternoon, at least three times a week, for a total of 90 min per week, during the 15-week intervention period. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group took part in normal school lessons during the walking sessions, which involved seated literacy work
Ha 2021	BMI short; BMI medium	Family-based physical activity program consisting of ten 30-min workshops followed by 60-min activity classes, led by two coaches in each session. The workshops addressed health benefits of regular PA, parenting tips, and principles of self-determination theory through a story-telling approach. The activity sessions incorporated different types of parent-and-child activities and games. These sessions took place in school halls or playgrounds to allow more open space for activities. Some activities and games were designed around a set of free equipment participants received. These included a sponge flying disc, soft volleyball, skipping rope, a pair of rackets, and some sponge balls. After the tenth session, participants were invited to attend a booster session approximately 3 months afterward. For the activity session, coaches invited parents and children to take more initiative in choosing what activities to do, even allowing some of them to	Non-active intervention	The control group started the intervention after 1 year (wait-list control)

		lead group games. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Howe 2011	BMI medium	The intervention consisted of 30 minutes of homework time during which the subjects were provided with a healthy snack free of charge, and 80 minutes of PA. All of the snacks were individually packaged, and every day the subjects had a choice of something salty (e.g., crackers and cheese), something sweet (e.g., low-fat cookies), or a fruit or vegetable. Subjects chose one snack and were allowed to get another snack if they were still hungry after the first one. The PA component included 25 minutes of skills development (e.g., how to dribble a basketball), 35 minutes of VPA, and 20 minutes of toning and stretching. Subjects wore Polar Accurex Plus HR monitors every day during the PA portion of the program. Activities during the MVPA included games such as basketball, tag, softball, relay races, etc., all of which were modified to keep all of the subjects active throughout the 35-minute period. Subjects received small weekly prizes (e.g., bouncy balls, Slinkies, pencils, note pads, lip gloss, play jewellery) for maintaining good behavior and attitude and at most one unexcused absence. We picked a student of the month in each school who received a slightly larger prize (e.g., movie pass, roller skating pass, basketball). The main purpose of the prizes was mainly to reward good behavior, participation, and effort. (extracted from Barbeau 2007) The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Participants in the control group received no intervention and were not allowed to stay for the after-school intervention but rather instructed not to change their daily after-school routine
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Attention control	For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial
Jones 2015	zBMI short; zBMI	The PA programs comprised 30 min of homework plus 90 min of structured physical activity. Facilitators	Dietary and activity	The healthy lifestyle (HL) education program (active comparison group)

	medium; BMI short; BMI medium	optimized time spent in moderate-to-vigorous physical activity by i) implementing activities—often with modifications (e.g., to rules, equipment, and play space)—designed to encourage participation and maximize 'movement time', ii) minimizing or eliminating 'wait time' within and between activities, and iii) providing regular verbal positive reinforcement and feedback. In addition to the biweekly physical activity sessions, the PA programs included a home and parental component. Participants were provided with a 'Health Passport' containing weekly challenges to be completed at home with parents. The challenges focused on physical activity and screen time and included activities in areas of active transport, active chores, fun outdoor activities and monitoring screen time. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	intervention	consisted of 30 min homework, 45 min healthy lifestyle education and 45 min physical activity. The healthy lifestyle education comprised evidence-based information on healthy lifestyles for children from the Australian Department of Health and Aging and best-practice information developed by the researchers. The healthy lifestyle education focused on general health messages, such as healthy hearts, food groups and the importance of eating breakfast. In contrast to the PA program, the physical activity component of the HL programs focused on lighter intensity and lifelong activities (e.g., bocce and orienteering) and did not include modifications to maximize participation or physical activity levels.
Ketelhut 2022	BMI short	Exergames are active video games that require bodily movements to play the game. In addition to the normal PE class twice a week, the children in the intervention group participated in two exergaming sessions per week lasting 15–20 min. The sessions were integrated into the daily school schedule and took place before, between, or after classes, as well as during breaks. The ExerCube is a physically immersive exergame setting shaped like an open cube. The three cushioned walls of the cube serve as a projection screen for the game scenario and a haptic interface. During the game (Sphery Racer), the player navigates an avatar along a virtual racing track by performing a variety of whole-body movement tasks. A motion-capturing system using HTC Vive Trackers attached to the wrists and ankles detects the player's movement in three dimensions through infrared sensor technology. By analysing the timing and accuracy of movements throughout the game, the motion capturing system guarantees a correct execution of the different movement tasks. Before each game, the system was calibrated to match the targets to the body height of the player. The game Sphery Racer implements six game levels, which guide the player through the workout while also gradually increasing duration. For a 15-minute session, the duration of the levels is 1:30, 2:00, 2:40, 3:50, and 5:10 min. For a 20-minute session, the duration of the levels is 1:50, 2:30, 3:20, 5:10, and 7:10 min. The levels are interspersed with short resting phases of about 30 s. The game continuously adjusts game difficulty and complexity to the player's fitness and cognitive skills. When the player makes too many mistakes or reaches a predetermined heart rate (HR), the game's speed slows down. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		The control group participated in their normal PE classes twice a week
Khan 2014	zBMI medium; BMI medium	The intervention group received a 2-hour intervention (5 days/week for 9 months). / The sessions consisted of 70 minutes of intermittent MVPA. Each session began with 20 to 25 minutes at physical activity stations focused on a health-related fitness component (eg, cardiorespiratory fitness, muscular strength). After the fitness activities, a healthful snack was provided during the 15-minute educational component (topics included goal setting, self-management, and self-efficacy). After	Non-active intervention	Participants in the control group partake in their regular afterschool activities, without intervention from the study staff. The control group was not contacted again until follow-up

		the educational component, participants engaged in 50 to 55 minutes of organizational games or sport-oriented activities (eg, dribbling a basketball). The sessions concluded with a 15-minute cool-down period. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		
Kovalskys 2016	zBMI long	Playgrounds were re-designed to promote 30 minutes of unstructured moderate-to-vigorous PA during school-breaks; a PA instructor acted as facilitator, and an educational component encouraging PA was included in the curricula. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	NR
Kriemler 2010	BMI medium; BMI long	Children in both groups had three physical education lessons each week, which are compulsory by law. The intervention group had two additional physical education lessons on the remaining school days (45 minutes each) taught mostly outdoors by physical education teachers. In addition, three to five short activity breaks (two to five minutes each) during academic lessons—comprising motor skill tasks such as jumping or balancing on one leg, power games, or coordinative tasks—were introduced every day. The children received daily physical activity homework of about 10 minutes' duration prepared by the physical education teachers. This included aerobic, strength, or motor skill tasks such as brushing their teeth while standing on one leg, hopping up and down the stairs, rope jumping, or comparable activities. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group received three physical education lessons each week (compulsory by law)
Lau 2016	BMI short	Children were arranged to group play an AVG, Xbox 360, twice per week with each session at 60 minutes over a period of 12 weeks in a school setting beyond the regular PA and physical education class. Xbox Sport Season Series 1 and 2 that comprise six different sport games in each season were adopted in the intervention. The two Seasons feature both team-based and individual sports, including 10-pin bowling, boxing, track and field, table tennis, beach volleyball, and association football in Season 1 and golf, darts, baseball, skiing, tennis, and American football in Season 2. The player controls the sports by mimicking how the sports are played in real life without the equipment that usually is associated with them. Children in the intervention group participated in two 60-minute gaming sessions per week for 12 school weeks. The intervention was held after school in a large function room that allowed all children in the intervention group to play at the same time. Team games were played with two children sharing one Xbox 360. This was designed to provide a better motivational climate compared with individual-based gameplay. Children and their partners with consensus of opinion	Non-active intervention	The control group received regular PA and physical education class and received no additional intervention

		had their own choice on the orders of games, what they wanted to play, and on the duration of each gameplay. Otherwise, the investigator would help to determine the game order. / Participants could get awarded based on degree and speed of movement and level of difficulty. The research assistant recorded the scores and briefed the participants in each session. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		
Lazaar 2007	zBMI short; BMI short	Children were required to follow PA after class, twice a week for 1 h. The exercise programme was designed to enhance the joy of movement, body awareness and team spirit in order to bring about long-term changes in behavioural patterns. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received regular sport physical education and PE classes
Li 2010	zBMI medium; zBMI long; BMI medium; BMI long	The program consisted of two daily 10-min physical activity sessions conducted in the break between classes. It provided a variety of safe, moderate, age-, and space-appropriate exercises. Teaching materials included activity cards, video demonstrations, tracking posters, and stickers. Each activity card introduced one exercise and explained how to perform it. The videos showed students from the pilot study performing the activities. Teachers could either demonstrate the activity or show it on a video. The tracking poster and stickers were used to illustrate the progress of each class. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	No intervention took place in the control schools.
Martinez-Vizcaino 2014	BMI medium	The program consisted of noncompetitive recreational activities focused on developing aerobic and muscular fitness. MOVI-2 included basic sports games, traditional games, and other outdoor activities such as cycling or gymkhanas. The program included two 90-minute PA sessions during the weekdays in the evening from 4 to 5.30 pm and one 150-minute session on Saturday morning each week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools kept their usual patterns of PA
Martinez-Vizcaino 2020	zBMI short; BMI short	After-school play-based, non-competitive, physical activity intervention including basic sports games, playground games, dance and other activities focusing on developing motor skills. Parents and teachers were involved in the programme promoting active lifestyles in	Non-active intervention	The control group received standard physical education lessons

		children through the use of reinforcement tools as teaching material (e.g. refrigerator magnet with recommendations for physical activity for children), and accessing the study blog (http:// movi3kids. blogspot. com. es/) where questions about how to promote active lifestyles were answered. Environmental interventions were introduced to encourage children to be more active in the playground including balance circuits and panels encouraging physical activity during recess, and tyres of different colours and sizes with posters describing how to use them. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes		
Martinez-Vizcaino 2022	zBMI medium; BMI medium	This program includes recreational and non-competitive physical activities, based on traditional games, but using a high-intensity interval training (HIIT0 protocol adapted to children's age. Children were involved in 60-minute after-school sessions 4 times a week developed within the school setting. Each session consisted of 15 minutes of set-up and warm-up games, followed by 28 minutes of games using the HIIT protocol, in which a 4 minute game of high-intensity activity (at 85%–90% of the maximum heart rate, approximately 178–190 ppm) was followed by a game of recovery activity lasting 3 minutes (at 65%–75% of the maximum heart rate, approximately 136–147 ppm), and this sequence was repeated 4 times. Finally, children played a 10- minute low-intensity game for cool down. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Control children continued with their standard physical education curriculum throughout the intervention period (two regular 50-min sessions per week).
Meng 2013 (Beijing)	zBMI medium; BMI medium	Group 1: Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Class on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students of school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. Group 2: Students conducted "Happy 10" led by teachers to do a 10-minute segment moderate intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	No intervention was taken place in the control schools
Morgan 2019	zBMI medium			

		The DADEE program was designed to energize fathers to become physical activity role models and advocates for their daughters, and vice versa. The program included eight weekly sessions with educational and practical components, which were delivered at the university by members of the research team. Mothers and non enrolled siblings were invited to one of the eight sessions and were told they could review the program resources at home if they were interested. The program engaged fathers and daughters in fun, co-physical activities targeting rough and tumble play, sports skills and aerobic and muscular fitness. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The wait-list control group received the intervention after the 36 weeks assessment.
Muller 2016	zBMI medium; zBMI long; Percentile long	Intervention classes were assigned to 1 unit of physical exercise (45 minutes) with at least 15 minutes of endurance training per school day in comparison to the regular two PE units (45 minutes each) weekly in the non-intervention control group. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control classes continued to receive 2 units of exercise per week
Muller 2019	zBMI medium	The physical activity interventions consisted of physical education lessons, moving-to-music classes, in-class activity breaks and school infrastructure enhancement to promote physical activity...." One school received the physical activity intervention only, one school also received the health education intervention (a series of classroom-based lessons to increase the awareness for intestinal parasite infections) and one school also received a nutritional interventions (a series of classroom-based to increase the awareness of the importance of healthy nutrition). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	The control group continued to follow their usual school curriculum
Newton 2014	zBMI short; BMI short; Percentile short	Children in both study groups were instructed to wear a study-provided pedometer every day during the course of the 12-week intervention. Parents in the Intensive intervention group (IIG) were given access to a version of the website in which they could view their child's daily step goal, monitor their child's step counts, view a steps/day graph, and read weekly behavioral articles, and they also received text messages. The step monitoring and steps/day website components and goals were identical to the minimal intervention group. The steps/day graph was color-coded to illustrate how their child's daily steps compared to the target step goal. Behavioral strategies based on the Social Cognitive Theory were adapted from previous interventions and were delivered through weekly articles posted on the website and via text messages. Text messages were designed to prompt parents to encourage their child's physical activity, remind parents of behavioral concepts presented in the articles, and motivate parents to foster behavioral change in their	Attention control	Parents in the control group were given access to a version of the website (formatted for a mobile phone) in which they could view their child's daily step goal, monitor their child's step counts, and receive monthly nutrition tips. The website provided parents with a target steps/day goal for their child, which was intended to increase their child's physical activity by 1000, 3000, and 6000 steps/day above the child's individualized baseline during the first, third, and fourth week of the intervention, respectively. The additional 6000 steps/day above the baseline level was to be maintained from weeks 4-12.

		child. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no		
Rhodes 2019	BMI short	The intervention condition received the Canada's physical activity guidelines (see comparator short description) and was provided with family physical activity planning material. This material included skill training content (workbook how to plan for family physical activity) and practical material to create a plan. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group received the standard package consisted of Canada's physical activity guidelines recommending 60 minutes of activity a day in bouts as short as five to ten minutes for children and a breakdown of ways for the family to achieve this physical activity (structured, unstructured, endurance, strength, activities, less than 60 minutes of sustained sedentary activity, reduce screen viewing by 30 min per day) commensurate with this guide.
Sacchetti 2013	BMI long	In each class assigned to the intervention group the ordinary classroom teacher was joined by a physical education teacher who held the physical education lessons and monitored the activity carried out during the week. Each educator was specifically trained in physical education (degree in "Exercise and Sport Sciences") and was responsible for the activity in 3-4 classes (a total of 7 educators). The type of physical activity (exercises, games, circuits, etc) was coordinated through monthly meetings, according to a previous standardized plan. The daily physical activity consisted of at least 30 minutes of physical exercise per day, divided between the schoolyard (vigorous activity) and the classroom (moderate activity). Twice weekly a further 50 minutes of physical education was spent in the gym, according to the standard curriculum of physical education. On average, then, during school hours, the children were engaged for around 45 minutes in specific physical activity which was both moderate, defined as activity allowing the children to control their verbal language without becoming breathless (the child can talk, but not sing), and vigorous, defined as activity leading to sweating and heavy breathing (the child is not able to say more than a few words without pausing for breath. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received the standard program of physical education
Salmon 2008	zBMI long	The programme was delivered by classroom teachers and targeted physical activity (PA-I) and sedentary behaviours (SB-I) in the school and home settings. Year 3 teachers in the PA-I group were asked to deliver nine key learning messages to children (which were reinforced in Years 4 and 5) that were focused on physical activity. Class-sets of pedometers were provided to support delivery of some of the lessons. Parents were sent nine newsletters each year (18 in total) that reinforced these messages and teachers set children physically active homework tasks (eg, go for a walk with parents and count letterboxes in their street). Classroom sets of physical activity (eg, balls, skipping rope) and novel circus equipment (eg, juggling balls, ribbons) were provided each year of the intervention.	Non-active intervention	The control group was a usual curriculum control condition and at study completion were provided with all the intervention curriculum and supporting materials.

		Asphalt line markings were painted in the school playground in the first year of the intervention, signage promoting physical activity was placed around the school and teachers were asked to encourage and support children's physical activity during recess and lunch breaks. Year 3 teachers in the SB-I group were asked to deliver nine key learning messages per year to children (eg, impact of sedentary behaviour on health, self-monitoring, goal setting). Year 4 and 5 teachers were asked to repeat and reinforce these learning messages to the children and extended lesson plans were provided. Nine newsletters were sent to parents each year (18 in total) that reinforced these messages and promoted family involvement. Teachers were asked to deliver a 30-min standing/active lesson every day by modifying how they delivered their usual curriculum (eg, active maths). Each SB-I classroom received six standing easels to help facilitate standing lessons. Teachers were asked to break up children's prolonged sitting (approximately every 30 min) with a 2-min standing/active break. They were asked to adapt standard homework tasks to break up sitting and incorporate standing at home. The PA-I + SB-I group received a combination of the PA-I and SB-I strategies (ie, their nine key learning messages each year targeted both physical activity and sedentary behaviour). The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Simon 2008	zBMI long; BMI medium; BMI long	The program included an educational component focusing on physical activity and sedentary behaviors. New opportunities for physical activity were offered at lunchtime, during breaks and afterschool hours, taking into account the obstacles to being active. Sporting events and 'cycling to school' days were organized. Parents and educators were encouraged to provide support to enhance the adolescents' physical activity level through regular meetings. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The controls followed their usual school curriculum without any intervention
Tanskey 2017	zBMI medium; BMI medium	Group 1: The 100 Mile Club is a walk/run program that encourages children to move 100 miles over the course of the school year (>3 miles per week). The program can be implemented before, during (physical education/recess), or after school. Group 2: The CHALK/Just Move program is composed of structured classroom-based PA breaks. Teachers were provided with a set of activity cards with various high- and low-intensity PA moves and were suggested combinations of moves to group together to build 5-movement breaks of 15 minutes. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control group schools were offered an intervention of their choice after completion of the evaluation in Fall 2017.

Telford 2012	BMI long	The specialist-taught intervention was conducted in 13 schools by 1 of 3 visiting PE teaching specialists and involved 2 classes of 45 to 50 minutes per week for 75 of the 80 weeks of school over the 2-year period. The general classroom teachers associated with the specialist- taught group conducted the remaining 50 to 60 minutes of PE in 2 or 3 extra sessions per week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The PE in the common-practice group was conducted only by general classroom teachers. In the control group classroom teachers continued teaching commonly practiced PE programs.
Thivel 2011	BMI short	The intervention consisted of 120 min (two times for 60 min) of supervised physical exercise in addition to 2 h of Physical Education classes per week. The additional 2 h per week of exercise were managed and taught by sports science students as part of their training; they were themselves supervised by a member of the investigation staff. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group did not have any intervention and followed their habitual 2 h of physical education per week.
van de Berg 2020	Percentile medium	Multi-arms study Group 1: WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programs The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Delayed intervention control
Vizcaino 2008	BMI medium	The intervention consisted in a non-competitive recreational physical activity program (Movi) adapted to the children's age and held after school at the school's athletic facilities. The sessions included sports with alternative equipment (pogo sticks, frisbees, jumping balls, parachutes) cooperative games, dance and recreational athletics. In most cases, children went home after class and then returned to the school premises to participate in the program. The intervention includes a home activity: no	Non-active intervention	The control group received the standard physical education curriculum (3 h per week of physical activity at low-to-moderate intensity)

		The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		
Wang 2018	zBMI medium; BMI medium	Intervention components included a) Classroom curricula; (b) School environment support; (c) Family involvement; (d) Fun programs/events. Local government was also involved in the intervention and played a critical role. Classroom curricula: knowledge of obesity and its hazards to health, the benefits of sufficient PA for body weight control, and skills to maintain sufficient PA, reduce screen time and take physically active transportation in daily lives. School environment support: three sub-components: 1. Posters and slogans encouraging students to engage in sufficient PA were posted on billboards inside the classroom, gymnasium, playground and cafeteria and refreshed bimonthly according to the scheduled intervention curriculum themes within each intervention school. 2. Easily accessed instruments for body weight and height measurement and BMI calculation were provided within each intervention classroom in the first month of intervention. 3. News leaflets regarding program progress were developed and sent to participating schools, students and families quarterly. Family involvement: Families (parents) were involved in this study via three ways. First, one health class was prepared for parents in each semester, with topics covering knowledge of childhood obesity, the health consequences of physical inactivity, and skills to help children maintain sufficient PA in their daily lives. Second, parents were assigned homework and asked to complete it with their children (for example, measuring body weight and height, calculating each other's BMI) in the first semester. Third, with assistance from parents, three special 1- week activities were developed for all intervention students in the second semester, including: 1 Physical housework week: Students engaged in PA through helping parents do physical housework at home, such as house cleaning, raw food preparation and dishwashing, for 1 week; 2 Walk-to-school week: Intervention children were encouraged to walk or ride bicycle to/from school for 1 week; and 3 No-TV week. Fun programs/events: two fun events for intervention students with consideration of the regular curricula: a composition writing and a painting class with the theme of PA events in daily life. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Control students received their routine health education programs regulated by educational authority.
Wendel 2016	BMI long; Percentile long	The intervention involved changing classroom environments from traditional seated desks to stand-biased desks, which are set at a height at which children can work at their desk while standing but are also outfitted with a stool so that they can sit if they choose to. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no	Non-active intervention	The control classrooms were left unchanged, outfitted identically to the rest of the classrooms in the school, with traditional seated desks

		– change the social environment of the child: no – change the physical environment of the child: yes		
Yin 2012	zBMI medium; zBMI long	FitKidThe FitKid PA program was designed to teach sport skills and improve aerobic and musculosketical fitness following a mastery-oriented youth sport activity program philosophy that focuses on confidence building, enjoyment, team play, and learning skills and deemphasizes competition and winning. To make the program appealing to parents and school officials, FitKid also included a free snack (USDA after-school snack program), academic assistance (homework and study skills), and transportation to home by school bus. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received the regular free "health screenings," which otherwise may cost more than $300, and diet/PA information to all participants.
Comparison: Dietary and Activity intervention vs Control				
Study ID	**Meta-analysis outcome(s)**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**
Adab 2018	zBMI long	Several behaviour change strategies were employed to encourage increased physical activity and improved diet quality. School staff were provided with training and resources for intervention delivery. A termly family newsletter reinforced messages delivered through the various intervention components. The 12 month intervention encouraged healthy eating and physical activity, including a daily additional 30 minute school time physical activity opportunity, a six week interactive skill based programme in conjunction with Aston Villa football club, signposting of local family physical activity opportunities through mailouts every six months, and termly school led family workshops on healthy cooking skills. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Schools allocated to the comparator arm continued with ongoing year 2 health related activities. In addition, we provided citizenship education resources, excluding topics related to healthy eating and physical activity
Annesi 2016	BMI short; BMI medium; Percentile medium	Youth Fit 4 Life use theory-based behavioural skills to support increased physical activity and healthy eating behaviours occurring both within and beyond after-school care time. It included highly structured daily session of 30 min/day of moderate-to vigorous physical activity and used cognitive-behavioral methods to encourage children to consume healthy foods and beverages. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	In the control group physical activity was administered in a variety of ways that were mostly left up to the discretion of the counsellor
Annesi 2017	BMI short; BMI medium	See Annesi 2016	Non-active intervention	See Annesi 2016
Baranowski 2003	BMI short	The intervention at Baylor was a 4- week summer day camp, followed by an 8-week Internet-based program, plus one Saturday meeting for the girls. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes	Non-active intervention	The control camp experienced only the usual camp activities at that site and focused on general health issues

		The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Baranowski 2011	zBMI short; Percentile short	Two interactive, computer-based video game s(9 sessions each) played in sequence to increase fruit, vegetable and water intake, physical activity and decrease TV viewing. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Dietary and Activity (minimal intervention)	The control group received a parallel web and DVD based knowledge games on fruit, vegetable, water, physical activity and physical inactivity
Barnes 2021	zBMI medium; BMI medium	This study arm received the SWAP IT nutrition and PACE physical activity interventions combined. SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and learning resources).
Beech 2003	BMI short	The active interventions involved highly interactive weekly group sessions with either girls (child-targeted program) or parents/caregivers (parent-targeted program). Content focused on knowledge and behavior change skills to promote healthy eating and increased physical activity. 1. Child-targeted intervention ''GEMS Jamboree': girls participated in weekly, 90- minute intervention sessions for 12 weeks including ''Movin' It'' (physical activity component) and ''Munchin' It'' (nutrition component). Each weekly session concluded with a ''Taking It	Attention control	Girls participated in arts and crafts, ''friendship-building''/social support type activities (''trust games''), and enjoyable games. Nutrition and physical activity were not addressed in this condition.

		Home'' segment in which the concepts of the day were reviewed, incentives (small gifts) were given, and motivation for healthy eating and the maintenance of physical activity was provided. 2. Eating and Activity Skills for Youth (EASY) was conducted in a 12-week, 90-minute session format that included: a physical activity component of dancing (EASY Moves); a didactic nutrition segment (EASY Tips); and a segment alternating food preparation and nutrition- related games (EASY Fun). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Bohnert 2013	zBMI short	30-week curriculum that includes 10 three-week modules. Each module covered a different sport, health, and leadership topic and was age-appropriate for early adolescents. Each session is led by trained coaches, is approximately 90 min in length, and is divided into two areas of focus: 50% covers physical instruction and energetic activity through traditional and non-traditional sports and fitness activities (e.g., rhythm and movement, soccer, flag football, volleyball, tennis, basketball, lacrosse, softball, golf, track and filed) and 50% addresses age-appropriate health education, nutrition education, and leadership and life skills topics. (GIG) focuses on enhancing girls' health literacy, empowering the girls to believe that they can make healthy choices as well as promoting self-control around health and life choices. A "girl of the day award" is given to the girl who worked the hardest at each session, along with a small prize. A healthy snack or meal is also provided at every session, along with take-home materials for families to reinforce program messages. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	No specific interventions were conducted with participants in the control condition other than participating in the health festivals.
Brandstetter 2012	BMI long	URMEL-ICE focused on health-promoting behaviour change in three areas: drinking sugar-sweetened beverages, spending time with screen media and being physically active. Main issues were the following: drinking water instead of soft drinks, discovering 'hidden' sugar in drinks, encouraging everyday physical activities, engaging in leisure activities without TV, learning about local sport and leisure facilities. The URMEL-ICE-intervention consists of material for 1 school year including 29 teaching units (each 30–60 min), 2 short blocks of physical activity exercises a day (each 5–7 min), 6 family homework lessons (tasks that cannot be accomplished by the child himself without the help of a parent) and materials for the training and information of the parents. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	NR
Brown 2013				

	zBMI short; BMI short; Percentile short	Modification the original Diabetes Prevention Program (DPP) for Native youth included adding cultural components, addressing youth's knowledge of, and access to, healthy food, including hands-on interactive learning activities and using a group format to deliver the intervention. Cultural aspects were incorporated throughout the program and included emphasis on traditional activities, use of storytelling and native language to convey information, and participation of elders. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Attention control	Youth drug and alcohol prevention program
Caballero 2003	BMI long	The Pathways Study intervention consisted of 4 components; classroom curriculum: culturally appropriate school-based lessons that promote healthful eating behaviors and increased physical activity; food service: provided nutrient guidelines and practical tools for reducing the fat content of school meals; physical activity: increasing energy expenditure in the school environment by implementing a minimum of three 30-minute sessions per week of moderate to vigorous physical activity; family involvement: family action packs, including snack packs with samples of low-fat foods and tips for preparing healthful snacks at home and family events at schools, which included cooking demonstrations and activities for healthier lifestyle, with the direct involvement of children. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	NR
Cao 2015	zBMI medium; zBMI long	The FIS-based comprehensive intervention model combined models of family- and school-based interventions and had three aspects: health knowledge, dietary behavior, and exercise behavior. Children received 6-hour health education course per semester, dietary intervention (eating speed control, advice on healthy eating), and exercise intervention (20-meter music shuttle run, 2-3 times/week; > 1-hour PA at school) at school; parents received health education, dietary intervention and exercise intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	NR
Chen 2010	BMI short	Children participated in a 45-min session once each week for 8 weeks, and parents participated in two sessions that lasted 2 h each session during these 8 weeks. In each session, children engaged in lessons related to nutrition, physical activity and critical thinking. An interactive dietary preparation software program tailored to common Chinese foods that was developed by Joslin Diabetes Center Asian American Diabetes Initiative was used for this study. Children received a food diary to record their food intake, books related to healthy eating and a packet of materials in both Chinese and English each week explaining the activities that highlight healthy eating and active	Non-active intervention	After completing the final follow-up assessment, this group received the ABC study intervention.

		lifestyles. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Choo 2020	zBMI short	Multi-level intervention strategies: child-level educational strategies, parent-level strategies, and center-level organizational strategies for obesity prevention among vulnerable children. The child-level intervention consisted of behavioral strategies based on the cognitive learning theory such as goal setting, self-monitoring, reinforcement, problem-solving, and experiential learning activity strategies (e.g., cooking, taste, and exercise classes). The healthy activity sessions consisted of weekly exercise directed by physical education graduates. The parent-level intervention consisted of parenting strategies aimed at promoting positive parenting styles and general/obesity-specific parenting practices and building behavioral modification skills of goal setting, self-monitoring, and reinforcement, and fostering a supportive family environment. It involved one session of group teaching, two home visits, three telephone counselling sessions, and 12 weekly text messages. The center-level intervention consisted of organizational strategies such as partnership building, curriculum development, center staff education, and center policy changes. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group received usual care being provided in the community child center program.
Crespo 2012	zBMI medium; zBMI long; Percentile medium; Percentile long	Multi-arm study Home/family environment intervention included discussions focused on increasing fruit, vegetable, and water consumption, increasing active play and decreasing sugar-sweetened beverages and TV viewing. School/community environment interventions designed to alter physical structures (e.g., playgrounds and salad bars), social structures and policies (e.g., teachers' discipline and classroom practices and public park maintenance), availability of protective or harmful products (e.g., physical education equipment and healthy children's menus in restaurants), and culturally-appropriate media messages (e.g., posters, newsletters, and point-of-choice messages in grocery stores). One group received a combination of the home/family environment and school/community environment interventions. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Participants in the control condition were asked to maintain their regular lifestyles and to attend the yearly scheduled measurements
De Heer 2011	BMI short; Percentile	A culturally tailored health education and physical activity after-school program with modules on healthy	Non-active intervention	Members of the control and spillover groups received fourth-grade health

	short	eating, exercise, diabetes, and self-esteem. Each session took place in the schoolyard or in the multipurpose room and comprised a 20- to 30-minute health education component followed by 45 to 60 minutes of physical activity. The physical activity component of the after-school program had four main objectives: 1. Involvement of students in at least 30 min of daily physical activity; 2. Involvement of students in MVPA for at least 40% of daily physical activity time; 3. Providing students with many opportunities to participate and practice skills in physical activities that could be carried over into other times of the day and maintained later in life; 4. Providing students with a variety of enjoyable physical activities. The health education curriculum consisted of a 12-16 lessons plan incorporating health modules, such as 'eating fruits and vegetables,' 'reading food labels' and 'what is diabetes.' Every child received a colourful bilingual health education workbook covering these modules. Each health education lesson was structured with two parts: the first part consisted of one or a few pages of explanations of a new concept, followed by an exercise such as a puzzle where children had to use the knowledge they just gained to complete the exercise. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no		workbooks and incentives at pretest and follow-up measurements, but they did not attend the after-school sessions
Duncan 2019	BMI short	Healthy Homework was an eight-week curriculum-based homework schedule, complemented by an in-class teaching resource, designed to promote physical activity and healthy eating in children. The research team provided professional learning for the teachers of the three intervention classes at each intervention school. At the start of the intervention, all children in participating classes received a homework booklet organised into weekly topics that each contained one physical activity and one nutrition component (e.g., walking and fruit/vegetables, screen time and breakfast, fitness and cooking). The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Schools assigned to the control group were offered the intervention (including all resources) following the final assessment period
Elder 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	The family intervention was tailored to the family's needs to target physical and social aspects of the home environment, including setting household rules. It included a telephone survey, group workshops at the recreation center, and home visits. For families with children in the normal weight range, the intervention focused on maintaining healthy eating and physical activity habits. The recreation center intervention emphasized making changes in the quantity and quality of physical activity and healthy food and beverage offerings within the centers and targeted center policies, programs, and facilities. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no	Non-active intervention	Families and recreation centers assigned to the control condition completed measures on the same schedule as those in the intervention conditions

		– change the social environment of the child: yes – change the physical environment of the child: yes		
Fairclough 2013	zBMI short; BMI short	The CHANGE! curriculum consisted of 20 weekly lesson plans worksheets, homework tasks, lesson resources, and a CD-ROM. The lessons were of 60 minutes duration and provided an opportunity for children to discuss, explore, and understand the meaning and practicalities of PA and nutrition as key elements of healthy lifestyles. The homework tasks supplemented the classroom work and targeted family involvement in food and PA related tasks. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Comparison schools received normal instruction. This did not involve a specific unit of PSHE focused on healthy eating and PA, but concepts related to these areas may have been touched on informally during other lessons (e.g., science, food technology, physical education, etc.)
Foster 2008	zBMI long; BMI long	The SNPI included the following components: school environment self-assessment on healthy eating and physical activity; 10 hours per year of training in nutrition education and nutrition and physical activity theme packets designed to integrate classroom lessons, cafeteria promotions, and parent outreach; nutrition policy to remove the sale of soda and other drinks, chips and snacks from vending machines and cafeteria of schools with full-service kitchens; social marketing to increase meal participation and consumption of healthy snack and beverage items; parent outreach to encourage parents and students, on the way to and from school, to purchase healthy snacks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	NR
Fulkerson 2022	zBMI medium	Participants randomized to the intervention condition received the NU-HOME family intervention program that included group sessions with other families focused on nutrition education, cooking skills, and physical activity. The intervention program also included individual goal setting phone calls with parents and online, complementary materials. The NU-HOME family intervention program consisted of seven monthly group sessions, individual goal setting calls and online materials to support the sessions. The intervention focuses on promoting healthful family meals where parents and children cook and eat together, healthful home food and physical activity environments, and being active together as a family. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Participants randomized to the delayed intervention condition did not receive any educational materials or training until after the final data collection. Once all data collection was completed, they received a shortened version of the NU-HOME intervention program that was offered to the intervention families
Gentile 2009	BMI short; BMI medium	The Switch program promoted healthy active lifestyles by encouraging students to 'Switch what you Do, Chew, and View'. The specific DO, VIEW, and CHEW goals were to be active for 60 minutes or more per day, to limit total screen time to 2 hours or fewer per day, and to eat five fruits/vegetables or more per day. The intervention utilized overlapping behavioral and environmental strategies employed at multiple ecological levels.	Non-active intervention	Control schools did not receive any school materials. Control families were recruited similarly to experimental families, but received no materials other than the surveys

		The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Greve 2015	BMI long	The main focus of the HSN programme is to communicate information about the health status of the children involved (based on health measurements) via the school health committee and the HSN web-based platform. Intention is that measuring children should raise awareness on the state of health, and lead to health-improving behavioural change. Part of the health information provided through the HSN intervention is already provided by the school nurses. Schools measure height and weight irrespective of whether they participate in HSN. Intervention adds additional measurements of fitness ranking and vertical jump height. This provides information on measurements at grade and school level besides informing students about their own measurements, encourages teachers to use this and other health information in class and communicates knowledge on health and potential health promoting projects through the web based platform and the school health committees. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools were offered the opportunity of participating in the HSN programme from the school year 2011/12 onward
Griffin 2019	zBMI short	The HDHK-UK intervention comprised weekly 90 min sessions over nine consecutive weeks; four courses were delivered. Fathers and children attended all sessions, which followed the same structure: 15 min discussion and review of the weekly activities followed by 30 min, where children and fathers took part in an education session separately. The groups were facilitated by local, experienced and trained staff to ensure the sessions were interactive and discussion was encouraged. Fathers' sessions covered a range of lifestyle behaviours around the importance of physical activity, nutrition and parenting. Children were taught about healthy eating, physical activity and how to be a supportive family member by encouraging and modelling healthy lifestyle behaviours at home. The final 45 min of the session were spent doing physical activity within family groups. These practical sessions had three elements: 'rough and tumble' play; teaching children fundamental movement skills (catching, throwing and kicking); and aerobic fitness. Some adaptations to resources were made by study team as a result of qual research including reducing the number of PowerPoint slides, simplifying and anglicising wording and updating the guidance and stats to align to UK public health recommendations. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The control group received information about local opportunities for physical activity plus a voucher for the family to attend a leisure centre
Grydeland 2014	zBMI long; BMI long	The multilevel approach included collaboration with school principals and teachers, school-health services and parent committees. Multiple intervention efforts	Non-active intervention	NR

			were orchestrated to promote a healthy diet and to increase awareness of healthy choices, to increase participants' physical activity during school hours and leisure time, and to reduce screen-time. The teachers were responsible for holding one structured lecture on energy balance for the students (lessons with student booklet), initiating a 10 minute physical activity break during class at least once a week, having fruit and vegetable (FV) breaks, hanging up key messages posters in the classrooms, carrying out active commuting campaigns, handing out fact sheets to parents once a month (including student-parent tasks in 7th grade), and implementing a computer tailored program for the students. The intervention schools received an "Activity box" with sports equipment and toys (such as a variety of balls, hockey-sticks, jump ropes, elastic bands, Frisbees, etc.) to promote physical activity during recess. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Habib-Mourad 2014	BMI short	The intervention specifically targeted obesity-related behaviours in 9–11-year-olds including: increasing consumption of fruits and vegetables, favouring healthy over high energy dense snacks and drinks, increasing the habit of having breakfast daily, increasing moderate-to-vigorous physical activity (MVPA), and decreasing overall sedentary behaviour. The intervention was comprised of 3 coordinated components: 1) 12 culturally appropriate classroom sessions using fun and interactive activities; 2) a family programme consisting of meetings, health fairs and packets sent home along with some food samples and recipes; 3) a food service intervention targeted the school shops and the lunch boxes sent by the family. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Students in the control schools received their usual curriculum during the intervention period
Habib-Mourad 2020	zBMI long	Twelve nutrition education interactive activities were delivered in the classroom during the first academic year and six complementary activities were delivered during the second academic year. The first component consisted of culturally appropriate classroom sessions using fun and interactive activities delivered once a week by teachers. The intervention sessions provided appropriate nutrition education in a simple and fun layout. Each session consisted of two sections; discussion, information and interaction about the topic of the week followed by activity: game and/or food preparation. Take-home packets summarizing the major points covered during the educational sessions were also sent home along with some food samples and recipes. The goal of the take home pamphlets was to address non-compliance and poor attendance of parents' school meetings. The third component included a food service intervention targeting the school shops and the lunch boxes sent by the family. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to	Non-active intervention	Students in the control schools did not receive any intervention through the entire three-year study period. After completion of the study, students in the control schools were offered the opportunity to receive the intervention

		– modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Haire-Joshu 2010	zBMI short	Intervention families received the standard tutoring program plus the intervention. The curriculum was developed to focus on content designed to enhance knowledge of dietary and activity guidelines, identify common and accessible activities, and low cost and accessible fruits and vegetables. Each module was packaged to contain all program materials including an individual visit lesson plan, a storybook, and a parent action newsletter. Child tailored storybooks: Eight computer tailored storybooks were developed that comprised an adventure series including colourful graphics and engaging characters (e.g., talking animals) as well as preferred repetitive phrasing of the storyline motto (e.g. "Play for an hour a day!") and an interactive word game. To create these computer tailored storybooks, children first completed a brief five-minute assessment to gather individual data on baseline knowledge, self-efficacy, dietary intake, activity level, current interests and preferred activities related to the theoretical constructs. Each child's data were matched with the specific messages and graphics that best reflected that child's needs. These elements were then exported into storybook templates creating the eight computer tailored storybooks for each child. Since the storybook was developed for that specific child, the content varied. However, all storybooks included: (1) discussion of positive patterns and ways of changing negative patterns, (2) specific action steps for the child to take to change or maintain behaviors, (3) suggestions for how the child can talk to his or her parents about possible strategies or solutions. All storybooks were created, printed and bound in-house. Children received the storybook in each session and were encouraged to take the book home to their parents. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control children received the standard tutoring program which consisted of routine one-hour visits with the child
HEALTHY Study Group 2010	zBMI long	The intervention consisted of four integrated components: nutrition, physical activity, behavioral knowledge and skills, and communications and social marketing. The nutrition component targeted the quantity and nutritional quality of foods and beverages that were served throughout the school environment. The physical-education component was designed to increase the amount of time students spent in moderate-to-vigorous physical activity. Behavioral knowledge and skills were communicated with the use of a classroom-based program, FLASH (Fun Learning Activities for Student Health). Communication strategies and social marketing integrated and supported the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Control school study activities emphasized recruitment and data collection. No 'placebo' intervention was delivered. Activities and efforts to retain the involvement of control schools and students throughout the trial were implemented. At the end of the study, control schools were given a set of intervention materials (excluding equipment and training sessions)
Hendy 2011	Percentile short	The intervention group (called the 'LIONS'') received stars punched into their name tags for each of three ''Good Health Behaviors'' that included eating 1/8 cup of fruit or vegetables (''the size of a ping pong ball'') first during their meal, choosing a low-fat and low sugar healthy drink, and having 5000 exercise steps recorded	Non-active intervention	The control group (called the ''TIGERS'') received stars punched into their nametags for each of three ''Good Citizenship Behaviors'' that included talking quietly during meals, keeping their meal area

			on their pedometers. Children could earn extra stars if their parents reported their behaviors during five dinner meals at home (with one star given for each dinner and for each mealtime behavior reported). Reward Days were offered each week so children could trade 10 stars for one small prize (pens, fancy pencils, notebooks, modelling clay, puzzles, banks, toy gliders, stickers, water bottles, playing cards, jump ropes, stuffed animals, balls, silly hats, etc.). A large table was set up in the corner of the lunchroom with large plastic bins containing a selection of five or six prizes. During the last 10 min of the lunch period for each grade, children were called by classroom to line up along the edge of the lunchroom to approach the table and trade their 10 stars for a prize of their choice. Children were given new nametags each week, but allowed to keep leftover stars toward the next week's Reward Day. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no		clean, and respecting others by not touching them or their things
Hopper 2005	BMI short	The program group received a health-related fitness school-based program and a home program that required parents and children to complete activities and earn points for nutrition and exercise activities. Physical education instruction for three 30-min lessons per week emphasized the physical activity and fitness objectives specified in Healthy People 2000 (1993). The specific lessons were taken from the curriculum guide by Hopper, Munoz, and Fisher (1997). Lessons included a variety of cooperative activities and games with 20 min of aerobic activity in each. Children received suggestions on how to participate in such activities as walking and bicycling with parents. Nutrition education occurred in the classroom and was scheduled as part of the curriculum for two 30-min lessons per week. Classes emphasized the impact of nutrition on heart health, reading labels, and other consumer tips. The classroom teacher taught the format and included hands-on activities, games, group discussion, and role-playing designed to encourage the use of healthy foods. Food choices were designated as "everyday" (low in fat and cholesterol, high in fiber) and "sometimes" (typically higher in fat) foods, thus, attempting to remove guilt and promote healthy eating habits. Children were also taught how to discuss nutritional topics at home with their parents and how to improve eating habits within the family. The intervention included a home program that requested parents and children to complete activities and earn points for exercise and nutrition activities. The school-based lessons paralleled the information taken home, and children were encouraged to share the knowledge learned in class with their parents. The family teams received weekly points for completing exercise and nutrition activities. Parents and children earned physical activity points, one point per minute of activity, in self-selected physical exercise/activity. A goal of 100 points per week was the target for each family fitness team. Children and parents received points for their individual exercise, but 50 of the 100-point weekly goal was designated for parents and children participating together in selected physical activities. Nutrition activities included using heart-healthy recipes, setting nutritional goals, and distinguishing between every day and sometimes foods. Each student and participating family members received a t-shirt after completing the pre-test session, and children were rewarded with stickers every time they returned their scorecard on Mondays. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no	Non-active intervention	Children received no additional instruction in nutrition and physical education beyond that provided in their regular school curriculum

		The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Hull 2018	zBMI short; zBMI long; BMI short; BMI long	Familias Saludables Activas aimed to increase physical activity, decrease sedentary behaviour and improve healthy eating behaviours through parental modeling and experiential learning for children. Trained lay community health promoters (CHPs) implemented the intervention in a Hispanic community centre over 12 months. The intensive 4-month phase, consisted of eight 90-min bi-weekly group sessions, was attended by parents and their children. During the 8-month reinforcement phase, families were mailed a bi-monthly newsletter reinforcing intervention content. In the alternating months, CHPs called parents to discuss goal-setting progress, motivate, give social support and answer questions. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The families randomized to the control arm receive an alternative intervention called Familias Saludables Sonrientes, or Smiling Healthy Families, focused on oral health that does not overlap with the content areas of the weight gain prevention intervention. The oral health intervention is structured in a parallel fashion to the obesity prevention intervention, as a family-based intervention implemented by trained lay CHPs in a community setting over a 12-month period
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Attention control	For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial
Jansen 2011	BMI short	Multicomponent intervention delivered by teachers and integrated into curriculum that focuses on the promotion of healthy eating and active living. The intervention targets individual behaviours as well as school policies and curriculum and is based on the theory of planned behaviour and the ecological model of Egger and Swinburn. The Rotterdam Daily Exercise Project consist of an intensified school sports curriculum by a professional teacher, during and after school hours, education of parents with respect to healthy nutrition and exercise, education of children with respect to healthy nutrition and exercise, as well as promoting sport facilities in the neighbourhood. The intervention includes a home activity: yes	Non-active intervention	Control schools continued with their usual curriculum. The usual curriculum of primary schools in the Netherlands consists of two PE sessions a week by the classroom teacher or a PE teacher, dependent on the school' s policy

		The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Kain 2014	zBMI medium; BMI medium	The intervention included classroom nutrition education, increasing physical education (PE) class time, and increasing time children were moderately active during those classes. Teachers from kindergarten-3rd grade were trained on the correct application of the contents of a special booklet that includes 8 sessions of 90 min each on health eating for the children. and on the use of a book containing a leaflet for each class which includes drawings of different exercises recommended to increase MVA. Kiosk owners were trained on how to gradually offer 80% of healthy foods. During one regular school meeting, the study nutritionist briefly explained parents in every class the objectives of the program and specifically the types and combination of snacks considered to be "healthy. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	NR
Keller 2009	zBMI medium	The paediatrician carried out a low-threshold intervention that consisted of an age-adapted nutrition and exercise programme to inspire the awareness of the adequate nourishment and motion. this included 3-monthly measurement of height and weight by paediatrician and consultation about aims to change lifestyle (diet and exercise) and progress to targets based on results of questionnaire (PA) and food diaries; 3 food diaries over period of 12 months, each for 5 days including 1 weekend. Dietician passed recommendations for dietary change (based on food diaries) to paediatrician for consultation with family and child. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The subjects of the control group received neither information after an intervention
Kipping 2008	BMI short	The intervention schools were provided with the teacher training and teaching materials for nine physical activity lessons, six nutrition lessons and one lesson about screen viewing. In the physical activity lessons, the children played games based on the food groups using photographs of food that reinforced the theory taught in the nutrition lessons. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control schools were provided with the teacher training and teaching material after the completion of the study
Kipping 2014	zBMI short; zBMI long	The intervention schools were provided with the teacher training and teaching materials for nine physical activity lessons, six nutrition lessons and one	Non-active intervention	Schools randomised to the control group continued standard education provision for the school year, and

		lesson about screen viewing; 10 parental-child interaction homework activities; information in the school newsletters about the importance of increasing physical activity, reducing sedentary behaviour and improving diet; written information for parents on how to encourage their children to eat healthily and be active. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		any involvement in additional health promoting activities, but had no access to the intervention teacher training and no known access to the teaching materials, which have not been published and were not made available by the research team beyond the intervention schools.
Klesges 2010	BMI medium; BMI long	The obesity prevention intervention provided practical experience with nutrition and physical activity. Girls and caregivers participated in the obesity prevention intervention through a combination of separate and joint sessions. Participants met weekly in small groups of typically 8 to 15 girls. Meetings were held at the community centers on weekday evenings. Sessions lasted approximately 90 min, and parents/caregivers attended with the girls. During the second year of the program the intervention transitioned to monthly field trips (e.g., tour of a grocery store, visit to the Civil Rights Museum) to provide an interactive learning experience in keeping with intervention goals. Field-trip sessions were designed to incorporate the nutritional and physical activity information from the first year into real-life scenarios. Behavioral goals for the girls included eating a nutritionally balanced diet, reducing consumption of high-fat foods and sugar-sweetened beverages, and increasing intake of fruits, vegetables, and water. Behavioral goals for increased moderate-to-vigorous physical activity and decreased sedentary behavior were also included. Behavioral strategies included skill building (e.g., teaching dance steps, healthy snack preparation), self-monitoring, feedback and positive reinforcement, goal-setting, problem-solving and social support. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The alternative intervention targeted the girls only and was designed to provide meaningful benefits with the goal of improving self-esteem and social efficacy. There was no focus on changing behaviors at home or activities related to diet, physical activity or body weight
Kobel 2017	BMI medium; Percentile medium	The intervention combines elements from behavioral prevention and situational prevention. The three main goals of the intervention are to increase physical activity, to decrease the consumption of sugar-sweetened beverages, and to decrease time spent with screen media. The ready to use materials the teachers are given include one lesson per week (on physical activity, diet or screen media use) and daily exercise breaks of 10–15 min. The main focus lies on the promotion of healthy and active alternatives, which children are offered to choose in order to lead a healthier lifestyle. In order to enable children to carry home the learnt information, parents' nights, regular parents' letters and so-called family homework are provided; the latter require joint efforts of parents and child to solve the given exercises. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The teachers in the schools of the control group continued to teach as normal and were obliged to wait one year before they could take part in the vocational training

Kocken 2016	zBMI short; zBMI long	The intervention EF! comprised a variety of theory and practical lessons on nutrition and physical activity to provide an attractive program for the children. The intervention was focused on the main behavioral changes: decreasing consumption of high-energy or high-fat foods and sugar-sweetened drinks; promoting a healthy breakfast; increasing consumption of fruits and vegetables; reducing television viewing and computer gaming/browsing; and increasing physical activities at school and outside school hours. These activities were especially designed to increase knowledge and awareness of the children, to get them involved and excited, and to involve parents and teachers in the process. The program consisted of seven lessons in the first school year and nine in the second year. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools followed their regular school program
Kubik 2021	zBMI medium; zBMI long; BMI medium; BMI long	The intervention targeted weight-related behaviors and lifestyle practices likely to prevent excess weight gain and unlikely to cause harm. The program included 14 kid group and 5 parent group sessions that were held after school at a central school location and 4 home visits, totalling 32.5 contact hours. The 90-minute kid group sessions were held once or twice a month and focused on behavioral messages presented by characters from the SNAPSHOT comics, a series of 14 comics, each with a targeted message about a healthy lifestyle practice were developed and provide the 'theme' for each kid group. The comics are colourful and engaging, with behavioral messages conveyed in simple rhymes 'spoken' by the SNAPSHOT comic characters, Nurse Karen Aboutkids, Trudy Foody and the Phyz, and comic villains such as Lord Bored (sedentary behavior), Sweatie Cheatie (sugary drinks), and the More Monsters (portion size). Each group session included a snack break with food preparation by the child, hands-on activities, games, and goal setting linked to the behavioral message and 30 minutes of physical activity. The 90-minute parent group sessions, held approximately every other month, began with a light easy-to-reproduce dinner prepared by the school nurse interventionist, followed by a check-in to share successes and challenges, hands-on activities with behavioral messages consistent with kid group themes, and 30 minutes of physical activity. A 60-minute home visit was scheduled quarterly and focused on tailored support for the child and parent, guided by child and family goals for behavior change. This included an icebreaker game; questions and review of the SNAPSHOT program content; a card-sort game that allows the child with parent assist to identify dietary and activity behaviors that are important to the child and a focus for behavior change, and a family goal setting activity led by child with parent assist. For the school-based components, a study-funded afterschool bus transported children from their school to the intervention site. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The control group received monthly newsletter with family-oriented healthy lifestyle information
Levy 2012	zBMI short	The strategy "Nutrition on the Go" consisted of 4 components: 1. A gradual decrease of the energy content of school breakfasts by reducing the fat content in milk, not increasing carbohydrates,	Non-active intervention	NR

		decreasing the sugar content of the cereals provided and including fruit. 2. The gradual regulation of food offered within the school, through the technical council of the State of Mexico. 3. Gradual adherence to the physical activity program, according to the requirements of the Ministry of Public Education (SEP, Spanish acronym). 4. Implementation of an educational campaign, called “Healthy Break,” for healthy eating and physical activity. The educational materials produced for the “Nutrition on the Go” strategy for healthy eating and physical activity included: student booklets and a facilitator’s guide; a school guide; a calendar for parents, as well as videos (or printed handouts for schools with no DVD players) and audio spots. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child’s behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Li 2019	zBMI medium	The intervention programme included 4 school- and family-based components targeting children, main carers, school physical activity and food provision to encourage physical activity and healthy eating behaviours in children both within and outside of school. Component 1: interactive learning workshops with coordinated family-wide healthy behaviour challenges. Component 2: setting improvement goals and providing supportive evaluation and feedback for school lunch provision. Component 3: promoting physically active games and activities involving both children and their parents. Component 4: improving the implementation of the Chinese national requirement for ‘One-Hour Physical Activity on Campus Every School Day. School principals and class teachers were provided with a programme handbook that explained all intervention activities and the support for intervention delivery that was required from the school staff. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child’s behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Schools assigned to the control arm continued with their usual provision during the full trial period with no access to any of the CHIRPY DRAGON intervention activities and resources.
Lichtenstein 2011	zBMI medium; zBMI long	Nutrition module and physical activity for children, and evening coaching sessions for parents. Materials used included colouring pads, food or the like. The contents of the children's modules were laid down in manuals that were given to all schools. The child nutrition units were worked out on the basis of the About Milk Pirates and Limo Kings file. Sports teachers received a folder with thematically structured suggestions for z. B. Exercises with roller boards etc. and for different settings such as sports field, playground or similar. The content of the movement units was flexible. The teaching units were: games with roller boards, playing with the swing cloth, when eating learns to walk, running and catching, wrestling and fighting, adventure worlds, relaxation. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child’s behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	No intervention

Liu 2019	zBMI short; zBMI medium; BMI short; BMI medium	School-level policies. Throughout the intervention period, students were told not to drink sugar-sweetened beverage or eat unhealthy snacks in schools and drinking water was advocated. They were also told not to play electronic products (e.g., smart phones and tablet computers) in schools. Children were encouraged to perform at least 60 minutes of moderate to vigorous physical activity (MVPA) each day. Health education activities. Delivery personnel (class teachers) of health education activities had been trained by study team members. Emphasis was put on participatory teaching method (i.e., case discussions, brainstorming, practices, scenario analyses, game playing, and singing songs) and interaction between teachers and students. A total of four health education lessons were delivered to children in the first semester, with one 40-min lesson delivered once every 2 weeks. Students were asked to keep diaries of behaviors in relationship to diet and physical activity for a week (from Monday to Sunday) once a month. Improvement of physical activity. Schools were required to provide at least three 45-minute physical education (PE) classes per week, with at least 30-minute MVPA in each class. We also provided students with small sports equipment to support the various extracurricular activities that children were interested in (e.g., rope jumping and shuttlecock kicking). In addition, students were encouraged to perform exercise at home and instruction manuals were distributed to them, which provided suggestions on types of activities they could engage in. Moreover, the extracurricular activities for children who were overweight/obese were encouraged by their parents, after the head teacher told their parents that the sport club was offered. PE teachers organized the club at weekdays, which consisted of 30-minute activities at moderate to vigorous intensity. Improvement of school lunches. Trained investigators then assessed the recipes of school lunches and provided practical suggestions to the managers of school lunch to improve children's dietary intake at school. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Schools in the control group continued usual practice without involvement in any intervention during the 12 months' follow-up
Liu 2022	zBMI short; zBMI medium; BMI short; BMI medium	DECIDE intervention included 3 components targeting children to promote a healthy diet and physical activity (health education on better diet, less sedentary time and more physical activity, reinforcement of physical activity, and BMI monitoring and feedback) and 2 components targeting the children's environment by engaging schools and families. School implemented of several school policies and ensured curriculum time for health education and physical education at school); and families to support children's behavioral changes). The intervention strengthened family involvement with the assistance of a smartphone app. The parents received 5 core messages through 3 face-to-face health education sessions and were encouraged to promote healthy diet and physical activity for their children outside school. Parents were trained to encourage their children to make behavioral changes. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention	The 12 control schools continued with their usual health education lessons and physical education sessions, but they did not focus on obesity

		– change the social environment of the child: yes – change the physical environment of the child: no		
Llargues 2012	BMI long	The intervention consisted of the promotion of healthy eating habits and physical activity. The educational methodology IVAC, based on the principle that the school children are actors able to operate over their environment, was used. The children investigate and reflect on how the environment determines their health and lifestyle, while the teacher assists them in developing skills to change these conditions. This educational method allows the inclusion of activities related to healthy food habits and physical activity in any subject of the curriculum. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	NR
Lloyd 2018	zBMI long; BMI long	HeLP intervention included dynamic and interactive activities (e.g. physical activity workshops, education sessions delivered by teachers with short homework tasks, drama sessions), and setting goals to modify behaviour (with parental support and one-to-one discussions with HeLP coordinators). HeLP consisted of four phases, which were ordered to enable and support behaviour change by targeting school and family environments and giving children the strategies and motivation to improve their snacking and activity-related behaviours. The programme delivered a general healthy lifestyle message with a focus on behaviours such as the consumption of sugar-sweetened beverages, healthy and unhealthy snacking, physical activity, and reducing screen time. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Schools assigned to the control group continued standard education provision throughout their participation in the trial and had no access to any of the HeLP resources and scripts, which have not been published and were not made available by the research team beyond the intervention schools.
Magnusson 2012	BMI long	The intervention primarily focused on increasing physical activity during school hours and promoting healthy dietary habits, both at school and at home. It was a teacher-led daily implementation of various intervention tactics, which were introduced and discussed during bimonthly meetings led by the research team. The PA intervention was progressive in nature, starting with approximately 30 minutes a day at the start of the study and increasing to approximately 60 minutes a day in the latter intervention year, where teachers who implemented the intervention used various strategies to better integrate PA into the daily routine at school. The teachers at the intervention schools were provided access to physical activity equipment intended to be used during regular school lessons. This included a cart with different sized foam, plastic and rubber balls, different coloured vests, and cones. Teaching materials promoting physical activity, such as books and DVDs on classroom workouts and cooperative activity games etcetera were also provided. The main focus of the dietary intervention was on increasing fruit and vegetable intake, with both educational material and homework assignments. Food-based dietary guidelines on fish, fish liver oil and milk intake were also in focus, and parents, teachers, and school food service staff were involved in the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention	The teachers in the control schools knew that they were a part of an intervention study but were in no contact with the research team except during the measurement periods.

		The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Marcus 2009	zBMI long	The teachers were instructed to encourage the children to increase the intake of vegetables during the school lunch, low fat dairy products and whole grain bread were promoted, and all sweets and sweetened drinks were eliminated in intervention schools. Physical activity was aimed to increase by 30 minutes per day during school time and sedentary behaviour restricted during after school care time. A STOPP newsletter was distributed to parents and school staff twice annually aimed to increase the awareness of the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group received no intervention and continued as usual
Morgan 2011	zBMI short	The 3-month HDHK program involved fathers attending eight face-to-face group sessions (75 min each). Five group sessions were for fathers only, three of the group sessions were practical and involved both fathers and children participating together. The program aims were to help fathers achieve their weight loss goals, become healthy role models and promote healthy behavior in their children. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The wait-list control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions.
Morgan 2014	zBMI short; BMI short	The 3-month HDHK program involved fathers attending eight face-to-face group sessions (75 min each). Five group sessions were for fathers only, three of the group sessions were practical and involved both fathers and children participating together. The program aims were to help fathers achieve their weight loss goals, become healthy role models and promote healthy behavior in their children. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The wait-list control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions.
NCT02067728 2014	zBMI short	Family nutrition physical activity tool implement during well-child visits within the practice comprising of two components: 1) assessment to screens for obesigenic behaviors. 2) Brief Action Planning conversation designed to assist the family develop a health behavior change goal based on obesigenic risks on the assessment tool. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no	Non-active intervention	The control group received usual care during the well-child visits

		– provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Nemet 2011a	BMI medium; Percentile medium	Nutritional intervention: the intervention consisted of topics such as food groups, vitamins, healthy food choices, food preparation and cooking methods, and information on fast-food versus home cooking. The topics were taught through short lectures/talks, games, and story reading. Topics, such as the contents of popular Israeli foods, fruits and vegetables, calcium and its importance, special dietary consideration during holidays, and dealing with food excess during celebrations, vacations, restaurants, etc. were also covered. All topics were delivered by the preschool teachers and made appropriate to the cognitive and social development levels of kindergarten children. In addition, monthly flyers detailing nutritional information were sent home via the children. Children were asked to present the nutritional information to their parents, and parents were asked to discuss the information with their children. Physical activity program: children participated in a 45-min (divided to three 15-min sessions) per day exercise training (6 days/week). Once a week, the training was directed by a professional youth coach. During the rest of the week similar physical activity sessions were coordinated by the preschool teacher and/or her assistant, as instructed during the seminars. The physical activity sessions were performed indoors and/or outdoors. The activities varied in duration and intensity and were designed primarily as games to encourage enthusiasm and participation of the children. Endurance type activities accounted for most of the time spent in training (about 20 % team sports, such as soccer or dodge ball and 80 % running games, such as tag, hide and seek, relays, etc.), with attention also given to coordination and flexibility skills. Children were encouraged by the study staff to increase their habitual after-school physical activity and to reduce sedentary activities (e.g., television viewing, video games). Preschool teachers were also given a CD collection of children songs, written by a famous Israeli children songwriter, related to the topic of nutrition and exercise. Parents and children were invited for two “ Health Festival ” days that focused on the major themes of the program (introduction of healthy nutrition, prevention of childhood obesity, and beneficial effects of exercise in children). The festivals included lectures given by the study team and games in which the children and parents played together. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child’s behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group received regular kindergarten schedule
Nemet 2011b	BMI medium; BMI long; Percentile medium; Percentile long	See Nemet 2011a	Non-active intervention	See Nemet 2011a
Nollen 2014	BMI short	Both conditions included three 4-week modules that targeted fruits/vegetables (FV; weeks 1–4), sugar-sweetened beverages (SSB; weeks 5–8), and screen time (weeks 9–12). The mobile technology (MT) intervention was delivered on aMyPal A626 handheld computer. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to	Attention control	Girls randomized to the control condition received manuals at weeks 1 (FV), 5 (SSB), and 9 (screen time). Manuals were comprised of screen shots from each respective module and were identical in content to MT.

		– modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no		
Nyberg 2015	zBMI short; zBMI medium	The programme was comprised of three components: Health information: a brochure was developed with the aim to increase parental knowledge on how to promote children's dietary and physical activity habits based on a literature review. Motivational interviewing: used to target and increase parental care and control and self-efficacy to provide support for healthy eating and physical activity to the child, as well as to stimulate willingness to change. Classroom activities component: targeted the children's knowledge, attitudes and preferences and the parents' role modelling for healthy behaviours. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control classes were offered the whole programme directly after the 6-months follow up measurements
Nyberg 2016	zBMI short; zBMI medium	See Nyberg 2015 The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	See Nyberg 2015
O'Connor 2020	zBMI short	Papa´s Saludables Nin˜os Saludables was culturally adapted from the Healthy Dads Healthy Kids program. Fathers were provided with the education and resources to successfully lose weight and learn about healthy nutrition, and fathers and children were encouraged to engage in fun PA together. This was achieved through the group sessions for fathers and children, and handbooks for fathers, mothers, and children, which were culturally adapted. The program included weekly 90-minute sessions over 10 weeks. The program was offered on Sunday afternoon, the time identified by the fathers they preferred due to busy work schedules, at the child's TCHP primary care pediatric clinic. Clinic classrooms and a designated area of the parking lot were used to deliver the program. Fathers and children attended all the sessions together, and mothers were invited to one session (week 4). Each meeting consisted of a brief introductory and review session with fathers and children, separate break-out discussions for fathers and children (Dad's Club and Kid's Club); and a joint PA component (Sports Club) for fathers and children. Each week covered different nutrition and physical activity topics for fathers and a corresponding session for children. The Sports Club included facilitator-led activities in rough and tumble play, fundamental sports skills, and fitness that encouraged fathers and children to take part in fun, active games together that they could also do at home. Each family was provided a set of culturally adapted game cards with a bag of sports equipment to encourage practicing sports skills at home. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The families in the waitlist control group received the full program after the post assessment of the full sample.

Pena 2021	zBMI short; BMI short	Gamification strategy consisting of four components: (1) Healthy Challenges of three types: Healthy Snacks Challenge, in which children collect points for bringing healthy snacks for school breaks; Steps Challenge, in which children are given an activity tracker; and Healthy Activity Challenge, in which children and their families collect points by uploading pictures of specific healthy activities defined by the research team; (2) gamification incentives, including the use of points, leader boards, and badges, to promote behavioral and structural change in the schools; (3) rewards, including a starting kit, activity reward, and structural reward for schools (e.g., climbing walls, improvements in sports infrastructure); and (4) an online platform, where children and parents could monitor the class and individual progress and receive nutritional education The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Students and parents in the control arm received access to the online platform used in the game (also available for participants in the intervention group).
Puder 2011	BMI medium	Multidimensional culturally tailored lifestyle intervention including a physical activity programme, lessons on nutrition, media use (use of television and computers), and sleep and adaptation of the built environment of the preschool class. Children participated in a physical activity programme consisting of four 45-minute sessions of physical activity a week. The sessions were prepared by an exercise physiologist and aimed to increase aerobic fitness and coordination skills; they were designed to be playful and organised into themes (such as "clown, spiderman"). The sessions took place in or around the preschool classroom and once a week in the gym. Additional sports equipment such as balls or skipping ropes was offered. Health promoters taught one physical activity sessions a week, which was reduced to twice a month after four months. The remaining sessions were provided by the regular preschool teacher. Additionally, there were 22 sessions on healthy nutrition, media use, and sleep. Positive and culturally independent nutritional messages were based on the five recommendations of the Swiss Society of Nutrition ("drink water," "eat fruit and vegetables," "eat regularly," "make clever choices," "turn your screen off when you eat"). Every other week children received a new funny physical activity or nutrition activity card to take home. These cards were based on the same themes and nutritional recommendations as the sessions and included specific exercises to be done at home. A CD with specific music for most physical activity cards was created to increase pleasure and define the minimal time the activity should be performed. In addition, healthy snacks during recess and healthy treats for anniversaries were promoted and preschool classes exclusively offered their children water and healthy food. In May 2009, a Ballabeina event was organised with games implementing the main messages of the intervention. Stickers that were pasted on a poster in the classroom showed how the programme was advancing. Parents participated in three interactive information and discussion evenings about promotion of physical activity, healthy food, limitation of TV use, and importance of sufficient sleep. The built environment in and around the preschool class was adapted to promote physical activity. Fixed and mobile equipment such as climbing walls, hammocks, balls, cords, or stilts were installed or provided in and around classrooms, including a "movement corner. Preschool classes were provided with a coloured poster of the "Ballabeina track" to be hung up on a classroom wall. According to the themes of the lessons and cards, stickers were added to allow children and parents to follow progress. Similarly, each class received a large "Ballabeina game" integrating all four lifestyle behaviours that were targeted during the	Non-active intervention	The control group received the regular school curriculum.

		intervention to provide a playful and constant recapitulation of the different parts of the intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Ramirez-Rivera 2021	zBMI short	Nutrition and physical activity were delivered by interns from University of Sonora. nutrition education: the program included 18 nutrition education sessions on 26 topics of nutrition and health; the intervention was delivered using a handbook and other didactic strategies such as videos, flannel boards, sketches, games, and workshops, in order to make the classes more entertaining and comprehensive. The program also includes the use of self-monitoring and positive reinforcement. Physical Activity: 20 physical activity classes composed of three parts (initial, core (greater effort) and final) to improve children's flexibility, cardiorespiratory fitness, balance, and coordination. Indirect Family Participation: Six information brochures were sent to parents. These included different nutrition and health topics, such as consequences of excess weight, difference between good and bad fats, importance of physical activity, healthy eating tips, and consequences of excessive consumption of ultra-processed foods. A booklet with ideas for preparing healthy snacks for their children was also sent home to parents. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The control group received only received general nutrition recommendations based on the 10 Tips to a Great Plate (Choose My Plate), in a single session of 1 h, at the end of the study. They continued with their usual classes.
Rerksuppaphol 2017	zBMI short; BMI short	The contents of the program consisted of personal data collection, anthropometric variables and the interpretation of nutritional status as normal, overweight or obese, information related to healthy nutrition, food habits and physical activity. Information presented over the internet included text and graphics. Information related to healthy nutrition such as daily amounts of each food group, portion and serving sizes was instructed to individual child based on their nutritional status. Participants were encouraged to have daily physical activity for at least 60 minutes per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Children in the control group were asked to measure weight and height by their teachers monthly and record the information in the report form.
Rosario 2012	zBMI short; BMI short	Teachers of the intervention group had 12 sessions and were encouraged to develop activities in class that focused on the learned topics; session 1: how to promote health and prevent disease, lifestyle determinants of health, obesity—definitions and descriptions of the problem, risk factors and health problems; session 2: key concepts in food and nutrition; sessions 3 and 4: dietary guidelines (the Portuguese Food Wheel), healthy eating advice for children, covering the five main food groups, and interventions to help children and their families to consume healthy	Non-active intervention	NR

		foods and plan well-balanced meals and snacks; session 5: teach children about the importance of water, and teaching strategies to replace consumption of sugar-sweetened beverages with water; sessions 6 and 7: appropriate physical activity levels and healthy eating behaviours such increasing fruit and vegetable intake and decreasing energy-dense micronutrient-poor foods; session 9: strategies to reduce screen exposure time; sessions 11 and 12; healthy cooking and strategies to get children and their families involved in healthy cooking. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no		
Rosenkranz 2010	zBMI short; BMI short; Percentile short	The intervention consisted of three main components: 1) An interactive educational curriculum delivered by troop leaders; 2) Troop meeting policies implemented by troop leaders; and 3) Badge assignments completed at home by Girl Scouts with parental assistance. The educational curriculum consisted of eight modules, delivered over the course of about four months. Each module consisted of a discussion of intervention target behaviors, worksheet for goal setting and self monitoring, physically active recreation session (e.g., walking, dancing, yoga, and active games), fruit and vegetable snack recipe preparation, family meals role-playing, clean-up period, and description of the take-home assignment. The modules were designed to require 60-90 minutes to deliver, with flexibility allowed for specified program activities and module order. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control troops completed usual troop meeting activities and received equal observation time, equal pretest and post-test assessment, and equal study scrutiny
Rush 2012	zBMI long	Each school programme is individualised to the school and is based on a needs assessment informed largely by the school's stock-take and individual key priorities identified by the specific school. Some activities are uniform across schools, e.g. the 'homeplay challenge', which aims to increase movement and water intake and reduce sedentary time in the home. Children in low-decile schools are provided with daily supplementary fruit and low-fat Calcium-enriched cow's milk. There was also a home–school link programme that provided opportunities for parents to attend three information-based sessions, which included a 45 min practical nutrition class. In addition to school children, the project offered assistance to teachers, parents and the local community. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Control schools were given no additional resources or information; however, no restrictions were placed on initiatives they may pursue for themselves.
Safdie 2013	BMI short; BMI medium; BMI long	The aim of the nutrition intervention component was to improve the prevailing food environment by increasing availability of healthy food and beverages (particularly water), by reducing the availability of energy-dense foods and sugar sweetened beverage and reducing the number of eating opportunities during the school day.	Non-active intervention	No changes were made to existing nutrition or physical activity practices in control schools.

		The aim of the PA intervention component was to enhance the prevailing physical activity environment by increasing the availability of physical activity resources, by improving infrastructure and enhancing aesthetics. The BASIC program focused on improving norms related to nutrition and physical activity at the schools and was limited to using existing school infrastructure and resources. The PLUS program implemented all the components incorporated in the basic program and included additional financial investment and human resources. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Sahota 2001	zBMI medium	The programme consisted of teacher training, modifications of school meals, and the development and implementation of school action plans designed to promote healthy eating and physical activity over one academic year. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention	The comparison schools continued with their usual health curriculum, without the intervention.
Sahota 2019	zBMI long	Whole school-based intervention to promote healthy nutrition and physical activity knowledge and behaviours: training of school staff in healthy lifestyles teaching and delivery of the PFP for pupils and their families; selection of on-line, interactive cross curricular healthy eating and physical activity lesson plans and a resource box comprising food models, food mats, food cards, DVDs, and books to facilitate teaching staff in programme delivery; increased sessions for physical activity. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control schools continued to deliver their existing curriculum and were offered £200 book vouchers (half at the end of year 1 and half at the end of year 2) as an incentive for their participation, as well as priority status to receive the PFP at the end of the study when the programme was to be offered to all primary schools in the area.
Santos 2014	zBMI medium	The program content focused on physical activity, promoting healthy foods, and having a healthy body image using the slogans: "Go Move!" (activity), "Go Fuel!" (nutrition), and "Go Feel Good!" (body image). Twenty-one lessons were provided to teachers to be delivered during the school year to older students. In schools randomized to the intervention, an older class was paired with a younger class. Each week, the older students received a 45-minute healthy living lesson from their classroom teacher. Later that week, the older students acted as peer mentors, teaching a 30-minute lesson to their younger "buddies." The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention	Waiting list control group received a regular curriculum

		– change the social environment of the child: yes – change the physical environment of the child: no		
Sekhavat 2014	zBMI medium; BMI medium	The counselling was conducted in a structured format for the parents of an intervention group and consisted of a 5-10 minute counselling session performed in a separate quiet area of the dental clinic. The counselling was encouraging an increase in the child's physical activity, a decrease in sugar-sweetened beverage consumption and a decrease in screen time. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	To ensure that both groups benefited equally from the study, the control group received counselling at the end of the study.
Sgambato 2019	BMI short	School- and home-based obesity prevention programme encouraging healthy eating habits and physical activity. Interventions at schools were based on educational games, group debates and culinary classes with focus on: (1) reducing the intake of cookies and sugar-sweetened beverages; (2) assembling colourful and tasty salads using vegetables and fruits through culinary classes; (3) encouraging water consumption; (4) increasing physical activity and reducing sedentary behaviour; (5) serving a healthy meal; and (6) reducing the dependence on processed food. Secondary prevention of obesity at home among adolescents with overweight and obesity: community health agents led activities that stimulated lifestyle changes at the family level. The goals were the same as those of the school intervention with emphasis on reducing soda and sugar-sweetened beverages, cookies, sweets and processed food, and increasing fresh food intake. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Participants in the control arm received only the routine activities for healthy behaviour of the school.
Sherwood 2019	zBMI medium; zBMI long; Percentile medium; Percentile long	The intervention include two components: (1) a brief pediatric primary care provider counselling during a scheduled annual well child visit followed by (2) phone coaching to support parents in making changes in the home environment to promote the targets of the treatment arm. The obesity prevention (OP) arm behavioral target areas based on pediatric obesity guidelines included limiting sugar-sweetened beverage consumption, encouraging fruit and vegetable consumption, limiting television and other screen time, eating breakfast daily, limiting restaurant eating, encouraging family meals, and limiting portion size. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	Contact control intervention focused on home safety and injury prevention, fire safety, bicycle safety, and sun protection.
Siegrist 2013	zBMI medium; BMI medium	The program consisted of monthly lessons lasting 45 min with three parts: a warm-up of 10 min with running, playing running games at high intensity, 30 min exercises to improve body awareness and self-esteem with conversation in class about health-related topics, and 5 min relaxation exercises. School environmental settings were altered to promote more physical activity	Non-active intervention	In the control group schools principals were instructed to continue with school activities as usual, without changing policies related to physical activity or nutrition during the study period.

		healthier food availability and choices (more vegetables and fruits and less energy-dense food) and reduce media consumption. Parents and teachers attended two and three educational health-related lessons, respectively, and also received 10 newsletters on health issues. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Siegrist 2018	BMI long	The intervention program comprised of weekly lifestyle lessons for children that were taught by their schoolteachers. The aim of the program was to increase physical activity in and outside of school by regular physical exercise in sports lessons and additional physical activity in school (active breaks during the lessons, active school breaks). Furthermore, the school prevention program intended to improve the eating pattern (less sweetened drinks, more healthy meals at school, healthy breakfast) and the health behavior (reduction of media use and inactivity) of the pupils. Parents received regular newsletters regarding the topics of the lifestyle lessons and were invited to a parental training program (2–3 times a year). The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control schools were asked to continue their usual activities.
Spiegel 2006	zBMI short	The WAY program engages students in multidisciplinary activities in language arts, mathematics, science, and health content, building their academic skills while developing their health attitudes, behavioral intent, and, ultimately, behavior. The program activities were designed to be teacher initiated and are organized into discrete modules with topics including physical activity and fitness, nutrition and diet, the body and how behaviour influence the body, genetic and family health history. The WAY intervention also included activities that required the students to interview family members to learn about their family health history, discuss meal and activity planning with their parents or guardians, and other impetuses to involve the parents. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Comparison classes participated in the data collection only and were not exposed to the WAY program.
Stettler 2015	zBMI medium; BMI medium	Parents and children in this program participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Group 2: Parents and children in the multiple behaviour program participated in a series of consultations and activities focused on multiple healthy interventions including the beverage only component and a physical activity aimed at progressively increase pedometer counts to 15,000 steps per day and progressively reduce screen time to ≤ 2 hours per day.	Attention control	Parents and children in this program participate in a series of consultations aimed at bullying prevention that are designed to help children learn strategies to make and keep friends, to express feelings appropriately, and to successfully decrease conflicts that often occur at school among children.

		The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Stolley 1997	BMI short; BMI medium	The intervention group was exposed to a culturally specific obesity prevention intervention that focused on adopting a low-fat, low-calorie diet combined with increased physical activity. Each week subjects met in small groups of 7-10 dyads led by either an advanced doctoral student in clinical psychology or a registered dietitian (two African American women, one white woman, and one Asian woman). In these groups, a "concept of the week" was discussed. Dyads then participated in an activity that reinforced the information presented. Activities involved tasting foods, comparing high-fat to low-fat foods, changing recipes, and planning meals. In addition, subjects in this program were asked to bring in their favourite recipes or foods to be analysed for fat and caloric content culturally relevant music and dance were used for a number of exercise and diet-related activities. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	The control group participated in a general health intervention. This intervention was organized like the treatment intervention with control subjects meeting in small groups (7-10 dyads) with group leaders. However, the focus of each class was a general health topic, including communicable disease control, various effective communication skills, relaxation techniques, stress reduction, and recycling
Story 2003	BMI short	KEEPS stood for Keys to Eating, Exercising, Playing, and Sharing. Intervention meetings, designed in a ''club meeting'' format, were held twice a week, for one hour after school, at each of the 3 elementary schools. The intervention also included a family component designed to reinforce and support the healthy eating and physical activity messages delivered in the after-school program. The intervention was taught by trained African-American GEMS staff. Club meetings consisted of fun, culturally appropriate, interactive, hands-on activities, emphasizing skill building and practice of the particular health behavior message for that week. A healthful snack, sometimes prepared by the girls, and chilled bottled water, was offered at each club meeting. Messages included information about the benefits of drinking water more often than soda pop, increasing the consumption of fruits and vegetables, drinking low-fat milk, selecting low-fat foods for snacks, eating smaller portions of snacks, choosing smaller-sized, and lower-fat, entrees in fast food restaurants, increasing physical activity, watching less television, and enhancing self-esteem. A major component of the afterschool intervention was increasing physical activity levels with a variety and choice of activities, such as dancing (ethnic, hip hop, aerobic), double-dutch jump rope, relay races, active African- American games, tag, and step aerobics. To keep girls' interest and participation, incentives were built into the program for attendance, setting short-term goals, and completing activities. These included attendance beads that made a bracelet when put together at the end of the intervention, water bottles, pedometers, jump ropes, and t-shirts. The after-school intervention messages were reinforced by family activities, including weekly family packets sent home to the parents and family night events. family The packets contained user-friendly materials, including practical suggestions about each week's healthful eating and exercise topic formatted on a refrigerator magnet, a ''Fridge Facts'' card, and colourful tip sheets. Every other week the family packet also included family sized packets of ingredients for the low-fat snack prepared by the girls during that day's club	Attention control	The GEMS Club served as an ''active placebo,'' non-nutrition/physical activity condition, and focused on promoting positive self-esteem and cultural enrichment.

			meeting (e.g., baby carrots and non-fat ranch dressing, or canned peaches with low-fat granola topping). The girls were encouraged to make the snack for family members. Two family nights were held during the intervention. Families participated in interactive booths, performing such tasks as measuring out the sugar in soda pop, determining the amount of fat in whole milk, compared with low-fat milk, label reading, and lower-fat cooking techniques. Family members participated in active games, danced, and had jump rope contests. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Story 2012	zBMI long; BMI long	Multicomponent intervention including physical Activity at school, healthy eating at school and family environment. The physical activity intervention goal was to achieve a total of at least 60 minutes of physical activity at school each day through a variety of approaches, including school PE, class walks outdoors, in-class action breaks, and active recess. Active Native American games were also integrated into the PE classes. The school-based dietary intervention goal was to improve the quality of children's diets at school, specifically to increase fruits and vegetables, and decrease sugar-sweetened beverages and high-fat foods. The family-focused intervention goal was to modify the home environment to reduce excessive caloric intake, reduce television watching, and increase physical activity. Each intervention school had three Family Night events related to nutrition and physical activity during the intervention period and one Summer Event. Parents received motivational encouragement telephone calls from trained Lakota research staff to set behavioral goals, encourage them in their efforts and to help them evaluate their progress. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group did not receive any intervention
Topham 2021	zBMI long	Group 1: The Family Lifestyle component focused on developing healthy food and exercise habits to promote a healthy weight in participating children; the first part of the sessions was conducted for the parents and for the children separately. The content of the children sessions included nutritional topics (e.g., dairy, fruits, veggies, healthy snacks, portion sizes) and activity (e.g., dance as activity, active games). In the second part of the sessions children and parents had to make and eat a healthy snack. Group 2: The Family Dynamic (FD) component focused on psychoeducation about parenting and child socioemotional functioning: general parenting and healthy family relationships (parent) and healthy emotion management and problem solving (child). Group 3: The Peer Group (PG) intervention promoted teaching children to accept each other by disallowing rejection at school. Group 4: All three above The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to	Non-active intervention	The control group received no classroom or family intervention

		– modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
van de Berg 2020	Percentile medium	Multi-arms study Group 1: WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programs The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Delayed intervention control
Wang 2012	zBMI medium	Nutrition Class (total 10 sessions, 45 min/session, once/month): topics focused on causes, adverse effects and prevention methods of child obesity, and ways to build up a healthy diet. Happy ten minutes (Happy 10 min): schoolteachers organised students to do exercise in two sessions of "happy ten minutes" every day. The exercise reached the moderate physical activity level and was either indoors or outdoors. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	NR	NR
White 2019	zBMI short; zBMI medium; zBMI long	The intervention group participated in a curriculum that was composed of 6 2-hour, biweekly sessions on cooking, eating, and playing together. After the 12-week face-to-face sessions, booster sessions, mailed monthly newsletters, and website challenges were used to continue engagement with the treatment group for the remainder of the 2-year study. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Control participants completed only assessments.
Williamson 2012	zBMI long	Group 1: The Primary Prevention program modified the school environment to promote healthy nutrition and physical activity with three primary objectives: 1) modify environmental cues related to healthy eating and activity, 2) modify the cafeteria food service program, and 3) modify the physical education programs as	Attention control	This group was given access to a website that provides information on stress management, and study skills and receive the educational enhancement program (LA GEAR UP) that targets academic

			described in the SPARK study (Sallis 1993) and to reduce sedentary behavior. Bi-monthly newsletters were sent home with the student providing campaign-specific information, suggestions on how to alter the home environment consistent with campaign topics, and specific activities that children are to complete at home with their parents. Menus were sent to parents with emphasis placed on the food choices recommended by the LA Health program. Group 2. This intervention arm combined Secondary Prevention (SP) with Primary Prevention (identical to the Primary Prevention program described above). SP employed a classroom instruction component combined with an internet-based approach similar to the interventions that were developed and tested in the HIPTeens study and other health behavior change studies in children. The internet intervention of this study was delivered as part of regular classroom instruction, combined with synchronous (online) internet counselling and asynchronous (email) communications for children and their parents. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes		achievement but does not target weight gain prevention.
Xu 2015	zBMI medium; BMI medium	Intervention schools implemented the specially developed intervention components, comprising a) classroom curriculum (including education on healthy eating and sufficient physical activity), b) school environment support, c) family involvement (including parents/guardians health classes), and d) fun programs/events. The classroom curriculum consists of two education modules, one on nutrition and one on physical activity. The nutrition module included an introduction to types of foods, and energy contained in different foods and practical advice on how to eat healthily on a daily basis. Students were shown what high-dense-energy foods are, for example Western snacks, soft-drinks and deep-fried foods. They were encouraged to consume low-dense-energy foods, such as vegetables and tofu. They were also offered tips on how to eat healthily, e.g., chewing thoroughly, and reducing fat intake by consuming meat without skin. The physical activity module encouraged students to engage in sufficient physical activity and to reduce screen-time. Students were also encouraged to do exercises inside or outside of the classroom during recess, and to walk to and from school. School environmental support included brief health-related messages and posters presented in locations such as inside the classroom, gymnasium, playground, and cafeteria. The messages and posters were updated monthly according to scheduled intervention themes. Furthermore, posters made by students were posted on rear blackboards in classrooms in intervention schools. The family involvement component included parents/guardians health class at school, in which they were invited to participate in an educational program twice per semester to learn appropriate strategies to advance healthy lifestyle choices against obesity. After school family events were also offered, these included parent–child interactive home assignments, such as identifying high-dense-energy home foods, and practicing to measure body weight and height and to calculate body mass index. Fun programs/events included: three presentation competition (picture painting, short paper writing and stage drama); no unhealthy snack for week; no TV for a week; no soft-drinks for a week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention	The control group received the routine health education

		The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		
Xu 2017 (5 other cities)	zBMI medium; BMI medium	The comprehensive intervention was a combination of nutrition and PA interventions. Nutritional intervention: Carton pamphlets were distributed to each student in the intervention schools. Class on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students of school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. Students were conducted "Happy 10" led by teachers to do a 10-minute segment moderate intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	No intervention was taken place in the control schools
Comparison: Activity intervention vs Dietary intervention				
Study ID	**Meta-analysis outcome(s)**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**
Barnes 2021	zBMI medium; BMI medium	PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only,	Dietary intervention	Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices,

			nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes		taste-testing new foods, and providing alternatives for use of food during celebrations. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Meng 2013 (Beijing)	zBMI medium; BMI medium	Students conducted "Happy 10" led by teachers to do a 10-minute segment moderate intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Dietary intervention	Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Class on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students of school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
van de Berg 2020	Percentile medium	Multi-arms study WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Dietary intervention	Multi-arms study The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes

				– change the physical environment of the child: yes
Comparison: Dietary and Activity intervention vs Dietary				
Study ID	**Meta-analysis outcome(s)**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**
Barnes 2021	zBMI medium; BMI medium	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Dietary intervention	Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of

		The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes		the child: yes – change the physical environment of the child: no
Stettler 2015	zBMI medium; BMI medium	Parents and children in this program participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Parents and children in the multiple behaviour program participated in a series of consultations and activities focused on multiple healthy interventions including the beverage only component and a physical activity aimed at progressively increase pedometer counts to 15,000 steps per day and progressively reduce screen time to ≤ 2 hours per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention	Parents and children in this program participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. The beverages-Only Intervention aimed progressively reduce intake of beverages with high sugar content (e.g. regular soda, sweetened iced teas and lemonade, fruit drinks with less than 100% fruit juice, and sports drinks) to ≤ 1 to 2 12-oz. serving/day and progressively increase intake of water, fat-free milk, and 1% milk to ≥ 6 12-oz. servings of per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
van de Berg 2020	Percentile medium	Multi-arms study Group 1: WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programs The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention	Multi-arms study The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes
Comparison: Dietary and Activity intervention vs Activity				
Study ID	**Meta-analysis**	**Intervention (short description)**	**Comparator**	**Comparator (short description)**

	outcome(s)			
Barnes 2021	zBMI medium; BMI medium	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/ convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Activity intervention	PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executive to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Ickovics 2019	Percentile long	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to	Activity intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to four conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school one to two times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit

		– modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes		component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes
Robinson 2003	BMI short	GEMS Jewels dance classes were offered 5 days per week at 3 community centers in the target neighbourhoods. The START (Sisters Taking Action to Reduce Television) intervention consisted of 5 lessons to be delivered during home visits with participating families over 12 weeks. GEMS Jewels dance classes were offered 5 days per week. Girls were encouraged to attend the dance classes as often as possible for their entire 3-month study enrolment, but they were not forced or coerced to attend any minimum number of days. Each daily session lasted for up to 2.5 hours, starting with a healthful snack (a motivating and necessary feature for the girls) and an hourlong homework period. This hour was followed by 45–60 minutes of moderate- to-vigorous dance. The sessions ended with 30-minute GEMS talks exploring the meaning of dance in the girls' lives, and the importance of dance in the African-American community and culture. Classes were led by female African-American college students and recent college graduates, recruited from dance organizations/troupes at nearby universities and in local communities. Three styles of dance were taught: traditional African dance, Hip-Hop, and Step. The classes were structured, and steps chosen, to provide sustained moderate-to-vigorous activity. Occasional activities also included creating costumes, videotaping, and performing for families and friends. The START (Sisters Taking Action to Reduce Television) intervention consisted of 5 lessons to be delivered during home visits with participating families. A female African- American intervention specialist scheduled lesson times with each family, and then delivered the intervention to the participating girl and any other available family members. The strategies promoted for reducing television viewing included non-selective reductions in total hours and/or access to television, selective reductions by day, time, context or content, and replacing that drive media content. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Activity intervention	The control intervention was designed to be a state-of-the-art information-based health education program to promote healthful diet and activity patterns. It included presenting monthly community health lectures and mailing newsletters to parents and to girls. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Robinson 2010	zBMI long; BMI long	See Robinson 2003 above	Activity intervention	See Robinson 2003 above
van de Berg 2020	Percentile medium	Multi-arms study Group 1: WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centered around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe	Activity intervention	Multi-arms study WAT! is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among youth. For the TGEG study, components of the WAT! program included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-program celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention.

		cards and Family Stories. Group 3: Combined WAT! and LGEG! programs The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes

Studies not included in the meta-analyses

Study ID	Comparison	Intervention (short description)	Comparator	Comparator (short description)
Anand 2007	Dietary and Activity vs Control	The SHARE-ACTION intervention consisted of a regular home visit by Aboriginal health counsellors trained to assess and set dietary and physical activity goals for each household member. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Usual care families received Canada's Food Guide to Healthy Eating16 and Canada's Physical Activity Guide to Healthy Active Living
Branscum 2013	Dietary and Activity vs Dietary and Activity	Comic-book program designed to help children learn and engage in behaviors associated with the prevention of obesity. For the theory-based intervention, constructs of the SCT, including self-efficacy, expectations, and self-control, were operationalized and targeted. Children in the theory-based intervention were asked to develop their comic stories on the health issues covered during the intervention. During the 'Introduction & Purpose of lesson' the instructor introduced and reviewed the lesson's key objectives and covered necessary knowledge and skills in order to perform the behavior the lesson targeted. In the 'Benefits' module, children learned positive benefits associated with the health behavior being promoted and sketched a comic-panel showing such a benefit. Next, children participated in 'Role-Playing' with the instructor to practice skills learned in the lesson in two separate real-world examples: one with a parent or guardian, and one with a peer. Finally, during 'Goal Setting', the instructor reviewed the key objectives of the lesson, children have the opportunity to ask questions about the lesson, and children sketched comic-book panels of themselves setting goals, monitoring and self-rewarding themselves for engaging the behavior the lesson targeted. The behavioral objectives for each lesson of the experimental intervention was to enable children to: engage in no more than 2 hours of screen time per day (lesson 1), consume water and sugar-free drinks instead of sugar-sweetened beverages (lesson 2), participate in at least 60 minutes of physical activity per day (lesson 3), and consume 5 servings of fruits and vegetables per day. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Dietary and Activity (minimal intervention)	For the knowledge-based intervention, pedagogical techniques were based on only building knowledge regarding healthy eating and physical activity. Children in the knowledge-based intervention were not asked to incorporate the health messages. Each lesson consists of 4 modules: Introduction & Purpose of lesson, Comic-Book activity #1, Comic-Book activity #2 and Wrap-up. During the 'Introduction & Purpose of lesson' the instructor introduced and covered the lesson's key objectives and taught necessary knowledge and skills in order to perform the behavior the lesson targeted. In the 'Comic-Book activity #1' and 'Comic-Book activity #2' modules, children learned an aspect of comic-book creation and sequential art. Finally, during 'Wrap-up', the instructor reviewed the key objectives of the lesson, and children had the opportunity to ask questions about the lesson. The behavioral objectives for each lesson of the comparison intervention were to enable children to: engage in no more than 2 hours of screen time per day (lesson 1), consume water and sugar-free drinks instead of sugar-sweetened beverages (lesson 2), participate in at least 60 minutes of physical activity per day (lesson 3), and consume 5 servings of fruits and vegetables per day.
Carlin 2021				

	Dietary and Activity vs Control	The IPAP intervention aimed to promote positive health behaviors in the family setting through the utilization of the functions of a smart speaker and its linked intelligent personal assistant. The research team was able to remotely access the devices and set weekly tasks, prompts, and reminders for family members. Families were signposted to search for the app Skills under the topics of Health and Fitness, Lifestyle, Sport, Cooking, and Recipes. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group continue as normal without the provision of the technology.
Di Maglie 2022	Activity vs Control	The enriched activity was obtained by limiting the inactivity time of children by introducing additional minutes of PA per day (at least 40 min) for 5\6 days a week for 6 months, in the context of schools and a sport center. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	Children in the control group participated in usual practice
Epstein 2001	Dietary and Activity vs Dietary and Activity	Weight-control treatment was provided to the parents for eight weekly meetings, followed by four biweekly and two monthly meetings during the 6-month intensive treatment. Participating parents and children attended the first meeting, at which they received the first modules in their parent and child workbooks. Child materials were sent home with the parents each week and included new workbook modules and program-related activities for the children to do with their parents. Parents were taught stimulus control to reduce access to high-fat/high-sugar foods and to increase access to fruits and vegetables, and to increase access to physical activity and to reduce access to sedentary behaviors. In the Increase Fruit and Vegetable group, the goal was to incrementally increase intake of fruits and vegetables to reach at least two servings of fruits and three servings of vegetables per day. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary and activity intervention	Participants in the Decrease Fat and Sugar group were provided incremental goals to reach a goal of no more than 10 servings of high-fat/high-sugar foods per week, in addition to the activity component of the intervention. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Gortmaker 1999	Dietary and Activity vs Control	Planet Health sessions were included within existing curricula using classroom teachers in 4 major subjects and physical education. Sessions focused on decreasing television viewing, decreasing consumption of high-fat foods, increasing fruit and vegetable intake, and increasing moderate and vigorous physical activity. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Control schools received their usual health curricula and PE classes and none of the Planet Health program

Hannon 2018	Dietary and Activity vs Dietary and Activity	The intervention was adapted from the lifestyle curriculum used in the Diabetes Prevention Programme (DPP). Scripts used in the 16 sessions of the Lifestyle Balance curriculum used in the DPP were modified to reflect consideration of applying session content to family members (mothers and children) vs the individual. We created 2 versions of the curriculum: one for mothers without direct involvement of their children, and another that included a supplemental program for youth. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary and activity intervention	This second curriculum had 2 fundamental differences from the mother only version. First, it made mothers aware of what their children were learning in parallel sessions. Second, it asked mothers to do at-home activities (conceptualized as homework) with their children to reinforce lesson concepts. The children's curriculum was designed as a 16-session weekly program that introduced several themes in the DPP curriculum adjusted for age-appropriate presentation. Each session contained both a snack and a physical activity component adapted from SPARK, an evidence-based physical education program. Finally, the curriculum encouraged children to engage parents in the form of "homework. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Hooft van Huysduynen 2014	Dietary vs Control	The intervention included five face-to-face sessions during which a dietician used motivational interviewing to guide the parents towards a healthy diet. To remind parents of what has been discussed and to provide additional practical information to improve dietary intake, the parents received leaflets about the discussed dietary behaviours. The parents also received three emails with individualised feedback. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group did not receive any of the intervention elements
Huys 2020	Dietary and Activity vs Control	The Feel4Diabetes intervention involved (1) the family component: six counselling sessions on healthy eating, improving PA and limiting sedentary behavio and families set SMART-goals; (2) the school component: a meeting with the head masters and teachers from all participating intervention schools in which researchers gave suggestions and examples of activities to promote children's PA, healthy snacking, drinking water and reducing sedentary behavior in the school context; (3) the community level component: existing health related activities in the intervention communities were bundled in monthly community-specific activity calendars. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to	Attention control	Families of the control group only received the first individual session of the family component (general advice for a healthy and active lifestyle during a one-hour session) and did not receive an intervention on the school or community level

		– modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no		
Johnston 2013	Dietary and Activity vs Control	Curriculum materials with integrated health information teaching aids, and health and nutrition educational materials developed for this study were provided to all 7 schools (intervention and control). The materials centered around 7 healthy messages: eat more fruits and vegetables, drink more water and less sugary beverages, opt for healthy snacks, increase active play and decrease screen time, eat 3 servings of low-fat dairy every day, eat a healthy breakfast, and choose an appropriate portion size. Staffs at schools randomized to the PFI condition were provided with a health professional that assisted with daily integration of materials and healthy messages. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	Schools randomized to the self-help (SH) condition attended a 1-day training before the beginning of each school year to review curriculum materials. Staffs at schools randomized to the SH condition were not provided with the health professional.
Lynch 2016	Dietary and Activity vs Control	The curriculum involved 8 sessions anchored around the 5-2-1-0 curriculum: weight trends in America & Plate Method; fruits and vegetables; hours or less of recreational screen time; hour of physical activity; sugary drinks; hours of sleep & healthy breakfast; portion sizes & healthy snacks. Each lesson consisted of review of previous topic, introduction of new content with visuals and class interaction, a class activity, simple goal setting related to the topic of the day at the end of the session. At baseline measurement students received pedometer and were instructed to wear the pedometer at all times that they were awake for the next 7 days. At initiation of the study, children in intervention classrooms received 5-2-1-0 information and a Small Steps Every Day 5-2-1-0 Mayo Action Card. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	NR
Macias-Cervantes 2009	Activity vs Control	Children in the experimental group were instructed to modify their physical activity with the main objective to obtain an increase of at least 2,500 steps per day over the baseline level. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	Children in the control group were asked to maintain the same level of physical activity throughout the 12 weeks of observation
Madsen 2013	Activity vs Control	SCORES is an after-school soccer program that offers soccer, creative writing and service-learning experiences to youth that would otherwise have limited access to extracurricular activities. In the current study a modified version of SCORE was implemented due to budget cuts. SCORES trained the district's after-school staff to operate the SCORES program. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention	NR

		The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		
Marsigliante 2022	Dietary vs Control	Food education and a healthy lifestyle (e.g., food choices, food labels, the five meals, consumption of fruits and vegetables, and sleep quality) were discussed with the active involvement of everyone. The educational intervention covered 12 lessons for the subject's biology and alimentation implemented by classroom teachers. The first part (six lessons) aimed at increasing awareness and information regarding energy balance-related behaviors, with supporting materials, such as a pocket-sized diary, to monitor own behavior. The second part (six lessons) aimed at facilitation of choice to improve one of the behaviors, setting personal goals, identifying barriers, improving self-efficacy, and evaluating the change process. In this way, the children and families understand how to organize their weekly meal planning without detailed prescriptions. All teachers and parents in the intervention schools received on-site training to provide them with general information on the nature and significance of the intervention and to support their role in educating the children. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control schools followed their regular curriculum.
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	Each lesson lasted approximately 90 minutes and included: (1) 20 to 30 minutes of moderate physical activity; (2) nutrition and cooking activities; (3) discussions; (4) self-reflections; (5) goal setting for healthier eating and physical activity; and (6) food and beverage tastings. Printed education materials, including recipes and goal-setting worksheets were provided to the participants at each of the 12 sessions. Educators led small group discussions, conducted hands-on and food preparation activities, and facilitated group decision-making and problem-solving experiences for participants. Peer educators were 8th grade students from the participating schools and were selected based on teacher recommendations regarding these students' high level of demonstrated responsibility and work ethic. Peer educators had 4 to 5 adolescents per educator. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Dietary and activity intervention	Intervention is the same as the peer-led but the educators were adults. Adult educators were recruited from among participating schools' staff members. Adult educators delivered the program to 7 to 8 adolescents per educator. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no
Pindus 2015	Activity vs Control	70 minutes (5 days/week) of moderate to vigorous physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention	The control group received the regular afterschool activities
Razani 2018				

	Activity vs Activity	Supported Park prescription group. Parents randomized to the supported park prescription group received counselling by a pediatrician about nature, a postcard with the map of local parks, journal, and pedometer. After randomization, they were advised to attend group nature outings on three consecutive Saturdays and were invited to bring their families. Participants received phone reminders on the Wednesday before outings and a text on the Friday before the Saturday outing. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Activity intervention	The independent park prescription group received counselling by a paediatrician about nature according to the script above, the postcard with a map of local parks, journal, pedometer, and no further intervention after randomization. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Riiser 2020	Activity vs Control	ASP staff received a seven-month course program to enhance their knowledge of, and skills in creating a, PA-supportive environment by accommodating and gently encouraging activities instead of directing them in a controlling manner. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group participants were invited to receive the intervention after the study was completed.
Salmon 2008	Activity vs Control	Each of the intervention conditions consisted of 19 lessons (40–50 min each) delivered by one qualified physical education teacher over one school year. Group 1: The Behavioural modification (BM) intervention aimed to reduce the time spent on TV viewing by 20%. The BM lessons were delivered in the classroom and a newsletter was sent home to parents of children in the BM or combined BM/Fundamental movement skills (FMS) intervention to monitor and confirm that the nominated programme was turned off, and encouraged their child maintain the TV switch-off. Grop 2: The FMS intervention comprised 19 sessions of 40–50 min duration taught across three school terms by the same intervention specialist teacher that delivered the BM intervention. The FMS intervention focused on six skills, including three object control skills (overhand throw, kick and strike) and three locomotor skills (run, dodge and vertical jump).The FMS lessons were delivered either in the indoor or outdoor physical activity facilities at each school. Group 3: Children in the BM/FMS condition received both the BM and FMS lessons, therefore receiving double the dose of the other intervention groups. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention	The control group received the usual physical education and sports classes (usual curriculum)
Tessier 2008	Activity vs Activity	In the intervention group, the three compulsory hours of physical education were delivered over 3 or 4 sessions a week. In the control group the three compulsory hours of physical education were delivered over 1 or 2 sessions a week	Activity intervention	The control group received the three compulsory hours of physical education following over a week delivered over 1 or 2 sessions

		The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no		
Treviño 2004	Dietary and Activity vs Control	The objective of the Bienestar Health Program is to provide children with 50 sessions of health programming distributed throughout 7 months. These behaviors were taught and reinforced through classroom, home, school cafeteria, and after-school care educational activities. Physical education teachers, parents, school cafeteria staff, and after-school caretakers were asked to encourage less dietary saturated fat intake, more dietary fiber intake, and more physical activity; to have less dietary saturated fat, more dietary fiber, and more physical activity available; and to be role models for the children. Children were asked to set goals aimed at accomplishing the targeted behaviors and to keep records of their accomplishments. Children were also asked to encourage their peers and adult caretakers to practice the 3 health behaviors." The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention	The control group received the health examination alone
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	For all intervention groups, an activity book, designed for use at home, accompanied each term's lessons. Every week in the activity book a related and fun 'homework', such as colouring, quiz or craftwork, was given, concluding with a weekly message for the children and parents. 1. Eat smart: Children explored the concept of health and its link with food (term 1); fruit and vegetables were promoted using tasting sessions and games (term 2); specific positive messages about 'power' foods (high starch foods) were given out (term 3); tooth friendly foods were explored (term 4). 2. Play Smart: The physical activity programme was designed to promote activity in daily life; children explored the concept of energy and activity (term 1); promotion of activity in the playground and a reduction in television viewing using team games, fun physical activities and quizzes (term 2 and 3); lessons on the activity pyramid (term 4). 3. Eat/Play Smart: Children in this group received half of the nutrition and half of the physical activity programme each term. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control	Be Smart: Children learnt about food in a non-nutrition sense. On alternate weeks, children learnt about the human body, using an interactive CD-Rom. Children had an activity book, which had a related homework, but it did not have weekly messages.
Zota 2016	Dietary vs Control	The intervention group received the DIATROFI program (daily free healthy meals) and health nutrition education program. All students enrolled in a school participating in the DIATROFI Program received a boxed fresh meal at 10 a.m. every school day. In the schools assigned to the multicomponent intervention group, a healthy nutrition educational program was also implemented, including educational material and	Non-active intervention	The control group only received the DIATROFI program (daily free healthy meals)

		activities for each target group (students of different ages, parents and school staff). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (three or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes		

Abbreviations: Abbreviations: CBT: Cognitive Behavioral Therapy; MVPA: moderate to vigorous physical activity; NR: not reported; PA: physical activity; PE: physical education; SSB: sugar sweetened beverages.
Short term follow-up: 12 weeks from baseline to < 9 months. Medium term follow-up: 9 months from baseline to < 15 months. Long term follow-up: 15 months or more.

Table 3

Description of serious adverse events

Comparison: Dietary intervention *vs* Control				
Study ID	**Meta-analysis outcome(s)**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Chai 2019	zBMI short; BMI short	N	n/a	n/a
Coleman 2012	zBMI medium; zBMI long	N	n/a	n/a
Cunha 2013	BMI medium	N	n/a	n/a
Damsgaard 2014	zBMI short	N	n/a	n/a
Davis 2021	zBMI medium; BMI medium; Percentile medium	N	n/a	n/a
de Ruyter 2012	zBMI short; zBMI medium; zBMI long	Y	Y	Control: headache: intervention: 0 (0%); control: 2 (1%); allergy: intervention: 2 (1%); control: 3 (1%); behavioural problems: intervention: 2 (1%); control: 1 (0.5%); abdominal discomfort: intervention: 2 (1%); control: 7 (2%). The authors reported that "We urged parents to report adverse events at the email address or cell phone number printed on all beverage cans and gave all parents the telephone number of an independent physician to report and discuss adverse events. None of the parents approached this physician. Adverse events were reported by 21 non-completers as a reason to stop drinking the beverages and by 7 children who completed the study."
Fulkerson 2010	zBMI short; Percentile short	N	n/a	n/a
Fulkerson 2015	zBMI medium; zBMI long	Y	N	No serious adverse events were reported
Han 2006	zBMI long	N	n/a	n/a
Hendrie 2011	zBMI short; BMI short	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
James 2004	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a
Keshani 2016	BMI medium	N	n/a	n/a
Lent 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	N	n/a	n/a
Meng 2013 (Beijing)	zBMI medium; BMI medium	N	n/a	n/a
NCT00224887 2005	BMI medium	Y	N	Adverse Event Reporting Description: the study was considered to be minimal risk. Interventions were informational/educational and did not include medications or invasive testing/procedures. No serious adverse event or all-cause mortality were reported

Nicholl 2021	zBMI short; BMI short; Percentile short	Y	N	Parental feedback requested included details of suspected adverse events, including any untoward medical occurrence affecting their child and not necessarily due to the dairy intervention. No adverse effects from the supplied dairy were reported
Paineau 2008	zBMI short; BMI short	N	n/a	n/a
Seguin-Fawler 2021	Percentile short	N	n/a	n/a
Sichieri 2008	BMI short	N	n/a	n/a
Stettler 2015	zBMI medium; BMI medium	N	n/a	n/a
van de Berg 2020	Percentile medium	N	n/a	n/a
Viggiano 2018	zBMI short; zBMI long	N	n/a	n/a
Comparison: Activity intervention vs Control				
Study ID	**Meta-analysis outcome(s)**			
Barbeau 2007	BMI medium	N	n/a	n/a
Barnes 2015	zBMI short	N	n/a	n/a
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Breheny 2020	zBMI short; zBMI medium	Y	N	No adverse events were reported
Clemes 2020	BMI short	N	n/a	n/a
De Bock 2013	BMI short; BMI medium	N	n/a	n/a
de Greeff 2016	BMI short	N	n/a	n/a
Diaz-Castro 2021	zBMI short; BMI short	N	n/a	n/a
Donnelly 2009	BMI long	N	n/a	n/a
Drummy 2016	BMI short	N	n/a	n/a
Farmer 2017	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a
Ford 2013	BMI short	N	n/a	n/a
Ha 2021	BMI short; BMI medium	N	n/a	n/a
Howe 2011	BMI medium	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
Jones 2015	zBMI short; zBMI medium; BMI short; BMI medium	Y	N	Adverse events, such as injuries, were recorded throughout the program. No adverse events were reported for the PA (physical activity) or HL (healthy lifestyle) group participants
Ketelhut 2022	BMI short	Y	N	No adverse events occurred during the intervention period in any of the participants
Khan 2014	zBMI medium; BMI medium	N	n/a	n/a
Kovalskys 2016	zBMI long	N	n/a	n/a
Kriemler 2010	BMI medium; BMI long	N	n/a	n/a
Lau 2016	BMI short	N	n/a	n/a
Lazaar 2007	zBMI short; BMI short	N	n/a	n/a
Li 2010	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a
Martinez-Vizcaino 2014	BMI medium	Y	Y	Adverse outcomes. Dizziness during baseline venepuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of the study. No other adverse events were reported by students during health examinations. Two minor ankle sprains occurred during the sessions of the program (9 months incidence risk: 0.4 %). One boy was expelled from the program for aggressive behavior toward peers; his parents and the School Board made the decision by consensus
Martinez-Vizcaino 2020	zBMI short; BMI short	Y	N	No injuries or other adverse events occurred during the physical activity sessions, or during the health and physical examinations
Martinez-Vizcaino 2022	zBMI medium; BMI medium	Y	N	Adverse effects were recorded in each session by the monitor. Dizziness during baseline venepuncture occurred in 2% of the children at baseline and in 1.1% of the children at the end of the study. No other adverse events were reported by students during health examinations or physical activity sessions
Meng 2013 (Beijing)	zBMI medium; BMI medium	N	n/a	n/a

Morgan 2019	zBMI medium	N	n/a	n/a
Muller 2016	zBMI medium; zBMI long; Percentile long	N	n/a	n/a
Muller 2019	zBMI medium	Y	N	There were no injuries or other adverse events during the physical activity lessons.
Newton 2014	zBMI short; BMI short; Percentile short	N	n/a	n/a
Rhodes 2019	BMI short	N	n/a	n/a
Sacchetti 2013	BMI long	N	n/a	n/a
Salmon 2008	zBMI long	N	n/a	n/a
Simon 2008	zBMI long; BMI medium; BMI long	N	n/a	n/a
Tanskey 2017	zBMI medium; BMI medium	N	n/a	n/a
Telford 2012	BMI long	N	n/a	n/a
Thivel 2011	BMI short	N	n/a	n/a
van de Berg 2020	Percentile medium	N	n/a	n/a
Vizcaino 2008	BMI medium	N	n/a	n/a
Wang 2018	zBMI medium; BMI medium	Y	N	Neither complaints nor adverse events were reported by any students or school personnel
Wendel 2016	BMI long; Percentile long	Y	N	The results of this study and previous pilot studies have established that activity-permissive classrooms do not cause harm to students
Yin 2012	zBMI medium; zBMI long	Y	Y	The incident rate of adverse events (e.g. musculoskeletal injuries) are reported as: Year 1: 0.03 (20 mild; 3 moderate; 1 severe); Year 2: 0.02 (4 mild; 6 moderate; 2 severe); Year 3: 0.01 (5 mild; 2 severe)
Comparison: Dietary and Activity intervention vs Control				
Study ID	**Meta-analysis outcome(s)**			
Adab 2018	zBMI long	Y	N	Quality of life, as total score or subdomains, social acceptance, or dissatisfaction with body image did not differ significantly between arms at any time. The authors found no evidence of harm from the intervention
Annesi 2016	BMI short; BMI medium; Percentile medium	N	n/a	n/a
Annesi 2017	BMI short; BMI medium	N	n/a	n/a
Baranowski 2003	BMI short	N	n/a	n/a
Baranowski 2011	zBMI short; Percentile short	N	n/a	n/a
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Beech 2003	BMI short	Y	Y	"Few adverse events and injuries were reported among the pilot study participants in Memphis. For example, during the 12-week intervention, injuries were reported by 2 girls (11%) in the comparison group, and one girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by one girl (5.5%) in the comparison group, and 2 girls (9.5%) in the parent-targeted group. None of the above adverse events were judged by the Coordinating Center to be related to study participation, but the Center deemed 2 of the injuries to be possibly related to participation in the intervention. Lastly, an elevated cholesterol value was reported for one participant, with notification made to the family."
Bohnert 2013	zBMI short	N	n/a	n/a
Brandstetter 2012	BMI long	N	n/a	n/a
Brown 2013	zBMI short; BMI short; Percentile short	N	n/a	n/a
Caballero 2003	BMI long	Y	N	No increase in physical education-related injuries was detected in the intervention schools on the basis of injury logs maintained by the schools
Cao 2015	zBMI medium; zBMI long	N	n/a	n/a
Chen 2010	BMI short	N	n/a	n/a
Choo 2020	zBMI short	N	n/a	n/a
Crespo 2012	zBMI medium; zBMI long; Percentile medium; Percentile long	N	n/a	n/a

De Heer 2011	BMI short; Percentile short	N	n/a	n/a
Duncan 2019	BMI short	N	n/a	n/a
Elder 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	N	n/a	n/a
Fairclough 2013	zBMI short; BMI short	N	n/a	n/a
Foster 2008	zBMI long; BMI long	N	n/a	n/a
Fulkerson 2022	zBMI medium	Y	Y	All-cause mortality: intervention: 1 (0.86%); serious adverse events: 0 (reported in the trial registration document)
Gentile 2009	BMI short; BMI medium	N	n/a	n/a
Greve 2015	BMI long	N	n/a	n/a
Griffin 2019	zBMI short	Y	N	There were no serious adverse events requiring hospital admission or adverse events requiring medical attention during the intervention. From Jolly 2020: "We present the number and percentage of fathers and children experiencing any serious adverse event (SAE) and suspected unexpected serious adverse reaction by group. Only overnight admissions to hospital due to injury or sudden illness during a HDHK session are reported as a SAE."
Grydeland 2014	zBMI long; BMI long	N	n/a	n/a
Habib-Mourad 2014	BMI short	N	n/a	n/a
Habib-Mourad 2020	zBMI long	N	n/a	n/a
Haire-Joshu 2010	zBMI short	N	n/a	n/a
HEALTHY Study Group 2010	zBMI long	Y	Y	"Less than 3% of the students who were screened had an adverse event; the proportions were nearly equivalent in the intervention and control schools. Adverse events were collected primarily to capture expected side effects of the blood drawing. A total of 2.4% of the students at baseline and 1.7% at the end of the study reported at least one adverse event that occurred during the health screening, with no significant differences between the intervention and control schools. The most frequent adverse event was dizziness. One 8th-grade girl in a control school committed suicide. The site investigators, the investigators from the National Institute of Diabetes and Digestive and Kidney Diseases, and the data and safety monitoring board determined that the event was unrelated to the study. We examined measures of extreme dieting behaviour at both the baseline and follow-up periods to assess whether the intervention could have produced unintended side effects. Overall, students in the intervention and control schools reported similarly low levels of extreme dieting behaviour at both baseline and follow-up measurements."
Hendy 2011	Percentile short	N	n/a	n/a
Hopper 2005	BMI short	N	n/a	n/a
Hull 2018	zBMI short; zBMI long; BMI short; BMI long	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
Jansen 2011	BMI short	N	n/a	n/a
Kain 2014	zBMI medium; BMI medium	N	n/a	n/a
Keller 2009	zBMI medium	N	n/a	n/a
Kipping 2008	BMI short	N	n/a	n/a
Kipping 2014	zBMI short; zBMI long	N	n/a	n/a
Klesges 2010	BMI medium; BMI long	N	n/a	n/a
Kobel 2017	BMI medium; Percentile medium	N	n/a	n/a
Kocken 2016	zBMI short; zBMI long	N	n/a	n/a
Kubik 2021	zBMI medium; zBMI long; BMI medium; BMI long	Y	N	No serious adverse events were reported
Levy 2012	zBMI short	N	n/a	n/a
Li 2019	zBMI medium	Y	N	The authors did not receive any reports of adverse events related to the intervention

Lichtenstein 2011	zBMI medium; zBMI long	N	n/a	n/a
Liu 2019	zBMI short; zBMI medium; BMI short; BMI medium	N	n/a	n/a
Liu 2022	zBMI short; zBMI medium; BMI short; BMI medium	Y	N	Measured adverse events included injury related to physical activity, body image dissatisfaction, underweight, and reduced growth in height. There were no reports from the children or parents of injuries related to physical activity. Body image dissatisfaction and other indicators of adverse events did not differ between the two groups
Llargues 2012	BMI long	N	n/a	n/a
Lloyd 2018	zBMI long; BMI long	N	n/a	n/a
Magnusson 2012	BMI long	N	n/a	n/a
Marcus 2009	zBMI long	Y	N	No signs of negative effects of the intervention as measured by self-report were found. The authors stated that the type of intervention presented seems not to be harmful
Morgan 2011	zBMI short	N	n/a	n/a
Morgan 2014	zBMI short; BMI short	N	n/a	n/a
NCT02067728 2014	zBMI short	Y	N	One enrolled patient (control group) death occurred during the study period; however, the death was in no way related to participation in this research study. The patient's death occurred following 1 month data collection, but prior to the 6-month data collection
Nemet 2011a	BMI medium; Percentile medium	N	n/a	n/a
Nemet 2011b	BMI medium; BMI long; Percentile medium; Percentile long	N	n/a	n/a
Nollen 2014	BMI short	N	n/a	n/a
Nyberg 2015	zBMI short; zBMI medium	N	n/a	n/a
Nyberg 2016	zBMI short; zBMI medium	N	n/a	n/a
O'Connor 2020	zBMI short	N	n/a	n/a
Pena 2021	zBMI short; BMI short	N	n/a	n/a
Puder 2011	BMI medium	Y	N	No injuries or other adverse events occurred during physical activity sessions in the intervention classes
Ramirez-Rivera 2021	zBMI short	Y	N	No negative effect of the measurements or study activities on the health of the participants were observed
Rerksuppaphol 2017	zBMI short; BMI short	N	n/a	n/a
Rosario 2012	zBMI short; BMI short	N	n/a	n/a
Rosenkranz 2010	zBMI short; BMI short; Percentile short	N	n/a	n/a
Rush 2012	zBMI long	N	n/a	n/a
Safdie 2013	BMI short; BMI medium; BMI long	N	n/a	n/a
Sahota 2001	zBMI medium	N	n/a	n/a
Sahota 2019	zBMI long	Y	N	Psychological well-being of the pupils was assessed to determine whether the intervention caused any harm
Santos 2014	zBMI medium	N	n/a	n/a
Sekhavat 2014	zBMI medium; BMI medium	N	n/a	n/a
Sgambato 2019	BMI short	N	n/a	n/a
Sherwood 2019	zBMI medium; zBMI long; Percentile medium; Percentile long	N	n/a	n/a
Siegrist 2013	zBMI medium; BMI medium	N	n/a	n/a
Siegrist 2018	BMI long	N	n/a	n/a
Spiegel 2006	zBMI short	N	n/a	n/a
Stettler 2015		N	n/a	n/a

	zBMI medium; BMI medium			
Stolley 1997	BMI short; BMI medium	N	n/a	n/a
Story 2003	BMI short	N	n/a	n/a
Story 2012	zBMI long; BMI long	N	n/a	n/a
Topham 2021	zBMI long	N	n/a	n/a
van de Berg 2020	Percentile medium	N	n/a	n/a
Wang 2012	zBMI medium	N	n/a	n/a
White 2019	zBMI short; zBMI medium; zBMI long	N	n/a	n/a
Williamson 2012	zBMI long	Y	N	No serious adverse events or all-cause mortality were reported in the result section of the trial registration
Xu 2015	zBMI medium; BMI medium	Y	N	There was no observable adverse event in the intervention group
Xu 2017 (5 other cities)	zBMI medium; BMI medium	N	n/a	n/a
Comparison: Activity intervention vs Dietary intervention				
Study ID	**Meta-analysis outcome(s)**			
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
Meng 2013 (Beijing)	zBMI medium; BMI medium	N	n/a	n/a
van de Berg 2020	Percentile medium	N	n/a	n/a
Comparison: Dietary and Activity intervention vs Dietary				
Study ID	**Meta-analysis outcome(s)**			
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
Stettler 2015	zBMI medium; BMI medium	N	n/a	n/a
van de Berg 2020	Percentile medium	N	n/a	n/a
Comparison: Dietary and Activity intervention vs Activity				
Study ID	**Meta-analysis outcome(s)**			
Barnes 2021	zBMI medium; BMI medium	N	n/a	n/a
Ickovics 2019	Percentile long	Y	N	Through the trial there were no adverse events to report
Robinson 2003	BMI short	Y	Y	"Injuries and all adverse events (any medical illnesses or injuries requiring a visit to a medical care provider or institution) during the prior 3 months were formally assessed in both groups at the baseline and follow-up assessments. Adverse events were also monitored continuously, between assessments, as staff became aware of them. Adverse events were rare. Over the course of the 12-week pilot study, injuries were reported by 2 girls (7.4%) in the treatment group, and 3 girls (9.1%) in the active control group. Other adverse events (problems requiring a visit to a medical care provider) were reported by 4 girls (14.8%) in the treatment group, and 6 girls (18.2%) in the active control group. One injury in the treatment group was judged to be related to participation in the study (a broken finger). All other injuries and other adverse events in both groups were judged to be unrelated to study participation."
Robinson 2010	zBMI long; BMI long	Y	N	"Self-reported psychosocial measures were assessed annually, including Overconcern with Weight and Shape, using the McKnight Risk Factor Survey, Self-Perceived body shape and body shape dissatisfaction using African American pre-adolescent female body figure silhouettes, Depressive symptoms using the 10-item short form of the Children's Depression Inventory (CDI), Self-Esteem using the 10-item Rosenberg Self-esteem scale, and School Performance. Systematic monitoring of all injuries and other medical problems requiring a visit to a medical care provider, height growth velocity, and BMI loss suggested no increased risk associated with participation in the study as a whole or between intervention groups (all P≥ .20). No injuries or illnesses were judged to be "probably" or "definitely" related study participation."
van de Berg 2020	Percentile medium	N	n/a	n/a
Studies not included in the MA				
Study ID	**Comparison**			

Anand 2007	Dietary and Activity vs Control	N	n/a	n/a
Branscum 2013	Dietary and Activity vs Dietary and Activity	N	n/a	n/a
Carlin 2021	Dietary and Activity vs Control	Y	N	No issues that limited or affected participation or resulted in adverse events were reported
Di Maglie 2022	Activity vs Control	N	n/a	n/a
Epstein 2001	Dietary and Activity vs Dietary and Activity	N	n/a	n/a
Gortmaker 1999	Dietary and Activity vs Control	Y	Y	Measures of extreme dieting behaviour at baseline and follow-up periods to assess whether the intervention could have produced unintended side effects. Overall, students in the intervention and control schools reported similarly low levels of extreme dieting behaviour at both baseline and follow-up measurements
Hannon 2018	Dietary and Activity vs Dietary and Activity	N	n/a	n/a
Hooft van Huysduynen 2014	Dietary vs Control	N	n/a	n/a
Huys 2020	Dietary and Activity vs Control	N	n/a	n/a
Johnston 2013	Dietary and Activity vs Control	N	n/a	n/a
Lynch 2016	Dietary and Activity vs Control	N	n/a	n/a
Macias-Cervantes 2009	Activity vs Control	N	n/a	n/a
Madsen 2013	Activity vs Control	N	n/a	n/a
Marsigliante 2022	Dietary vs Control	N	n/a	n/a
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	N	n/a	n/a
Pindus 2015	Activity vs Control	N	n/a	n/a
Razani 2018	Activity vs Activity	Y	N	No serious adverse events (including all causes mortality) were reported in the trial registration, but it is not clear if these results refer to the parents or the children or both
Riiser 2020	Activity vs Control	N	n/a	n/a
Salmon 2008	Activity vs Control	N	n/a	n/a
Tessier 2008	Activity vs Activity	N	n/a	n/a
Treviño 2004	Dietary and Activity vs Control	N	n/a	n/a
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	N	n/a	n/a
Zota 2016		N	n/a	n/a

	Dietary vs Control			

Abbreviations: N: no; n/a: not applicable; Y: yes

Table 4

Description of costing information

Comparison: Dietary intervention *vs* Control					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Chai 2019	zBMI short; BMI short	Y	N	Y	N
Coleman 2012	zBMI medium; zBMI long	N	n/a	n/a	n/a
Cunha 2013	BMI medium	N	n/a	n/a	n/a
Damsgaard 2014	zBMI short	N	n/a	n/a	n/a
Davis 2021	zBMI medium; BMI medium; Percentile medium	Y	N	Y	N
de Ruyter 2012	zBMI short; zBMI medium; zBMI long	N	n/a	n/a	n/a
Fulkerson 2010	zBMI short; Percentile short	Y	N	Y	N
Fulkerson 2015	zBMI medium; zBMI long	Y	Y	N	N
Han 2006	zBMI long	N	n/a	n/a	n/a
Hendrie 2011	zBMI short; BMI short	Y	N	Y	N
Ickovics 2019	Percentile long	Y	Y	N	N
James 2004	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a	n/a
Keshani 2016	BMI medium	N	n/a	n/a	n/a
Lent 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	Y	Y	N	N
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Y	Y (Meng 2013)
NCT00224887 2005	BMI medium	N	n/a	n/a	n/a
Nicholl 2021	zBMI short; BMI short; Percentile short	N	n/a	n/a	n/a
Paineau 2008	zBMI short; BMI short	Y	N	N	N
Seguin-Fawler 2021	Percentile short	Y	N	Y	N
Sichieri 2008	BMI short	Y	N	N	N
Stettler 2015	zBMI medium; BMI medium	Y	Y	N	N
van de Berg 2020	Percentile medium	Y	N	N	N
Viggiano 2018	zBMI short; zBMI long	N	n/a	n/a	n/a
Comparison: Activity intervention vs Control					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barbeau 2007	BMI medium	Y	N	Y	N
Barnes 2015	zBMI short	Y	N	Y	N
Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Breheny 2020	zBMI short; zBMI medium	Y	Y	N	Y (Breheny 2020)
Clemes 2020	BMI short	Y	N	N	N
De Bock 2013	BMI short; BMI medium	Y	N	N	N
de Greeff 2016	BMI short	N	n/a	n/a	n/a
Diaz-Castro 2021	zBMI short; BMI short	N	n/a	n/a	n/a
Donnelly 2009	BMI long	N	n/a	n/a	n/a
Drummy 2016	BMI short	N	n/a	n/a	n/a
Farmer 2017	zBMI medium; zBMI long; BMI medium; BMI long	Y	Y	N	N
Ford 2013	BMI short	N	n/a	n/a	n/a
Ha 2021	BMI short; BMI medium	Y	Y	Y	N
Howe 2011	BMI medium	Y	N	Y	N
Ickovics 2019	Percentile long	Y	Y	N	N
Jones 2015	zBMI short; zBMI medium; BMI short; BMI medium	N	n/a	n/a	n/a
Ketelhut 2022	BMI short	N	n/a	n/a	n/a
Khan 2014	zBMI medium; BMI medium	Y	N	Y	N
Kovalskys 2016	zBMI long	N	n/a	n/a	n/a
Kriemler 2010	BMI medium; BMI long	Y	N	N	N
Lau 2016	BMI short	N	n/a	n/a	n/a
Lazaar 2007	zBMI short; BMI short	N	n/a	n/a	n/a

Li 2010	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a	n/a
Martinez-Vizcaino 2014	BMI medium	Y	Y	N	N
Martinez-Vizcaino 2020	zBMI short; BMI short	N	n/a	n/a	n/a
Martinez-Vizcaino 2022	zBMI medium; BMI medium	N	n/a	n/a	n/a
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Y	Y (Meng 2013)
Morgan 2019	zBMI medium	N	n/a	n/a	n/a
Muller 2016	zBMI medium; zBMI long; Percentile long	N	n/a	n/a	n/a
Muller 2019	zBMI medium	Y	N	N	N
Newton 2014	zBMI short; BMI short; Percentile short	Y	Y	Y	N
Rhodes 2019	BMI short	Y	N	Y	N
Sacchetti 2013	BMI long	N	n/a	n/a	n/a
Salmon 2008	zBMI long	Y	N	N	N
Simon 2008	zBMI long; BMI medium; BMI long	N	n/a	n/a	n/a
Tanskey 2017	zBMI medium; BMI medium	Y	N	Y	N
Telford 2012	BMI long	N	n/a	n/a	n/a
Thivel 2011	BMI short	N	n/a	n/a	n/a
van de Berg 2020	Percentile medium	Y	N	N	N
Vizcaino 2008	BMI medium	Y	Y	N	N
Wang 2018	zBMI medium; BMI medium	N	n/a	n/a	n/a
Wendel 2016	BMI long; Percentile long	Y	N	Y	N
Yin 2012	zBMI medium; zBMI long	Y	Y	N	Y (Wang 2008)
Comparison: Dietary and Activity intervention vs Control					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Adab 2018	zBMI long	Y	Y	Y	Y (Canaway 2019)
Annesi 2016	BMI short; BMI medium; Percentile medium	N	n/a	n/a	n/a
Annesi 2017	BMI short; BMI medium	N	n/a	n/a	n/a
Baranowski 2003	BMI short	Y	N	Y	N
Baranowski 2011	zBMI short; Percentile short	Y	N	Y	N
Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Beech 2003	BMI short	Y	N	Y	N
Bohnert 2013	zBMI short	N	n/a	n/a	n/a
Brandstetter 2012	BMI long	N	n/a	n/a	n/a
Brown 2013	zBMI short; BMI short; Percentile short	Y	N	Y	N
Caballero 2003	BMI long	N	n/a	n/a	n/a
Cao 2015	zBMI medium; zBMI long	N	n/a	n/a	n/a
Chen 2010	BMI short	N	n/a	n/a	n/a
Choo 2020	zBMI short	N	n/a	n/a	n/a
Crespo 2012	zBMI medium; zBMI long; Percentile medium; Percentile long	Y	N	Y	N
De Heer 2011	BMI short; Percentile short	Y	N	N	N
Duncan 2019	BMI short	N	n/a	n/a	n/a
Elder 2014	zBMI medium; zBMI long; BMI medium; BMI long; Percentile medium; Percentile long	N	n/a	n/a	n/a
Fairclough 2013	zBMI short; BMI short	N	n/a	n/a	n/a
Foster 2008	zBMI long; BMI long	N	n/a	n/a	n/a
Fulkerson 2022	zBMI medium	Y	N	Y	N
Gentile 2009	BMI short; BMI medium	Y	Y	N	N
Greve 2015	BMI long	Y	N	Y	N
Griffin 2019	zBMI short	Y	Y	Y	N
Grydeland 2014	zBMI long; BMI long	N	n/a	n/a	n/a
Habib-Mourad 2014	BMI short	N	n/a	n/a	n/a
Habib-Mourad 2020	zBMI long	Y	N	N	N
Haire-Joshu 2010	zBMI short	Y	N	Y	N
HEALTHY Study Group 2010	zBMI long	Y	Y	Y	N
Hendy 2011	Percentile short	Y	Y	N	N
Hopper 2005	BMI short	N	n/a	n/a	n/a
Hull 2018	zBMI short; zBMI long; BMI short; BMI long	Y	N	Y	N

Ickovics 2019	Percentile long	Y	Y	N	N
Jansen 2011	BMI short	N	n/a	n/a	n/a
Kain 2014	zBMI medium; BMI medium	N	n/a	n/a	n/a
Keller 2009	zBMI medium	N	n/a	n/a	n/a
Kipping 2008	BMI short	Y	Y	N	N
Kipping 2014	zBMI short; zBMI long	Y	Y	N	N
Klesges 2010	BMI medium; BMI long	N	n/a	n/a	n/a
Kobel 2017	BMI medium; Percentile medium	Y	Y	N	Y (Kesztyus 2017)
Kocken 2016	zBMI short; zBMI long	N	n/a	n/a	n/a
Kubik 2021	zBMI medium; zBMI long; BMI medium; BMI long	N	n/a	n/a	n/a
Levy 2012	zBMI short	N	n/a	n/a	n/a
Li 2019	zBMI medium	Y	Y	N	Y (Zanganeh 2021)
Lichtenstein 2011	zBMI medium; zBMI long	N	n/a	n/a	n/a
Liu 2019	zBMI short; zBMI medium; BMI short; BMI medium	N	n/a	n/a	n/a
Liu 2022	zBMI short; zBMI medium; BMI short; BMI medium	N	n/a	n/a	n/a
Llargues 2012	BMI long	Y	Y	N	Y (Mora 2015)
Lloyd 2018	zBMI long; BMI long	Y	Y	N	Y (Wyatt 2018)
Magnusson 2012	BMI long	Y	N	Y	N
Marcus 2009	zBMI long	Y	N	N	N
Morgan 2011	zBMI short	Y	N	N	N
Morgan 2014	zBMI short; BMI short	N	n/a	n/a	n/a
NCT02067728 2014	zBMI short	N	n/a	n/a	n/a
Nemet 2011a	BMI medium; Percentile medium	N	n/a	n/a	n/a
Nemet 2011b	BMI medium; BMI long; Percentile medium; Percentile long	N	n/a	n/a	n/a
Nollen 2014	BMI short	N	n/a	n/a	n/a
Nyberg 2015	zBMI short; zBMI medium	N	n/a	n/a	n/a
Nyberg 2016	zBMI short; zBMI medium	Y	N	Y	N
O'Connor 2020	zBMI short	N	n/a	n/a	n/a
Pena 2021	zBMI short; BMI short	Y	N	Y	N
Puder 2011	BMI medium	Y	N	N	N
Ramirez-Rivera 2021	zBMI short	N	n/a	n/a	n/a
Rerksuppaphol 2017	zBMI short; BMI short	N	n/a	n/a	n/a
Rosario 2012	zBMI short; BMI short	N	n/a	n/a	n/a
Rosenkranz 2010	zBMI short; BMI short; Percentile short	Y	N	Y	N
Rush 2012	zBMI long	Y	Y	N	Y (Rush 2014)
Safdie 2013	BMI short; BMI medium; BMI long	Y	N	N	N
Sahota 2001	zBMI medium	N	n/a	n/a	n/a
Sahota 2019	zBMI long	Y	N	Y	N
Santos 2014	zBMI medium	N	n/a	n/a	n/a
Sekhavat 2014	zBMI medium; BMI medium	N	n/a	n/a	n/a
Sgambato 2019	BMI short	N	n/a	n/a	n/a
Sherwood 2019	zBMI medium; zBMI long; Percentile medium; Percentile long	Y	N	N	N
Siegrist 2013	zBMI medium; BMI medium	N	n/a	n/a	n/a
Siegrist 2018	BMI long	N	n/a	n/a	n/a
Spiegel 2006	zBMI short	N	n/a	n/a	n/a
Stettler 2015	zBMI medium; BMI medium	Y	Y	N	N
Stolley 1997	BMI short; BMI medium	Y	N	Y	N
Story 2003	BMI short	N	n/a	n/a	n/a
Story 2012	zBMI long; BMI long	N	n/a	n/a	n/a
Topham 2021	zBMI long	N	n/a	n/a	n/a
van de Berg 2020	Percentile medium	Y	N	N	N
Wang 2012	zBMI medium	N	n/a	n/a	n/a
White 2019	zBMI short; zBMI medium; zBMI long	Y	Y	Y	N
Williamson 2012	zBMI long	N	n/a	n/a	n/a
Xu 2015	zBMI medium; BMI medium	N	n/a	n/a	n/a
Xu 2017 (5 other cities)	zBMI medium; BMI medium	Y	Y	N	Y (Xu 2020b)
Comparison: Activity intervention vs Dietary intervention					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**

Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Ickovics 2019	Percentile long	Y	Y	N	N
Meng 2013 (Beijing)	zBMI medium; BMI medium	Y	Y	Y	Y (Meng 2013)
van de Berg 2020	Percentile medium	Y	N	N	N
Comparison: Dietary and Activity intervention vs Dietary					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Ickovics 2019	Percentile long	Y	Y	N	N
Stettler 2015	zBMI medium; BMI medium	Y	Y	N	N
van de Berg 2020	Percentile medium	Y	N	N	N
Comparison: Dietary and Activity intervention vs Activity					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barnes 2021	zBMI medium; BMI medium	Y	N	N	N
Ickovics 2019	Percentile long	Y	Y	N	N
Robinson 2003	BMI short	Y	N	Y	N
Robinson 2010	zBMI long; BMI long	N	n/a	n/a	n/a
van de Berg 2020	Percentile medium	Y	N	N	N
Studies not included in the meta-analyses					
Study ID	**Comparison**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Anand 2007	Dietary and Activity vs Control	N	n/a	n/a	n/a
Branscum 2013	Dietary and Activity vs Dietary and Activity	N	n/a	n/a	n/a
Carlin 2021	Dietary and Activity vs Control	Y	N	Y	N
Di Maglie 2022	Activity vs Control	N	n/a	n/a	n/a
Epstein 2001	Dietary and Activity vs Dietary and Activity	N	n/a	n/a	n/a
Gortmaker 1999	Dietary and Activity vs Control	Y	Y	N	Y (Wang 2003)
Hannon 2018	Dietary and Activity vs Dietary and Activity	Y	N	N	N
Hooft van Huysduynen 2014	Dietary vs Control	N	n/a	n/a	n/a
Huys 2020	Dietary and Activity vs Control	Y	Y	N	Y (Willems 2020 and Willems 2021)
Johnston 2013	Dietary and Activity vs Control	N	n/a	n/a	n/a
Lynch 2016	Dietary and Activity vs Control	N	n/a	n/a	n/a
Macias-Cervantes 2009	Activity vs Control	N	n/a	n/a	n/a
Madsen 2013	Activity vs Control	N	n/a	n/a	n/a
Marsigliante 2022	Dietary vs Control	N	n/a	n/a	n/a
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	Y	Y	N	N
Pindus 2015	Activity vs Control	N	n/a	n/a	n/a
Razani 2018	Activity vs Activity	Y	N	Y	N
Riiser 2020	Activity vs Control	N	n/a	n/a	n/a
Salmon 2008	Activity vs Control	N	n/a	n/a	n/a
Tessier 2008	Activity vs Activity	N	n/a	n/a	n/a
Treviño 2004	Dietary and Activity vs Control	Y	N	Y	N
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	N	n/a	n/a	n/a
Zota 2016	Dietary vs Control	Y	Y	N	N

Abbreviations: N: no; n/a: not applicable; Y: yes.

Table 5

Description of PROGRESS characteristics

Comparison: Dietary intervention vs Control				
Study ID	**PROGRESS factors reported**	**PROGRESS factors for which impact is reported**	**Place of residence**	**Race/Ethnicity/Culture/Language**
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness	NR

				classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional (inner/outer regional/remote)	
Chai 2019	Place of residence; Gender/Sex; Education; Socioeconomic status			One metropolitan and two rural sites. Modified Monash category: Major City (MM 1): 61%; Medium Regional (MM 4): 3%; Small Regional (MM 5): 37%;	NR
Coleman 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex		NR	Hispanic: 52% African American: 19%; Non-Hispanic white: 19%; Asian/Pacific Islander: 7%; Native American: 0.3%; unknown: 2.7%
Cunha 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status			Metropolitan area of Rio de Janeiro	Skin colour: Intervention: White: 25.6%; Brown: 47.6%; Black: 26.8%. Control: White: 25.7%; Brown: 42.7% Black: 31.5%
Damsgaard 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Education			NR	Immigrant/descendant: 12%; non-immigrant: 88%
Davis 2021	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status			NR	White: 20.8%; Black: 9.7%; Hispanic: 64.4%; Native Americans, Asian/Pacific Islands/Other: 3.6%

de Ruyter 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Urban area	Dutch: 78.2%; Non-Western: 18.7%; Other: 1.9%
Fulkerson 2010	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education		NR	Children ethnicity: Caucasian: 84%; mixed race; 11%; American Indian: 5%; African American: 2%
Fulkerson 2015	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Urban	Ethnicity: Hispanic: 9%; Race: White: 68%; Black: 18%; American Indian, Asian, Multi-racial: 14%
Han 2006	Gender/Sex		NR	NR
Hendrie 2011	Occupation; Gender/Sex; Education; Socioeconomic status		NR	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
James 2004	Gender/Sex		NR	NR
Keshani 2016	Occupation; Gender/Sex; Education		NR	See Notes on PROGRESS

Lent 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Black/African American: intervention: 46.2%; control: 38.3%; White: intervention: 0.5%; control: 13.2%; Hispanic/Latino: intervention: 43.2%; control: 16.2%; Asian: intervention: 0.5%; control: 15.9%; Native American/Alaskan Native: intervention: 0.2%; control: 1.5%; Other/Mixed/Unknown: intervention: 9.4%; control: 15%
Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status		Urban	NR
NCT00224887 2005	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Native American communities in Pine Ridge Reservation	Mother is of Mexican descent and identifies with the Mexican-American community (See PROGRESS notes)

Nicholl 2021	Gender/Sex; Education; Socioeconomic status		NR	NR
Paineau 2008	Occupation; Gender/Sex		See Notes on PROGRESS	NR
Seguin-Fawler 2021	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		Farm communities	American Indian/Alaskan Native: intervention: 0.7%; control: 1.9%; Asian/Pacific Islander: intervention:1.4%; control: 1.3%; Black: intervention: 15.5%; control: 12.1%; White: intervention: 75.7%; control: 76.4%; Multiracial: intervention: 4.7%; control: 5.7; not one of the above: intervention 2%; control: 2.5%; Hispanic: intervention: 6.1%; control: 6.4%
Sichieri 2008	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Metropolitan city	Race: Intervention: White: 41.8%; Mulatto: 25.9%; Black: 32.3%; Control: White: 42.3%; Mulatto: 30.6%; Black: 26.9%
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex		NR	Beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; Control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9%
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%
Viggiano 2018	Gender/Sex	Gender/Sex	NR	NR

Comparison: Activity intervention vs Control				
Study ID	**PROGRESS factors reported**	**PROGRESS factors for which impact is reported**	**Place of residence**	**Race/Ethnicity/Culture/Language**
Barbeau 2007	Race/Ethnicity/Culture/Language; Gender/Sex		NR	100% Black
Barnes 2015	Gender/Sex; Socioeconomic status		NR	NR
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional (inner/outer regional/remote)	NR
Breheny 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	See Notes on PROGRESS	White British: 51.5%; South Asian: 16.2%; Black African Caribbean: 8.4%; Other/not specified: 23.9%
Clemes 2020	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Urban (schools located in the city of Bradford)	South Asian Heritage: 48%; White British: 36%; Other: 16%
De Bock 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Rural and non-rural	Immigrant background (non-German): 37%

de Greeff 2016	Gender/Sex		NR	NR
Diaz-Castro 2021	Gender/Sex		NR	NR
Donnelly 2009	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Rural and urban schools	Caucasian: 77.4%; African American 6.2%; Hispanic: 10.1%; Native American: 1.65; Asian: 1.2%; Multi-Ethnic: 3.6%
Drummy 2016	See Notes on PROGRESS	Gender/Sex	NR	NR
Farmer 2017	Gender/Sex; Socioeconomic status		NR	New Zealand/European: 53%; Pacific Island: 12.3%; Asian: 8.7%: Unknown: 14.04%
Ford 2013	Gender/Sex		NR	NR
Ha 2021	Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	NR	NR
Howe 2011	Race/Ethnicity/Culture/Language; Gender/Sex		NR	100% Black
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
Jones 2015	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Gender/Sex	NR	Cultural background: Australian: 81.1%; Asian: 8.1%; European: 0%; Other: 10.8% English spoken at home: 89.2%
Ketelhut 2022	Gender/Sex; Socioeconomic status		NR	NR
Khan 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	NR	Intervention: White: 47%; Black or African American: 23%; Asian: 15%; Other and multiracial: 15% Control: White: 53%; Black or African American: 26% Asian: 9%; Other and multiracial: 12%

Kovalskys 2016	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Town	Eligible children comprised mainly of a Caucasian population
Kriemler 2010	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Rural and urban	Migrant families: 27%
Lau 2016	Gender/Sex		NR	NR
Lazaar 2007	Gender/Sex		NR	NR
Li 2010	Place of residence; Gender/Sex	Gender/Sex	Urban Beijing	NR
Martinez-Vizcaino 2014	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education	Gender/Sex; Education	Rural schools: 90%	Born abroad: intervention: girls: 12.7%; boys: 12%; control: girls: 14.2%; boys 17.1%
Martinez-Vizcaino 2020	Gender/Sex		NR	NR
Martinez-Vizcaino 2022	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex	Mainly rural schools	NR

Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status		Urban	NR
Morgan 2019	Occupation; Gender/Sex; Education; Socioeconomic status		NR	NR
Muller 2016	Gender/Sex		NR	NR
Muller 2019	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Socioeconomic status		Townships school: 57%; Northern Area schools: 43%	The study population consisted of coloured children (mixed race ancestry), usually Afrikaans speaking, and black African children, mainly Xhosa speaking
Newton 2014	Race/Ethnicity/Culture/Language; Gender/Sex		NR	African-American: 59%
Rhodes 2019	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		NR	Predominately white visible minority: education condition: 17%; education + planning condition: 7.7%
Sacchetti 2013	Place of residence; Gender/Sex		City, plain, hills; (see PROGRESS notes)	NR

Salmon 2008	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Suburban primary schools	Country of birth: Australia: 66.9%; other: 33.1%
Simon 2008	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	Residence location with < 50 000 inhabitants: intervention: 44.5%; control: 48.2%	NR
Tanskey 2017	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Race/Ethnicity/Culture/Language	Urban, suburban and peri-urban schools	Race/Ethnicity: White: 37%; Hispanic: 365; Black: 7%; Asian: 4%; Multi-ethnic: 6%; Other/no response: 10%
Telford 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Outer suburb	Children's ethnic descent (1 or both parents): White: 86%; Asian: 8%; Australian Aboriginal or Torres Strait Islander: 3%; Polynesian: 1%; missing data: 2%
Thivel 2011	Gender/Sex		NR	NR
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%
Vizcaino 2008	Place of residence; Gender/Sex	Place of residence; Gender/Sex	Urban, suburban and rural Except for the provincial capital (population 48 000), all the towns were small (population 1800–6500) and	NR

			their main economic activities were farming, food processing and mechanical industries	
Wang 2018	Place of residence; Gender/Sex		Urban districts	NR
Wendel 2016	Race/Ethnicity/Culture/Language; Gender/Sex		NR	White: 74.6%; Hispanic: 7.85; Black: 7.3%; Other: 10.4%
Yin 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Schols in urban, suburban, and rural community settings within a metropolitan area.	White: 32%; African-American: 66%
Comparison: Dietary and Activity intervention vs Control				
Study ID	**PROGRESS factors reported**	**PROGRESS factors for which impact is reported**	**Place of residence**	**Race/Ethnicity/Culture/Language**
Adab 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Rural and urban areas	Ethnicity: White British: 45.3%; South-Asian: 30.5%; Black African-Caribbean: 7.9%; Other: 16.2%; unknown: 1.1
Annesi 2016	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	White: 11.4 %; African-American: 75.4 %; Hispanic; 11.4 %; other 1.8 %
Annesi 2017	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	NR	White: 31% White; black: 65%; other: 4%
Baranowski 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	100% African-American or Black (as identified by parents)
Baranowski 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Urban middle school students in Texas (75%) and rural middle school students in North Carolina (25%)	White: 39.9%; African American: 24.2%; Hispanic: 28.1%; other: 7.8%
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional	NR

			(inner/outer regional/remote)	
Beech 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	100% African-American or Black (as identified by parents)
Bohnert 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban	Ethnicity: African-american: 36%; Latina: 60%; Caucasian: 4%
Brandstetter 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Education		NR	Migration background: Intervention: 36.8%. Control: 28.9% (see PROGRESS notes)
Brown 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Indian reservations	100% Native American
Caballero 2003	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Gender/Sex	American-Indian schools located primarily in rural settings	100% American Indian ethnicity
Cao 2015	Gender/Sex		NR	NR
Chen 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education		NR	100% Chinese American children
Choo 2020	Gender/Sex; Education; Socioeconomic status		NR	NR
Crespo 2012	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	NR	Children born in USA: 86.2 %; parent born outside United states: 71.8%
De Heer 2011	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	The majority of the participants were hispanic school children. Children with limited English proficiency across participating schools (average): 47%

Duncan 2019	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Socioeconomic status	NR	Intervention: European: 65.9%; Maori 10.4%; Pacific Island: 6.4%; Asian: 13.1%; Other: 4%. Control: European 70.5%; Maori: 5.5%; Pacific Island: 1.8%; Asian: 13.1%; 19.1%; Other: 3%
Elder 2014	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex; Education	Urban (primarily in the city of San Diego)	Latino: 41.2%
Fairclough 2013	Place of residence; Race/Ethnicity/Culture/Language; Socioeconomic status	Gender/Sex; Socioeconomic status	Eligible schools were identified within pre-defined geographical units known as Neighbourhood Management Areas (data not reported); home postcodes were measured and used to generate the household indices of multiple deprivation	White British ethnicity: 95% (representative of the school age population in Wigan)
Foster 2008	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex	Urban public schools	Race: Black: 45.5%; Asian: 21.8%; Hispanic: 15%; White: 12.2%; Other: 5.5%
Fulkerson 2022	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Rural	Ethnicity: Non Hispanic/Latino: 93%; Hispanic/Latino: 7% Race: Not White or multiracial: 7%; White: 93%
Gentile 2009	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Urban (Cedar Rapids) and suburban (Lakeville)	White: Lakeville schools: 96%; Cedar Rapid schools: 93%
Greve 2015	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Municipality of Odense (fourth largest municipality in Denmark)	Non-Western immigrant: intervention 14.3%; control: 21.6%

Griffin 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Urban local authority	Ethnicity: White British: 39.5%; Non-White British: 60.5% Main spoken language: English: 86.1%; Urdu: 2.3%; Punjabi: 2.3%; Spanish: 2.3%; Turkish: 2.3%; Missing: 2.3%
Grydeland 2014	Place of residence; Gender/Sex; Education	Gender/Sex; Education	Largest towns or municipalities	NR
Habib-Mourad 2014	Place of residence; Gender/Sex; Religion; Socioeconomic status		City	NR
Habib-Mourad 2020	Gender/Sex; Socioeconomic status		NR	NR
Haire-Joshu 2010	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		Primarily urban and suburban population	Race: Intervention: White: 54.35; Other: 45.7%. Control: White: 62.4%; Other: 37.6%
HEALTHY Study Group 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence; Gender/Sex	NR	Hispanic: 54.2%; Black: 18%; White: 19.3%; Other: 8.5%

Hendy 2011	Place of residence; Gender/Sex		Small town	NR
Hopper 2005	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Predominantly rural area	Caucasian: 83%; Native American: 5%; Asian: 5%; Hispanic: 5%; Africar American: 2%
Hull 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Metropolitan area	100% Hispanic population. Mother country of birth: Mexico: intervention: 74%; control: 72%; Other Latin American country: intervention: 26%; control: 28% Parent English-speaking ability: Not at all: intervention: 12%; control: 14%; A little: intervention: 58%; control: 59%; Somewhat/good/very good: intervention: 29%; control: 28% Child country of birth: Mexico: intervention: 3%; control: 6%; Other Latin American country: intervention: 3%; control: 1%; USA: intervention: 94%; control: 93% Child usual language spoken: Mostly/only Spanish: intervention: 33%; control: 37%; English/Spanish equally: intervention: 53%; control: 55%; Mostly/only English: intervention: 14%; control: 19%
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
Jansen 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Inner city	Dutch: Grades 3 – 5 intervention: 14.3%; Grades 3 – 5 control: 6.9%; Grades 6 – 8 intervention: 13.6%; Grades 6 – 8 control: 8.0% Surinam: Grades 3 – 5 intervention: 9.4%; Grades 3 – 5 control: 11.0%; Grades 6 – 8: intervention: 11.3%; Grades 6 – 8 control: 12.7% Antillean: Grades 3 – 5 intervention: 5.6%; Grades 3 – 5 control: 4.1%; Grades 6 – 8: intervention: 4.8%; Grades 6 – 8 control: 2.8% Moroccan: Grades 3 – 5 intervention: 26.8%; Grades 3 – 5 control: 36.4%; Grades 6 – 8: intervention: 22.1%; Grades 6 – 8 control: 34.6% Turkish: Grades 3 – 5 intervention: 21.9%; Grades 3 – 5 control: 20.3%; Grades 6 – 8: intervention: 23.7%; Grades 6 – 8 control: 22.5% Capeverdean: Grades 3 – 5 intervention: 4.0%; Grades 3 – 5 control: 4.0%; Grades 6 – 8: intervention: 5.1%; Grades 6 – 8 control: 4.7%

				Other/missing: Grades 3 – 5 intervention: 18.0%; Grades 3 – 5 control: 17.4%; Grades 6 – 8: intervention: 19.4%; Grades 6 – 8 control: 14.7%
Kain 2014	Gender/Sex; Socioeconomic status		NR	NR
Keller 2009	Gender/Sex		NR	NR
Kipping 2008	Place of residence; Gender/Sex; Socioeconomic status		Urban area	NR
Kipping 2014	Place of residence; Gender/Sex; Socioeconomic status		Urban and rural areas	NR
Klesges 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Socioeconomic status	NR	100% African-American
Kobel 2017	Race/Ethnicity/Culture/Language; Gender/Sex; Education		NR	Study targets children with migration background that were spoken to in language other than German in first 3 years of life
Kocken 2016	Race/Ethnicity/Culture/Language; Gender/Sex		See Notes on PROGRESS	Ethnicity: Western: 85%; Non-western: 11.3%
Kubik 2021	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Urban school disrict: 80%; suburban school distric: 20%	White: 37%; Hispanic: 23%; Black: 21%; Other: 19%

Levy 2012	Place of residence; Gender/Sex; Socioeconomic status		Urban and rural schools	NR
Li 2019	Place of residence; Gender/Sex; Education; Socioeconomic status	Gender/Sex; Education	Urban schools	NR
Lichtenstein 2011	See Notes on PROGRESS		NR	See Notes on PROGRESS
Liu 2019	Race/Ethnicity/Culture/Language; Gender/Sex		NR	Schools with minor ethnic groups were not included
Liu 2022	Gender/Sex; Education	Gender/Sex; Education; Socioeconomic status	NR	NR
Llargues 2012	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education	Education;	NR	Immigrant: intervention: 17.3%; control: 20.7%
Lloyd 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	Urban and rurals schools	Ethnicity: White: 95.8% Pupils with English as an additional language/Non-White British: 4.1%

Magnusson 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	Native children (Caucasian-White): 97%
Marcus 2009	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Blocks of flats and detached houses	Parents categorised as immigrants varied between 5%-10% (range) in both intervention and control schools
Morgan 2011	Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	NR	NR
Morgan 2014	Place of residence; Occupation; Gender/Sex; Socioeconomic status	Place of residence; Gender/Sex; Socioeconomic status	Rural local government areas	NR
NCT02067728 2014	Gender/Sex		NR	NR
Nemet 2011a	Race/Ethnicity/Culture/Language; Gender/Sex; Religion		NR	Jewish children

Nemet 2011b	Race/Ethnicity/Culture/Language; Gender/Sex; Religion; Socioeconomic status		NR	Arab-Israeli community
Nollen 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	Race: African-American: 83.7%; Bi- or Multi-racial: 8.2%; American Indian/Alaska Native: 6.1%; Asian/Pacific Islander: 2% Ethnicity: Hispanic/Latina: 7.8%
Nyberg 2015	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Mixed types of housing: blocks of flats, semi-detached houses and detached houses.	Parents were born in Sweden: 70%; parents were born in in Europe: 7%; parents were born in outside of Europe: 23%
Nyberg 2016	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex; Education; Socioeconomic status	See Notes on PROGRESS	Parents born outside the Nordic region: 80.4%
O'Connor 2020	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		NR	Language spoken at home: English: 0%; Spanish: 83.3%; Both English and Spanish: 16.7% Country of birth (if outside United States): Mexico: 69.4%; El Salvador: 8.3%; Honduras: 5.6%; Other/unknown: 5.6% Acculturation: Hispanic: 3.6 (SD 0.48); Non-Hispanic: 2 (SD 0.8)

Pena 2021	Race/Ethnicity/Culture/Language; Gender/Sex		NR	Not Chilien nationality: intervention: 21.9%; control: 29.5%
Puder 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Gender/Sex	German vs French part of Switzerland: 51%	Mainly speaking foreign language at home (any language other than German or French): 40% Parental migration status: neither parent: 28%; one parent: 24%; both parents: 48% Most common migration regions: former Yugoslavia: 25%; Portugal: 17%; rest of Europe (predominantly Mediterranean and Eastern Europe): 31%; Africa: 12%; rest of the world (predominantly Asia, Middle East, and South America): 15%
Ramirez-Rivera 2021	Gender/Sex; Education		NR	NR
Rerksuppaphol 2017	Place of residence; Gender/Sex		Township	NR
Rosario 2012	Place of residence; Gender/Sex; Education		Urban schools	NR
Rosenkranz 2010	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Towns of 4,000 to 50,000 population	Non-Hispanic Caucasian: intervention: 79.4%; control: 75%
Rush 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Rural schools: 76%; urban schools: 24%	New Zealand European: 59%; Maori: 34%; Pacific Islands: 4%; Asian: 3%; Other: 1%
Safdie 2013			Urban area	NR

	Place of residence; Gender/Sex; Socioeconomic status			
Sahota 2001	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Outside inner city schools	Children from ethnic minorities in schools: 1-42%
Sahota 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Town	White-British: intervention: 73.9%; control: 65.9%; Pakistani: intervention: 19.2%; control: 18.2%; Gypsy/Roma: intervention: 0%; control: 9.4%
Santos 2014	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence; Gender/Sex; Socioeconomic status;	Rural schools: 49% ; urban schools: 51%. Dissemination areas inside Winnipeg are assigned urban status, whereas those outside Winnipeg are assigned rural status	First Nations (i.e. indigenous): 28.3%; Non - First Nations: 71.7%
Sekhavat 2014	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	NR	Race: Southeast Asian: 7.7%; West Asian: 4.2%; White: 21.4%; Asian: 6.5%; Black: 19.2%; Latin American: 8.9%; Arab: 6.0%; Native: 0.6%; South Asian: 22.6%; Mixed: 1.8%; Guyana: 0.6%; Missing: 0.6% Aboriginal person: 98.2% Country of birth: developing: 25.6%; developed: 74.4% Language: English/French: 88.1%; others: 11.9%
Sgambato 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Metropolitan area	Black: intervention: 24.4%; control: 23.5%; White: intervention: 23.1%; control: 27.6%; Mixed race: intervention: 52.5%; control: 48.9%
Sherwood 2019	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Metropolitan area	Non-Hispanic White: 69.1%; Hispanic: 6.9%
Siegrist 2013	Gender/Sex		NR	NR
Siegrist 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		City area schools; 80%; schools outside the greater city area: 20%	Children were mainly Caucasian

Spiegel 2006	Socioeconomic status		NR	NR
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex		NR	Beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; Control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9%
Stolley 1997	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		Urban	100% African-American
Story 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	Children ethnicity: Biracial: 13% Parent/caregiver ethnicity: African-American: 83%; Biracial: 5.6%; Caucasian only: 11.4%
Story 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Native American communities in Pine Ridge Reservation	Children were of American Indian heritage: 99.3% (see PROGRESS notes)
Topham 2021	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Rural schools	Euro-American: 72%; American-Indian: 18.5%; Latino: 4.5%; African-American: 2.5%; Multiethnic: 2.1%; Other: 0.2%
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%
Wang 2012	See Notes on PROGRESS		NR	NR

White 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Mostly rural communities	White: 68%; Hispanic: 14%; Black: 12%; Asian: 1%; Native American: 3%; Other: 2%
Williamson 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language	Rural location	African-American: 68.4%; White: 31.6%
Xu 2015	Gender/Sex; Education		NR	See Notes on PROGRESS
Xu 2017 (5 other cities)	Place of residence; Gender/Sex; Education; Socioeconomic status		Urban	NR
Comparison: Activity intervention vs Dietary intervention				
Study ID	**PROGRESS factors reported**	**PROGRESS factors for which impact is reported**	**Place of residence**	**Race/Ethnicity/Culture/Language**
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional (inner/outer regional/remote)	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status		Urban	NR

van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%

Comparison: Dietary and Activity intervention vs Dietary

Study ID	PROGRESS factors reported	PROGRESS factors for which impact is reported	Place of residence	Race/Ethnicity/Culture/Language
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional (inner/outer regional/remote)	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex		NR	Beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; Control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9%
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%

Comparison: Dietary and Activity intervention vs Activity

Study ID	PROGRESS factors reported	PROGRESS factors for which impact is reported	Place of residence	Race/Ethnicity/Culture/Language
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	School remoteness classification: 75% Urban (major cities); 25% Regional (inner/outer regional/remote). Students remoteness classification: 80% Urban (major cities); 20% Regional	NR

			(inner/outer regional/remote)	
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban district with >21,000 students	Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes)
Robinson 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	100% African-American or Black (as identified by parents)
Robinson 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		NR	100% African-American or Black (as identified by parents)
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Ethnicy: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4%
Studies not included in the meta-analyses				
Study ID	**PROGRESS factors reported**	**PROGRESS factors for which impact is reported**	**Place of residence**	**Race/Ethnicity/Culture/Language**
Anand 2007	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status; Social capital		Aborigenal National Reservation	Aboriginal Community
Branscum 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Suburban county	African American: intervention: 14%; control: 6%; Caucasian: intervention: 73%; control: 82%; Asian: intervention: 5%. Control: 12%; Hispanic: intervention: 3%; control 0%; Mixed Race: intervention: 5%; control: 0%
Carlin 2021	Gender/Sex; Socioeconomic status		NR	NR

Di Maglie 2022	Place of residence; Gender/Sex	Gender/Sex	City	NR
Epstein 2001	Gender/Sex		NR	NR
Gortmaker 1999	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Metropolitan area	Intervention: White: 69%; African-American: 11%; Hispanic: 11%; Asian/Pacific Islander: 9%; American Indian: 2%; Other: 5% Control: White: 63%; African-American: 15%; Hispanic: 16%; Asian/Pacific Islander: 7%; American Indian: 2%; Other: 9%
Hannon 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban setting	Ethnicity: Hispanic or Latino: mothers only: 77.6%; mothers + children: 71.2%; English as primary language: mothers only: 84.4%; mothers + children: 82.8% Race: African-American: mothers only: 57.8%; mothers + children; 57.1%; Caucasian: mothers only: 28.1%; mothers + children: 275; Others: mothers only: 14.1%; mothers + children: 15.9%
Hooft van Huysduynen 2014	Gender/Sex; Education		NR	NR
Huys 2020	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Socioeconomic status		NR	Parents ethnic background: Caucasian: 90.7%
Johnston 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Race/Ethnicity/Culture/Language	Suburban	Hispanic: intervention: 21.3%; control: 16.4%; Black: intervention: 16.0%; control: 29.4%; Asian: intervention: 29.7%; control: 26.0%; White: intervention: 33.0%; control: 28.2%
Lynch 2016	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex;		NR	White: 60.8%; Non-White: 39.2%

	Education			
Macias-Cervantes 2009	Gender/Sex		NR	NR
Madsen 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Urban school district	African-American: 12%; Asian: 32%; Latino: 42%; White: 0%; Other: 14%
Marsigliante 2022	Place of residence; Gender/Sex	Gender/Sex	City	NR
Muzaffar 2019	Race/Ethnicity/Culture/Language; Gender/Sex		NR	White: intervention: 45%; control: 55%; Black: intervention: 42%; control: 23%; Asian: intervention: 8% control: 13%; Latino/a: intervention: 4%; control: 16%; Other: intervention 6%; control: 14%
Pindus 2015	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		NR	Intervention: White: 69%; Black or African American: 6%; Asian: 6%; Other and multiracial: 19%. Control: White: 63%; Black or African American: 0% Asian: 6%; Other and multiracial: 25%
Razani 2018	Place of residence; Race/Ethnicity/Culture/Language; Education; Socioeconomic status		Urban	Parent Race/Ethnicity: African American: 67%; Non-Latino White5%; Latino 15%; Other (Native American, Middle Eastern, API): 13% Parent Primary Language: English: 79%; Spanish: 9%; Arabic 4%; Other (Nepali, Tongan, Mandinca, Fulanis, Ahmaric, French, Farsi): 8% Parent Country of birth: United States: 82%; Not United states: 17%; Missing: 1%
Riiser 2020	Place of residence; Gender/Sex	Gender/Sex	Urban and rural	NR
Salmon 2008	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex	Suburbs in metropolitan area	NR
Tessier 2008	Place of residence; Occupation; Gender/Sex		Urban and rural schools; principal home located in a city: 21.4%	NR
Treviño 2004	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Urban (Inner-city neghbourhood)	Intervention: Asian 6.2%; African-American 13.1%; Mexican-American 76.7%; Other ethnic groups 4%; Control: Asian 5.5%; African-American 7%; Mexican-American 82.5%; other ethnic groups 5%
Warren 2003	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Urban (schools were in close proximity to the	Children of Caucasian origin: 89%

			Oxford Brookes University)	
Zota 2016	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Living in the Attica region: Multicomponent intervention: 68.4%; Environmental intervention: 52%; School near Roma establishments: Multicomponent intervention: 10.4%; Environmental intervention: 16.1%	Greece as maternal country of birth: multicomponent intervention: 68.5%; Environmental intervention: 69.3%; Greece as paternal country of birth: multicomponent intervention: 71.7%; Environmental intervention: 73%; Greece as child country of birth: multicomponent intervention: 96.4%; Environmental intervention: 96.9%

Abbreviations: NR: non reported; SD: standard deviation; SE: standard error.

Table 6

Description of studies and/or outcome(s) not included in meta-analyses

Results are reported narratively						
Study ID	**Comparison**	**Reported outcome(s)**	**Outcome(s) not included in meta-analyses**	**Results as reported by authors**	**Direction of effect**	**Comments**
Anand 2007	Dietary and Activity vs Control	BMI	BMI short	The authors reported that one of the limitations of our study included not being powered to detect differences in BMI	No effect	—
Hooft van Huysduynen 2014	Dietary vs Control	BMI	BMI short	The authors reported that the intervention did not affect children's BMI (P = 0.390)	No effect	—
Madsen 2013	Activity vs Control	zBMI	zBMI short	The authors reported that in adjusted models, there was no difference between groups in change of zBMI.	No effect	—
The comparison is not eligible for meta-analyses (the comparison is between the same type of intervention)						
Study ID	**Comparison**	**Reported but not eligible/Measured but not reported/Planned but not measured**	**Details of missing evidence**	**Results**	**Direction of effect**	**Comments**
Branscum 2013	Dietary and Activity vs Dietary and Activity	BMI Percentile	Percentile short	The author reported that no significant difference were found for the interaction (group-by-time) for BMI percentile	No effect	—
Epstein 2001	Dietary and Activity vs Dietary and Activity	zBMI; Proportion of children with weight status classification of overweight	zBMI short; zBMI medium	The authors reported that children showed a stable percentage of overweight over time	No effect	—
Hannon 2018	Dietary and Activity vs Dietary and Activity	BMI Percentile	Percentile short; Percentile medium	The authors reported that participating children (mothers and children intervention group) had a reduction in BMI percentile at 3 months (−1.77, P = 0.014), 6 months (−3.0, P = 0.002), and 12 months (−2.91, P = 0.004). No evidence of	Beneficial effect of the intervention that included both mothers and children	—

				beneficial effect of the intervention was observed in the mothers-only group		
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	BMI Percentile	Percentile short; Percentile medium	The authors reported that significant differences were not found between the control and treatment groups regarding change in BMI percentile	No effect	—
Tessier 2008	Activity vs Activity	BMI	BMI short	The authors reported that multiple short sessions (3 or 4 sessions) of PE compared with 1 or 2 session(s) did not change the speed of increase in BMI	No effect	—

Results are not eligible to be included in the meta-analyses

Study ID	Comparison	Reported but not eligible/Measured but not reported/Planned but not measured	Details of missing evidence	Results	Direction of effect	Comments
Di Maglie 2022	Activity vs Control	BMI	BMI short	The authors reported that the change in body mass index in intervention group (−2.4 ± 0.6 kg/m2) was significantly different from that in control group (3.01 ± 1.8 kg/m^2)	Beneficial effect	It is unclear whether the results are from BMI or percentile measurements and whether the authors reported a standard deviatin or a standard error.
Gortmaker 1999	Dietary and Activity vs Control	BMI	BMI long	NR	n/a	BMI was measured but results are not reported; data are reported as proportion of children that had a weight status classified as obesity according to an index based on BMI and trycep skinfold measures
Johnston 2013	Dietary and Activity vs Control	zBMI	zBMI long	Overall, 10.8% of students with a normal-weight status became overweight (10.4%) or obese (0.4%) at 24 months. No differences were found between the PFI and SH conditions in terms of the likelihood of normal-weight students becoming overweight or obese compared to normal-weight control (OR: 1.66)	No effect	Results are reported as percentage of students that had their weight status changed to overweight or obesity after intervention, where classification of obesity and overweight was based on zBMI
Lynch 2016	Dietary and Activity vs Control	BMI	BMI short	There was no statistical difference in improvement of BMI in the intervention group compared with the control group.	No effect	Results are reported as median (IQR) BMI
Macias-Cervantes 2009	Activity vs Control	BMI	BMI short	BMI did not change	No effect	Results are reported as median (IQR) BMI
Marsigliante 2022	Dietary vs Control	BMI	BMI short	The authors reported that participants had a mean body mass index of 18.3 ± 2.7 kg/m2 and its variation in the intervention group (−2.7 ± 0.5 kg/m2) was significantly different from that in the control group (3.41 ± 0.8 kg/m2). In the experimental group, there were significant dierences between the proportion of children who were overweight, underweight, normal weight, or obese before and after intervention.	Beneficial effect	It is unclear whether the results are from BMI or percentile measurements and whether the authors reported a standard deviatin or a standard error.
Pindus 2015	Activity vs Control	BMI; BMI Percentile	BMI medium; Percentile medium	Th authors reported that no significant differences between intervention and control groups were noted at post-test BMI	No effect	Results reported as median (inter-quartal range, IQR) BMI and BMI percentile
Riiser 2020	Activity vs Control	Proportion of of children with BMI ≥25	BMI short; BMI long	The authors sreported that there were no significant differences in any of the	No effect	Results reported as proportion of children with BMI ≥25

				trajectories for the children with an age- and gender adjusted baseline BMI of < 25 vs a BMI of ≥25		
Salmon 2008	Activity vs Control	BMI	BMI medium	The authors reported that there was a significant intervention effect from baseline to post-intervention, and from baseline to follow-up, on age- and sex-adjusted BMI in the intervention groups compared with controls	Beneficial effect	Results are reported as BMI units of difference from the sex–age population median; we are unsure how to interpret the effect estimate
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	zBMI	zBMI long	The authors reported that no significant changes in the rates of overweight and obesity were seen as a result of the intervention	No effect	Results are reported as percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means
Zota 2016	Dietary vs Control	Odds ratio of changing from a weight status classification of overweight or obese to a normal weight status	BMI medium	The authors reported that body mass index (BMI) was calculated (kg/m2) from parent-reported weight and height, and students were then categorized as lean, normal weight, overweight and obese, according to the International Obesity Task Force BMI cutoff points. Children in the intervention group had 61 % higher odds of improving BMI from overweight/obese to normal	Beneficial effect	Results reported as odd ratios of changing the weight status from overweight or obese classification to normal weight

The outcome(s) was measured at follow-up(s) but results are not reported

Study ID	Comparison	Reported but not eligible/Measured but not reported/Planned but not measured	Details of missing evidence	Results	Direction of effect	Comments
Huys 2020	Dietary and Activity vs Control	zBMI	zBMI medium	NR	n/a	zBMI data at follow-up not reported. zBMI-z listed a secondary outcome in the trial registration but not in the main article. Quote: "Measurements were performed at baseline (April–September 2016) and after 1 year (March–August 2017)." We are unsure BMI was measured at follow-up
Treviño 2004	Dietary and Activity vs Control	BMI	BMI short	n/a	NR	BMI measured and used to derive body fat measure but is not reported at follow-up. Quote: "Body fat was measured using bioelectric impedance analysis (Tanita Corporation of America Inc, Arlington Heights, Ill) and body mass index. Bioelectric impedance analysis was used for body fat measurement because body fatness has been shown to relate closely to atherogenic and diabetogenic risk factors in children and because body mass index may not represent true body fatness in prepubertal children. The children, in indoor clothing, were asked to remove their

						shoes and socks and step on the metal box. Within 30 seconds, the instrument prints out percentage of body fat and weight. Students, in indoor clothing and barefooted, also had their height measured using a wall stop measuring tape (stadiometer) (Seca Bodymeter 206; Seca Corp, Hanover, Md). Body mass index was calculated as weight in kilograms divided by the square of height in meters using the Quetelet Index measure."
Measurement of the outcome at follow-up(s) was planned but results are not reported (there is no evidence that it was measured)						
Study ID	**Comparison**	**Reported but not eligible/Measured but not reported/Planned but not measured**	**Follow-up**	**Results**	**Direction of effect**	**Comments**
Carlin 2021	Dietary and Activity vs Control	zBMI	short term	NR	n/a	zBMI was measured at baseline but not at follow-up. zBMI is listed as secondary outcome in the trial registration but not in the main article
Razani 2018	Activity vs Activity	BMI	short term	NR	n/a	BMI measurements were planned but data are not reported. Based on the study protocol, the auhtors planned to nesure BMI in clinic at baseline, one month, and three months out by using weight and an average of three measurements of height. The study reported a comparison between groups that were allocated to the same type of interventions (activity vs activity)
Missing evidence from studies included in meta-analyses						
Study ID	**Comparison**	**Reported but not eligible/Measured but not reported/Planned but not measured**	**Details of missing evidence**	**Results**	**Direction of effect**	**Comments**
Cunha 2013	Dietary vs Control	BMI	BMI short	NR	n/a	The results are not eligible for inclusion in the meta-analyses. BMI was measured at 6 months and at 9 months from baseline; results are for the group coefficient and group x time coefficiente. We only extracted data at the 9 months follow-up for inclusion in the meta-analysis
Donnelly 2009	Activity vs Control	BMI Percentile	Percentile long	There were no significant differences for change in BMI percentile (baseline to year three) for intervention vs control and this finding was not influenced by gender	No effect	Results for BMI percentile are reported as narrative only. There were no significant differences for change in BMI percentile (baseline to year three) for intervention vs control
Liu 2022	Dietary and Activity vs Control	zBMI; BMI	BMI long; zBMI long	NR	n/a	BMI and zBMI measurement at the last follow-up (21 months after baseline as reported in the study protocol) were planned but results are not reported in the main article
Muller 2016	Activity vs Control	zBMI	zBMI long	The authors reported that at the 4-year follow-up 24 (10.2%) of the remaining 236 students were overweight or obese (intervention 11	Beneficial effect	The results are not eligible for meta-analysis: data for the long term follow-up (4 years) are reported as percentage of participants that are

				(8.3%), control 13 (12.5%), P = 0.49) and 18 (6.9%) were underweight (intervention 7 (5.3%), control 11 (10.6%), P = 0.25). Students in the intervention group were more likely to have healthy BMI in comparison to the control group within the 10th to 90th percentile (intervention 86.4%, control 78.2%, P = 0.13). At follow-up the intervention group had a lower rate of BMI percentile >90th. More adolescents in the intervention than in the control group who were overweight or with obesity at baseline developed normal BMI after 4 years of intervention (eight in the intervention and two in the control groups, respectively) while in both groups five students (two boys, three girls each) with initially normal BMI percentile became overweight.		overweight or obese. We excluded these results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to mean
Salmon 2022	Activity vs Control	zBMI	zBMI short	NR	n/a	BMI was measured at T2 (5-9 months), T3 (18 months) and T4 (30 months) but T2 data are not reported. Quote: "Children's height (cm) and weight (kg) were measured twice at each time point with a portable stadiometer."
Tanskey 2017	Activity vs Control	zBMI; BMI	zBMI short; BMI short	NR	n/a	The results are not eligible for inclusion in the meta-analysis: the regression coefficient for study group (relative to control) is described as a factor associated with mean change in BMI/zBMI expressed on a per month basis. We only extracted data at the 12-months follow-up
Topham 2021	Dietary and Activity vs Control	zBMI	zBMI short	NR	n/a	The results are not eligible for inclusion in the meta-analyses. zBMI measurements were made at four time points: 0, 0.3, 1.3 and 3.3 years. Data reported as coefficient for 'intervention condition' from a random intercept model. We were only able to extract the data from measurements at the 3.3 years follow-up.

Abbreviations: NR: not reported; n/a: not applicable;

Table 7

Risk of bias due to missing evidence

Comparison: Dietary intervention vs Control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 1096 participants. Results from 512 participants in Cunha 2013 are not reported and no information regarding the direction of the effect is reported; results from 186 participants in Hooft van Huysduynen 2014 show no evidence of effect of the intervention; resuts from 398 in Marsigliante 2022 suggest a beneficial effect of the intervention. Meta-analysis of results from 2107 participants shows no evidence of effect of the intervention. The proportion of missing data is very large (52%) and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 2556 participants from Zota 2016 and reported results suggests a beneficial effect of the intervention. Meta-analysis of results from 6815 participants shows no evidence of effect of the intervention. The proportion of missing data is relativelly large

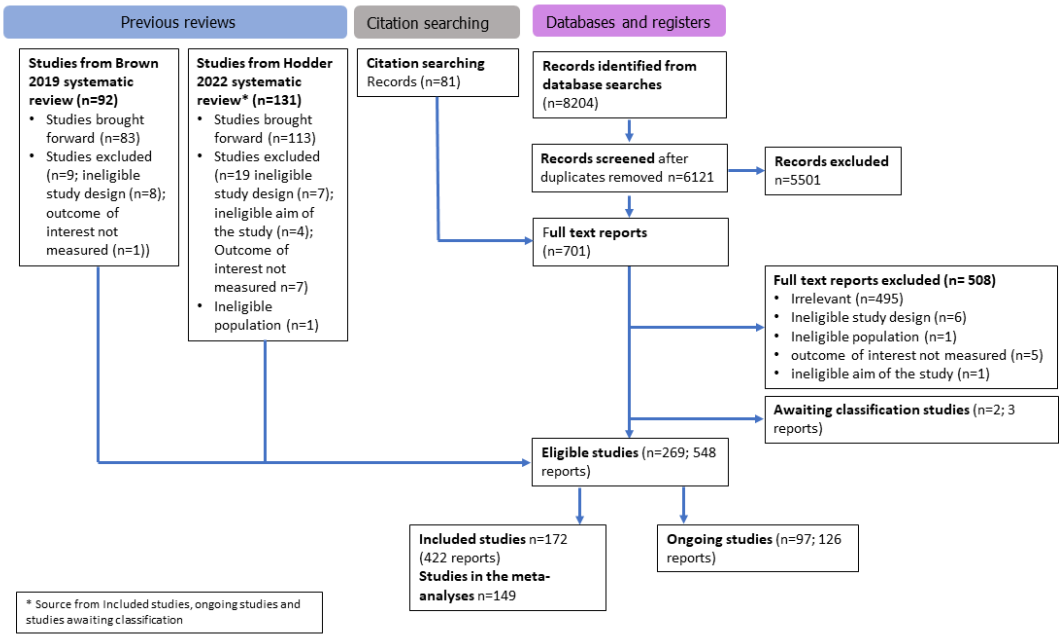
		(37.5%) and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Data from 218 participants are missing from Warren 2003, and results show a beneficial effect of the intervention. Meta-analysis of results from 5150 participants shows no evidence of effect of the intervention. The proportion of missing data is small (4%) and therefore missing data do not have an impact on the effect estimate.
BMI percentile short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: Activity intervention vs Control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	Some concerns	Some concerns over results missing from included studies. Data are missing from 1103 participants. Results from 160 participants in Di Maglie 2022 show a beneficial effect of the intervention; results from 62 participants in Macias-Cervantes 2009 and from 361 participants in Riiser 2020 show no effect of the intervention; results from 520 participants in Tanskey 2017 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 4069 participants shows no evidence of effect of the intervention. Althought the proportion of missing data is relativelly small (27%) there is some potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium term	Some concerns	Some concerns over results missing from included studies. Data are missing from 327 participants. Results from 32 participants from Pindus 2015 show no evidence of effect of the intervention; results from 295 participants in Salmon 2008 show a beneficial effect of the intervention. Meta-analysis of results from 21286 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is very small compared to the number of particiants included in the meta-analysis (1.5%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI long term	Some concerns	Some concerns over results missing from included studies. Data are missing from 567 participants. Results from 299 participants from Riiser 2020 shows no evidence of effect of the intervention; results from 268 participants in Salmon 2008 show a beneficial effect of the intervention. Meta-analysis of results from 8302 participants shows no evidence of effect of the intervention. The proportion of missing data is small compared to the number of participants included in the meta-analysis (7%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI short term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 1240 participants. Results from 156 participants in Madsen 2013 show no evidence of effect of the intervention; results from 564 participants in Salmon 2022 and from 520 participants in Tanskey 2017 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results of 3580 participants show no evidence of effect of the intervention. The proprtion of missing data is relativelly large (35%) and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Data are missing from 450 participants. Data from 218 and 232 participants are missing from Warren 2003 and from Muller 2016, respectivelly. Results from Warren 2003 show no effect of the intervention, and results from Muller 2016, show some beneficial effect of the intervention. Meta-analysis of results from 6810 participants shows no evidence of effect of the intervention. The proportion of missing data is relativelly small (7%) and therefore missing data do not have an impact on the effect estimate.
BMI percentile short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium term	Some concerns	Some concerns over results missing from included studies. Data from 32 participants are missing from Pindus 2015, and results show no evidence of effect of the intervention. Meta-analysis resultys from 621 participants show a beneficial effect of the intervention. The proportion of missing data is small compared to the number of particiants included in the meta-analysis (5%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile long term	High risk of bias	Serious concerns over results missing from included studies. Data from 1490 participants are missing from Donnelly 2009, and results show no evidence of effect of the intervention. Meta-analysis resultys from 860 participants show no evidence of effect of the intervention. The proportion of missing data is very large compared to the number of particiants included in the meta-analysis (173%), and there is potential for missing results to

		impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
Comparison: Dietary and Activity intervention vs Control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	Some concerns	Some concerns over results missing from included studies. Data are missing from 1509 participants. Results from 93 participants in Anand 2007 and from 31 participants in Lynch 2016 show no evidence of effect of the intervention; data from 1419 participants in Treviño 2004 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 16066 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is small (9%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Results from 1295 participants in Gortmaker 1999 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 22098 participants show no evidence of effect of the intervention. The proportion of missing data is small (9%) and therefore missing data do not have an impact on the effect estimate.
zBMI short term	Some concerns	Some concerns over results missing from included studies. Data are missing from 249 participants. Results from 17 participants in Epstein 2001 show no beneficial effect of the intervention; results from 198 participants in Topham 2021 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 12784 participants show no evidence of effect of the intervention. The proportion of missing data is very small compared to the number of particiants included in the meta-analysis (2%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI medium term	Some concerns	Some concerns over results missing from included studies. Data are missing from 185 participants. Results from 17 participants in Epstein 2001 show no beneficial effect of the intervention; results from 168 participants in Topham 2021 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 20998 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is very small compared to the number of particiants included in the meta-analysis (1%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI long term	Some concerns	Some concerns over results missing from included studies. Data are missing from participants. Results from 477 participants in Johnston 2013 show no evidences of effects of the intervention; results from 418 participants in Warren 2003 show some evidence of beneficial effects of the intervention. Meta-analysis of results from 23594 participants show no evidence of effect of the intervention. The proportion of missing data is relativelly small compared to the number of particiants included in the meta-analysis (4%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: Activity intervention vs Dietary intervention		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	n/a	No meta-analysis
BMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long term	n/a	No meta-analysis
zBMI short term	n/a	No meta-analysis
zBMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long term	n/a	No meta-analysis
BMI percentile short term	n/a	No meta-analysis
BMI percentile medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.

BMI percentile long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: Activity and Dietary intervention vs Dietary intervention		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	n/a	No meta-analysis
BMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long term	n/a	No meta-analysis
zBMI short term	n/a	No meta-analysis
zBMI medium term	Some concerns	Some concerns over results missing from included studies. Data are missing from 17 participants in Epstein 2001, and results show no beneficial effect of the intervention. Meta-analysis resultys from 456 particiants show no evidence of effect of the intervention. The proportion of missing data is small compared to the number of particiants included in the meta-analysis (4%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI long term	n/a	No meta-analysis
BMI percentile short term	n/a	No meta-analysis
BMI percentile medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: Activity and Dietary intervention vs Activity intervention		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI short term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long term	High risk of bias	Serious concerns over results missing from included studies. Data from 218 participants are missing from Warren 2003, and results show show no evidence of effect of the intervention. Meta-analysis resultys from 131 participants show no evidence of effect of the intervention. The proportion of missing data is very large compared to the number of particiants included in the meta-analysis (167%), and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile short term	n/a	No meta-analysis
BMI percentile medium term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.

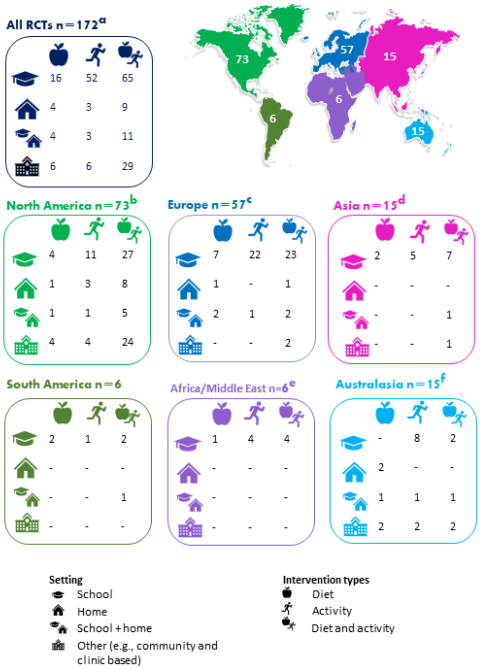
Abbreviations: n/a: not applicable

Figure 1



PRISMA flow diagram. Date of last search February 2023.

Figure 2



Distribution of studies by location, type of intervention and setting.

[a]Total n=172 RCTs (n=208 active intervention arms) were conducted worldwide; eight RCTs included treatment arms for more than one intervention type; 17 RCTs included more than one treatment arm for the same intervention type.

[b]Total n=73 RCTs (n=93 active intervention arms) were conducted in North America; five RCTs included treatment arms for more than one intervention type (Ickovics 2019; Robinson 2003; Robinson 2010; Stettler 2015; van de Berg 2020); 11 RCT included more than one treatment arm for the same intervention type (Beech 2003; Branscum 2013; Crespo 2012; Epstein 2001; Hannon 2018; Muzaffar 2019; Razani 2018; Safdie 2013; Tanskey 2017; Topham 2021; Williamson 2012).

[c]Total n=57 RCTs (n=61 active intervention arms) were conducted in Europe; one RCT included treatment arms for more than one intervention type (Warren 2003); two RCTS included more than one treatment arm for the same intervention type (Paineau 2008; Tessier 2008).

[d]Total n=15 RCT (n=16 active intervention arms) were conducted in Asia; one RCT included treatment arms for more than one intervention type (Meng 2013 (Beijing)).

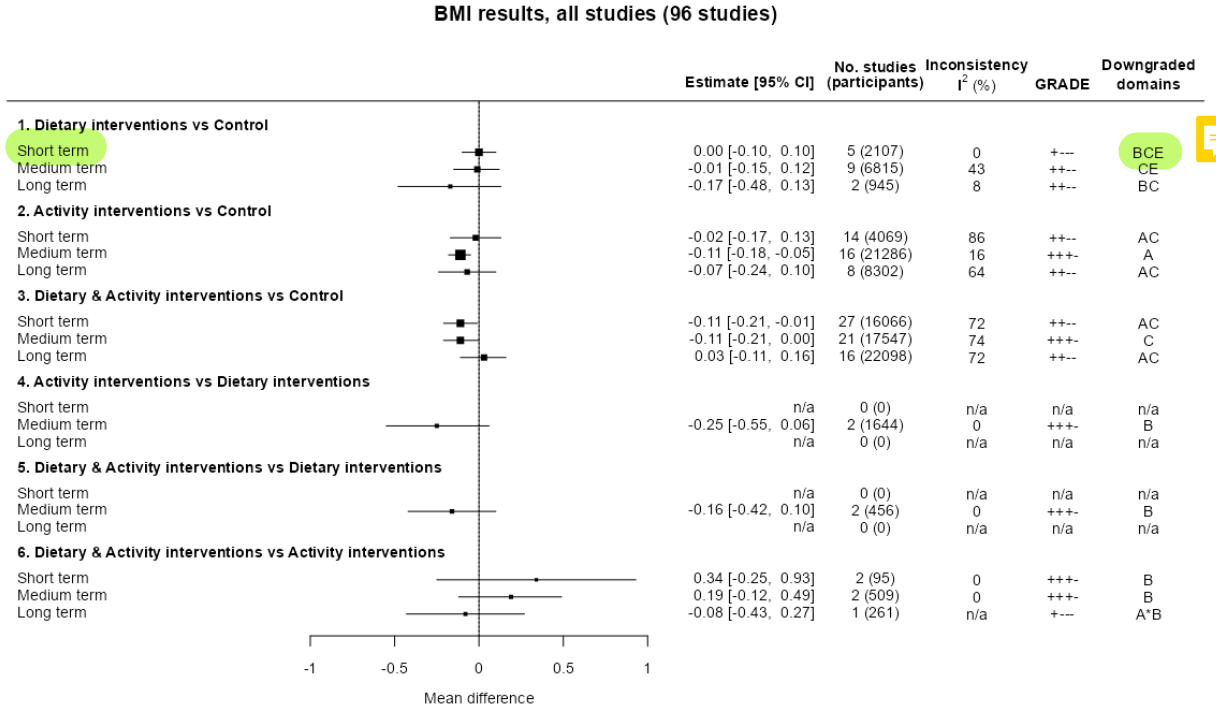
[e]Total n=6 RCTs (n=9 active intervention arms) were conducted in Africa and Middle East; one RCT included more than one treatment arm for the same intervention type (Muller 2019).

[f]Total n=15 RCTs (n=21 active intervention arms) were conducted in Australasia; one RCT included treatment arms for more than one intervention type (Barnes 2021). Three RCTS included more than one treatment arm for the same intervention type

(Chai 2019; Salmon 2008; Salmon 2022).

Abbreviations: RCT: randomised controlled trial

Figure 3



Summary of meta-analysis results for BMI.

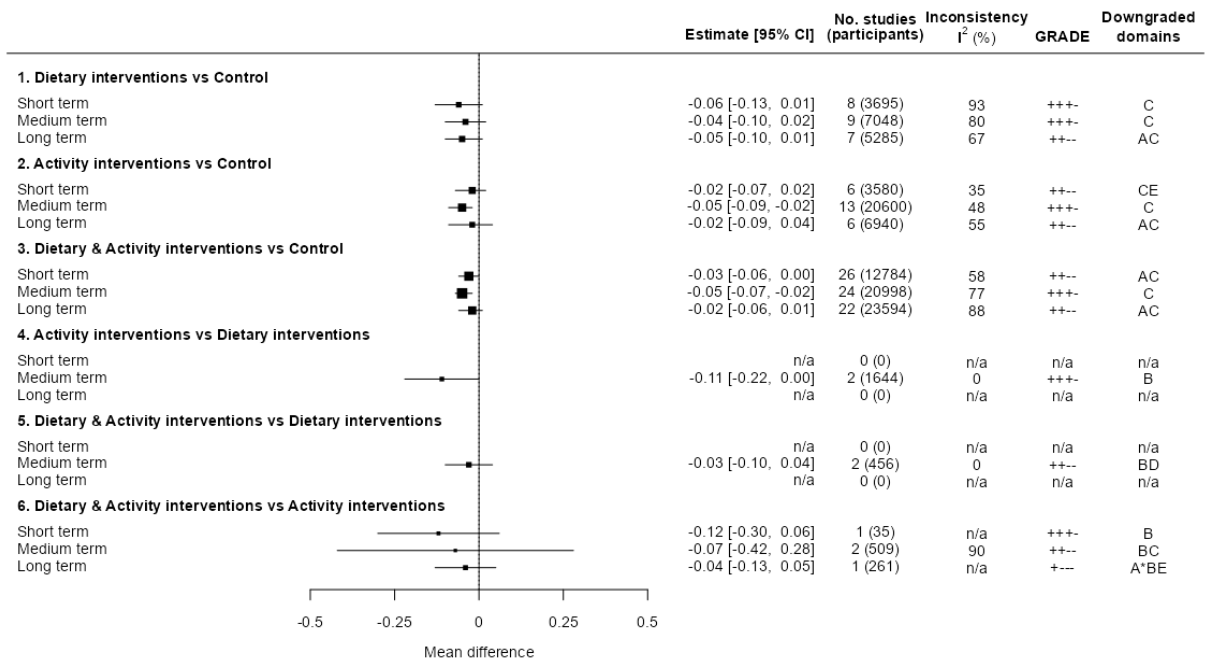
Certainty of the evidence(GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low.

GRADE domains: A=risk of bias; B=imprecision; C=inconsistency; D=indirectness; E=publication bias.

*Downgraded two levels.

Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 4



Summary of meta-analysis results for zBMI.

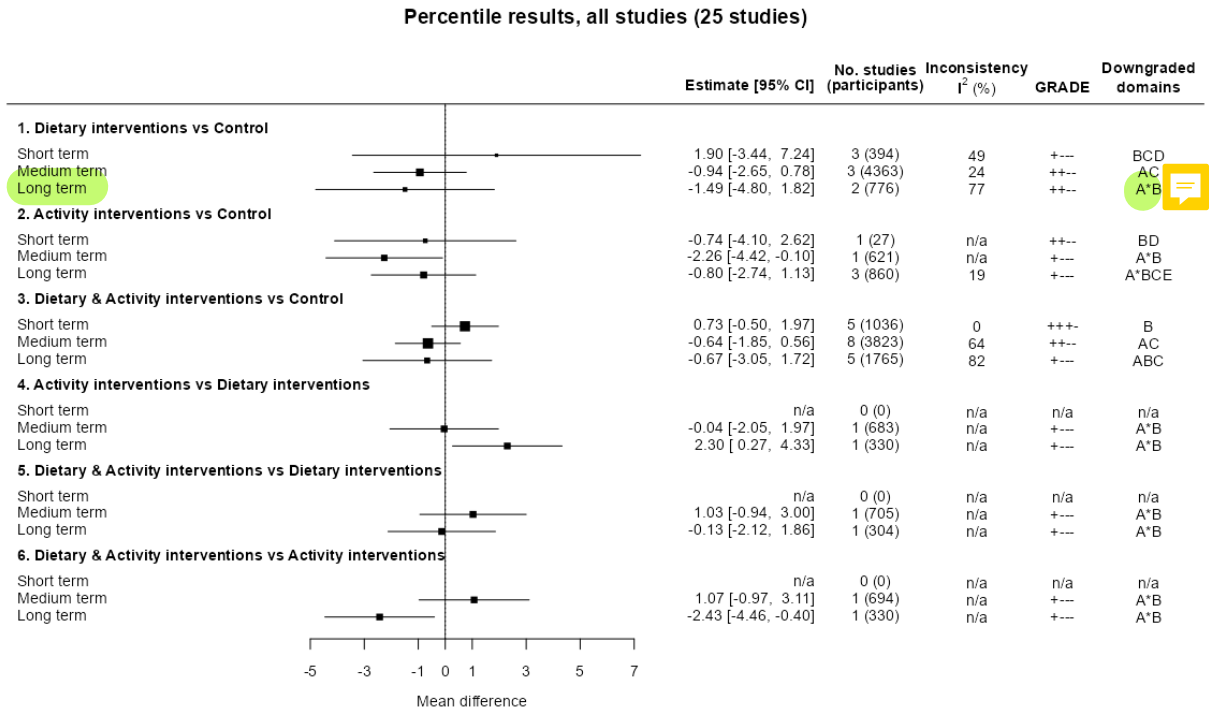
Certainty of the evidence(GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low.

GRADE domains: A=risk of bias; B=imprecision; C=inconsistency; D=indirectness; E=publication bias.

*Downgraded two levels.

Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 5



Summary of meta-analyses results for BMI percentile.

Certainty of the evidence(GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low.

GRADE domains: A=risk of bias; B=imprecision; C=inconsistency; D=indirectness; E=publication bias.

*Downgraded two levels.

Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 6

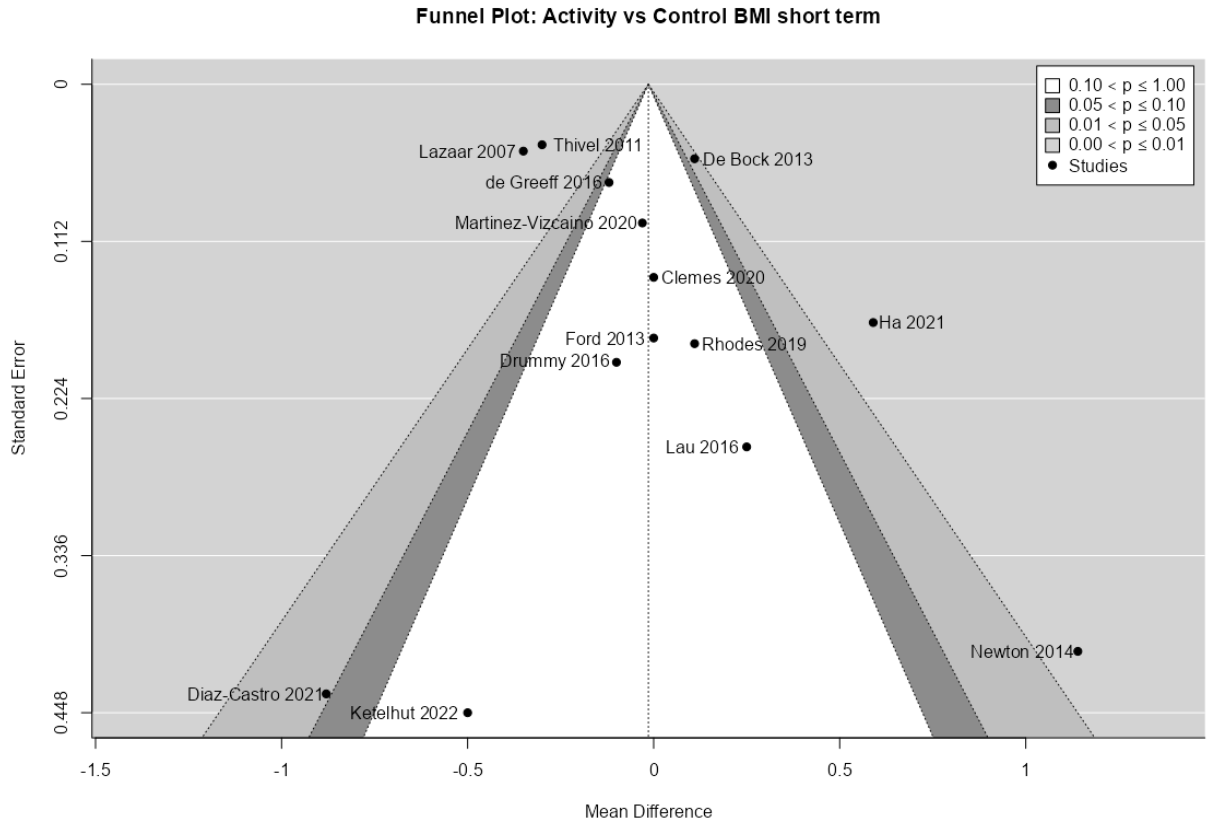


Figure 7

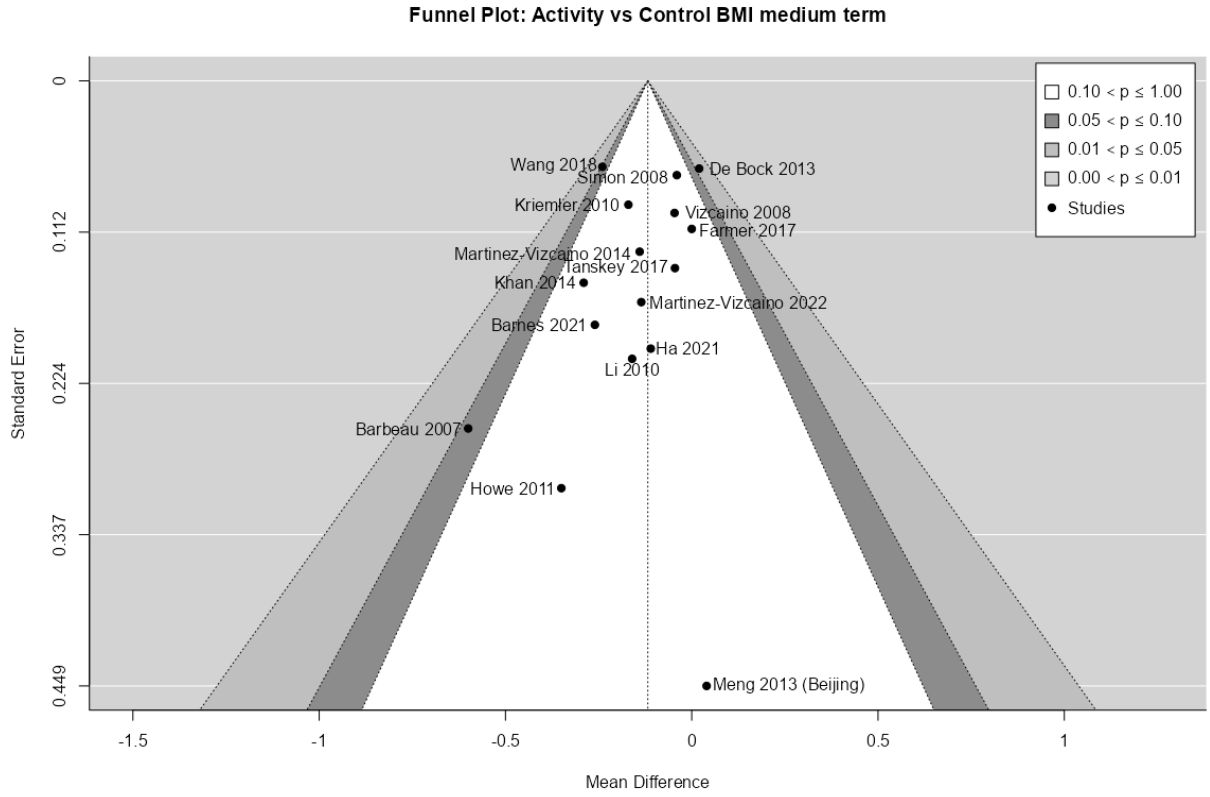


Figure 8

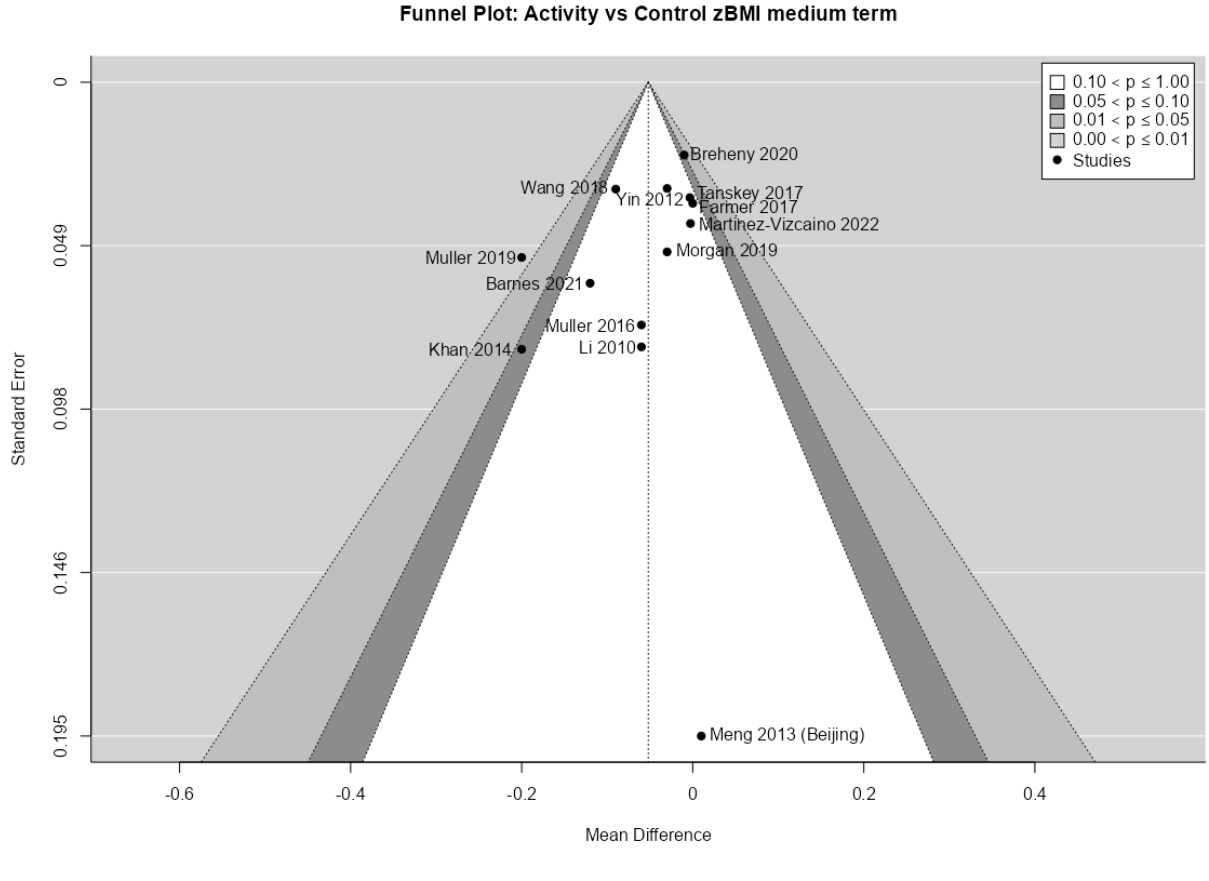


Figure 9

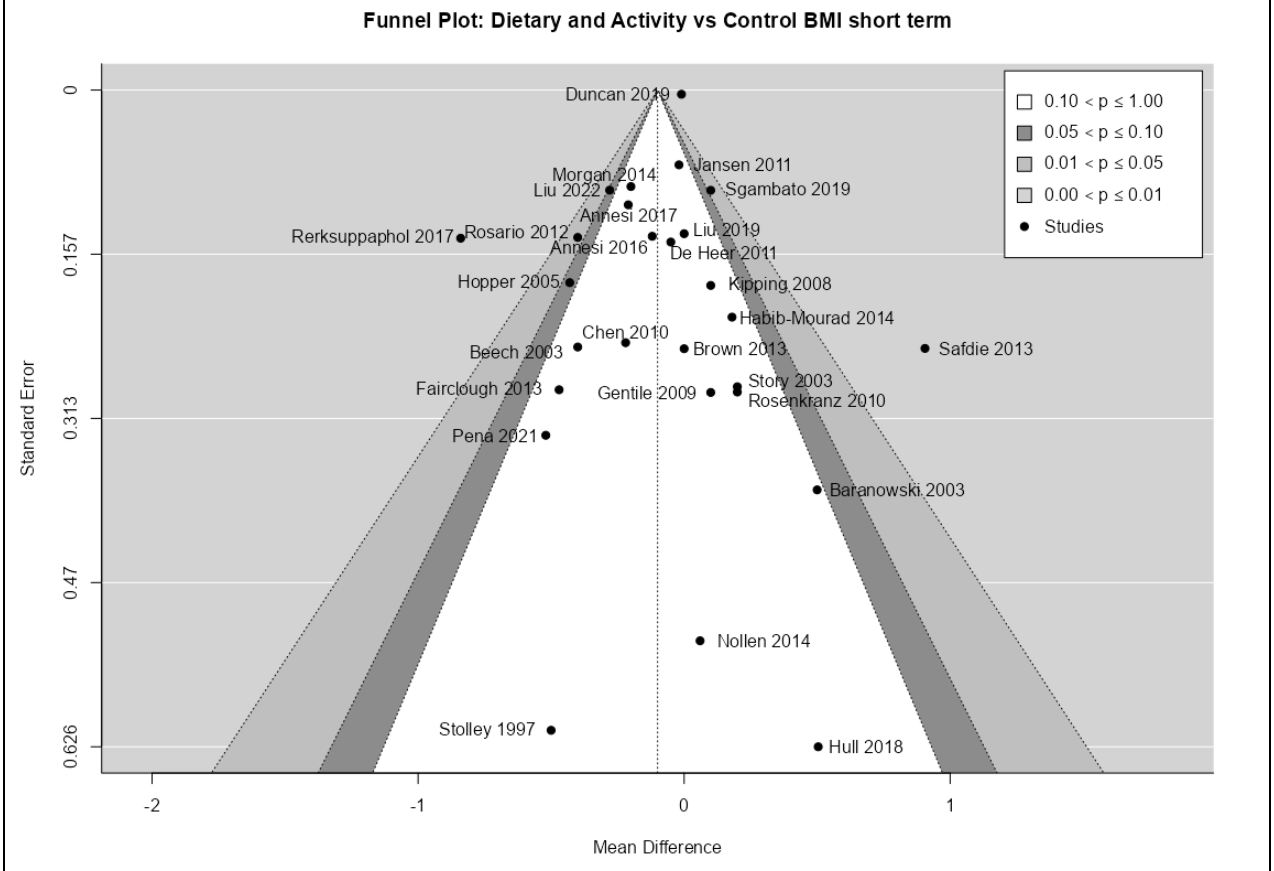


Figure 10

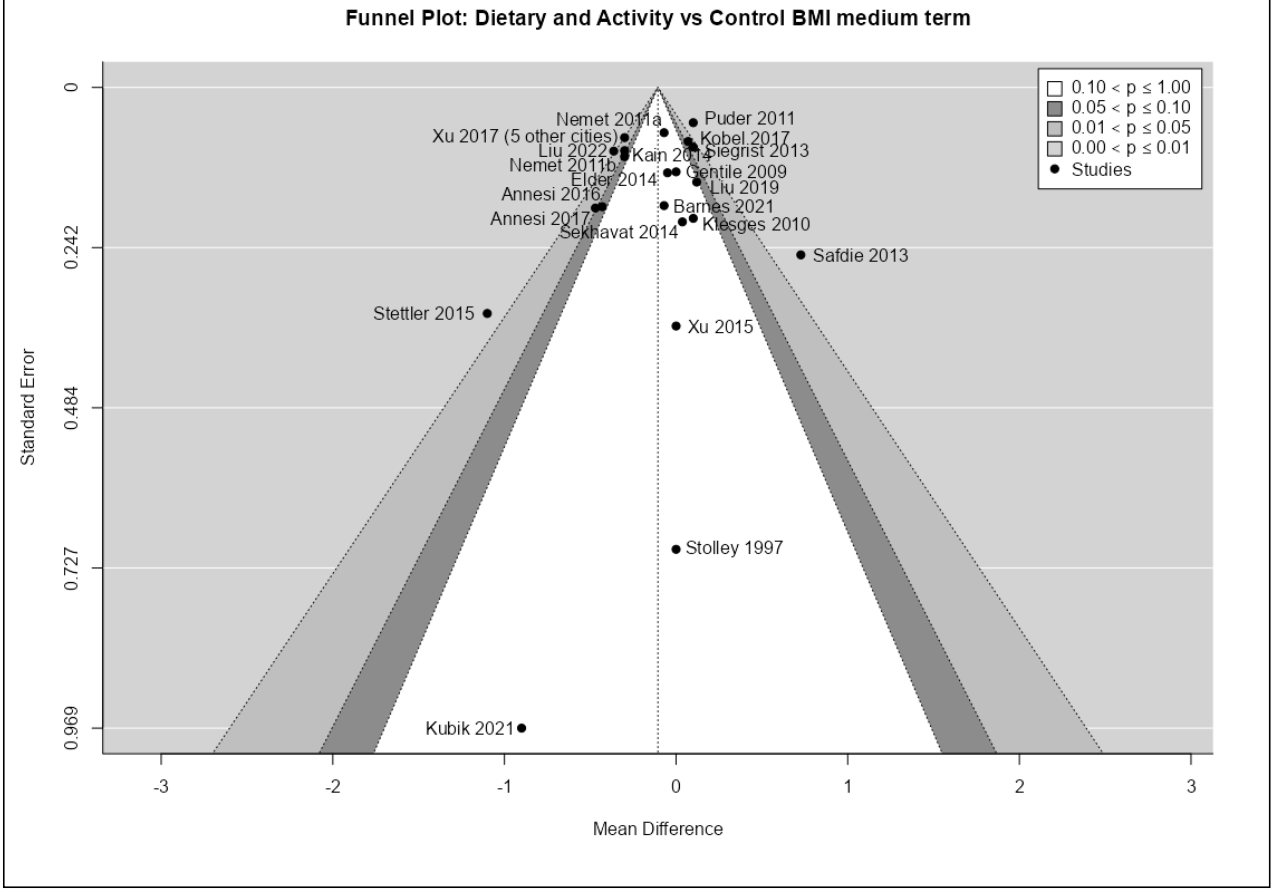


Figure 11

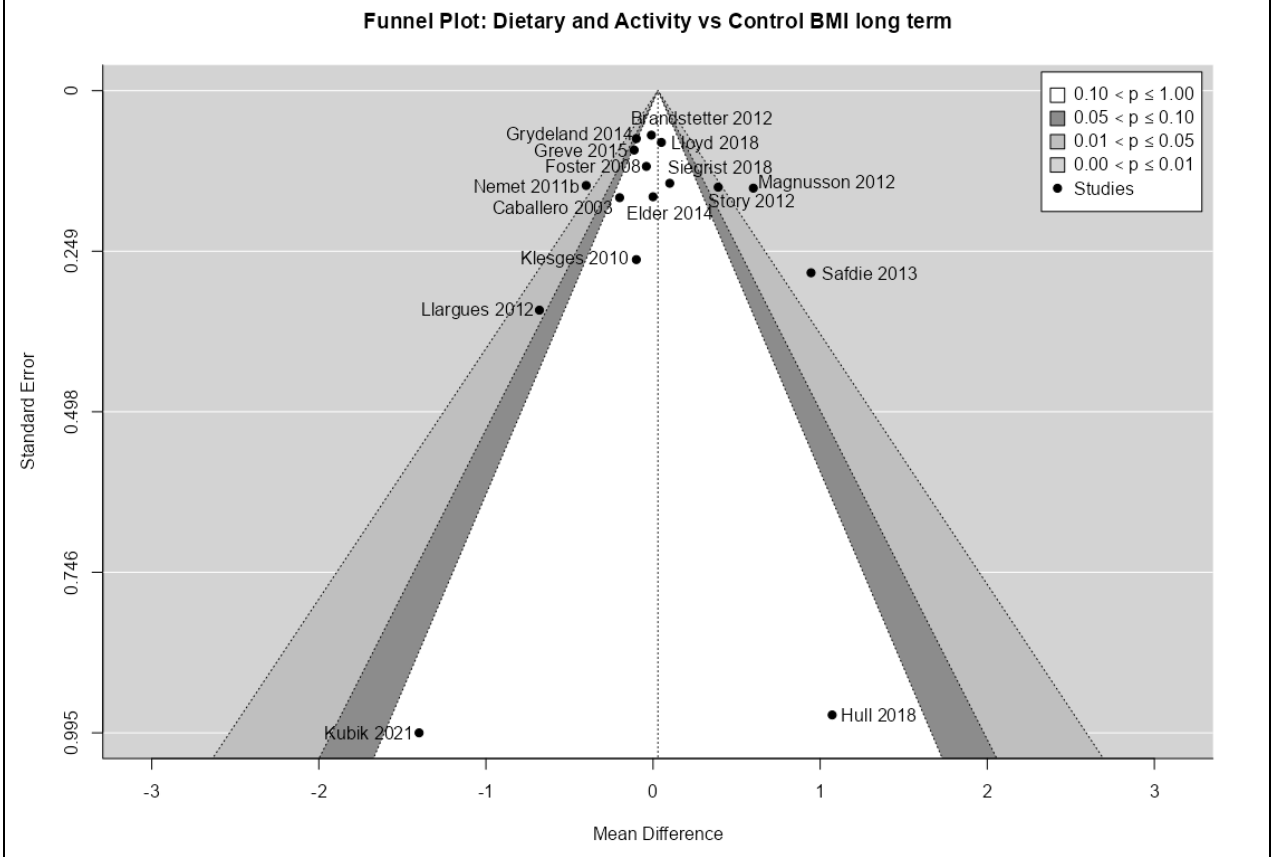


Figure 12

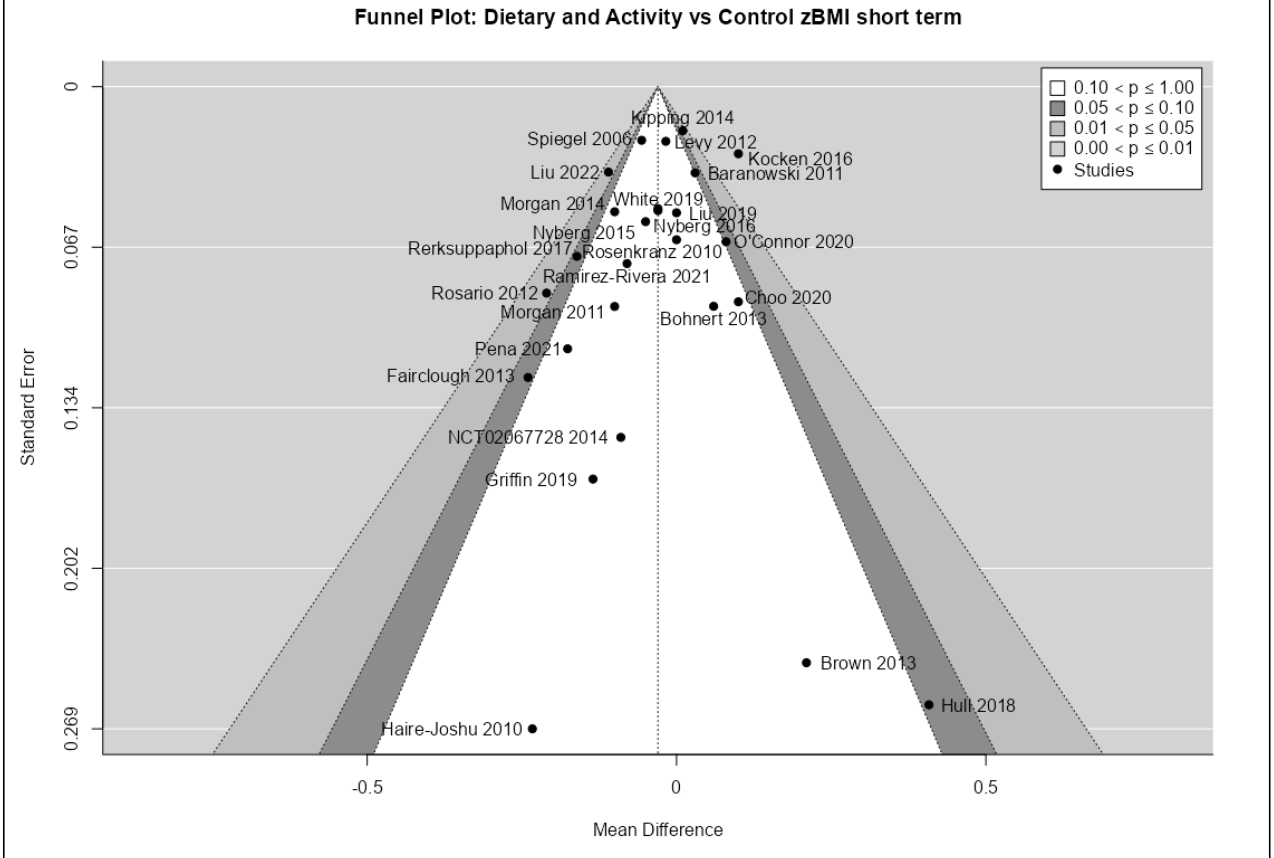


Figure 13

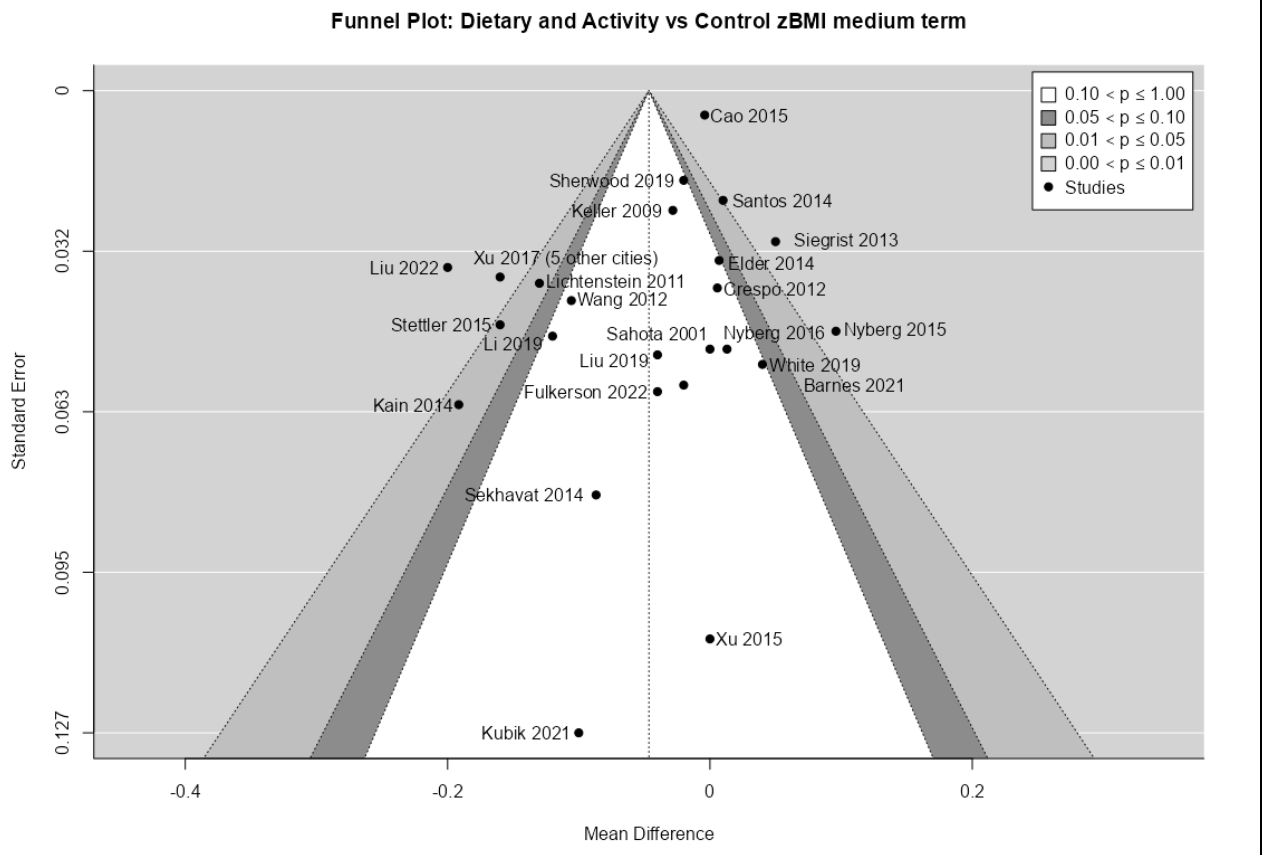


Figure 14

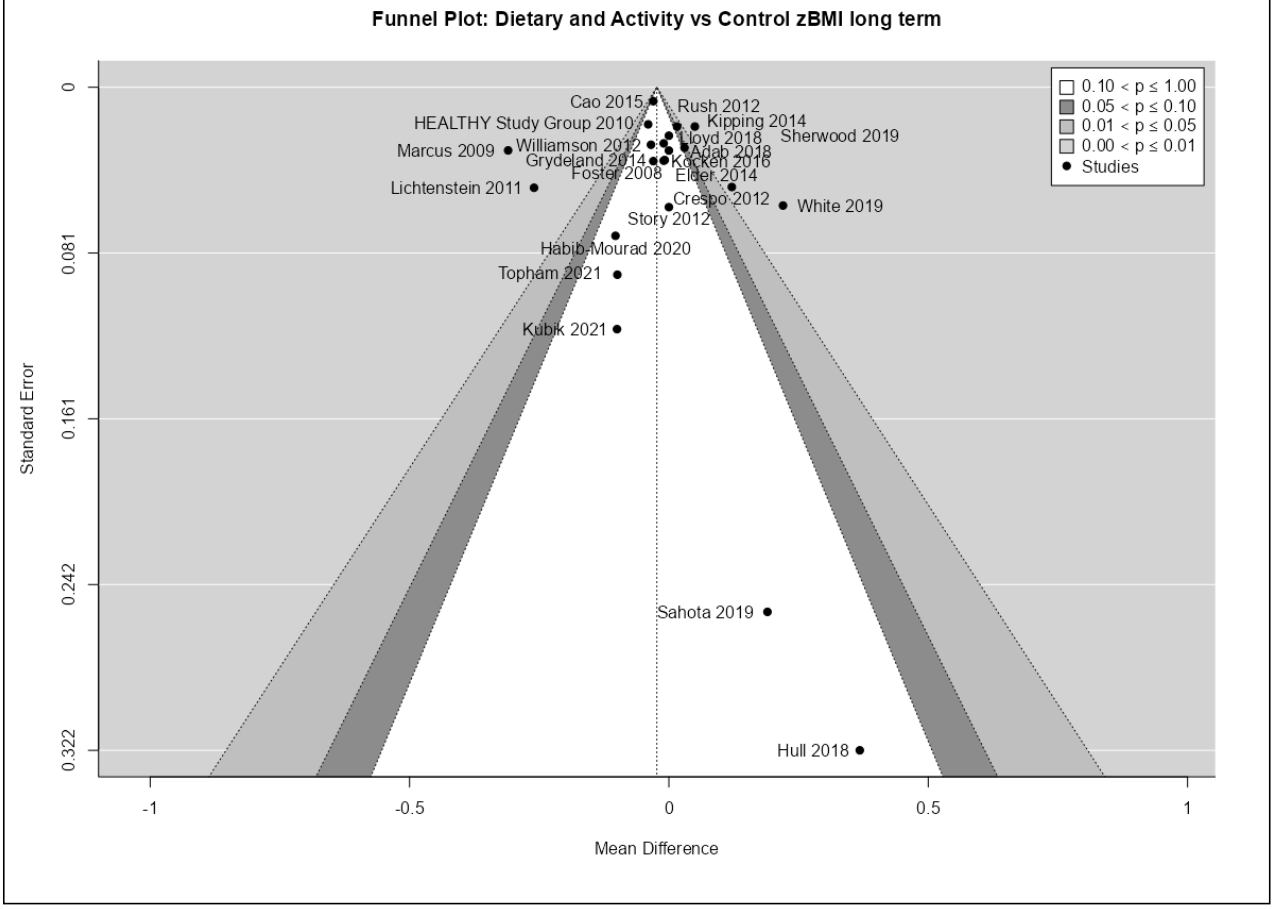
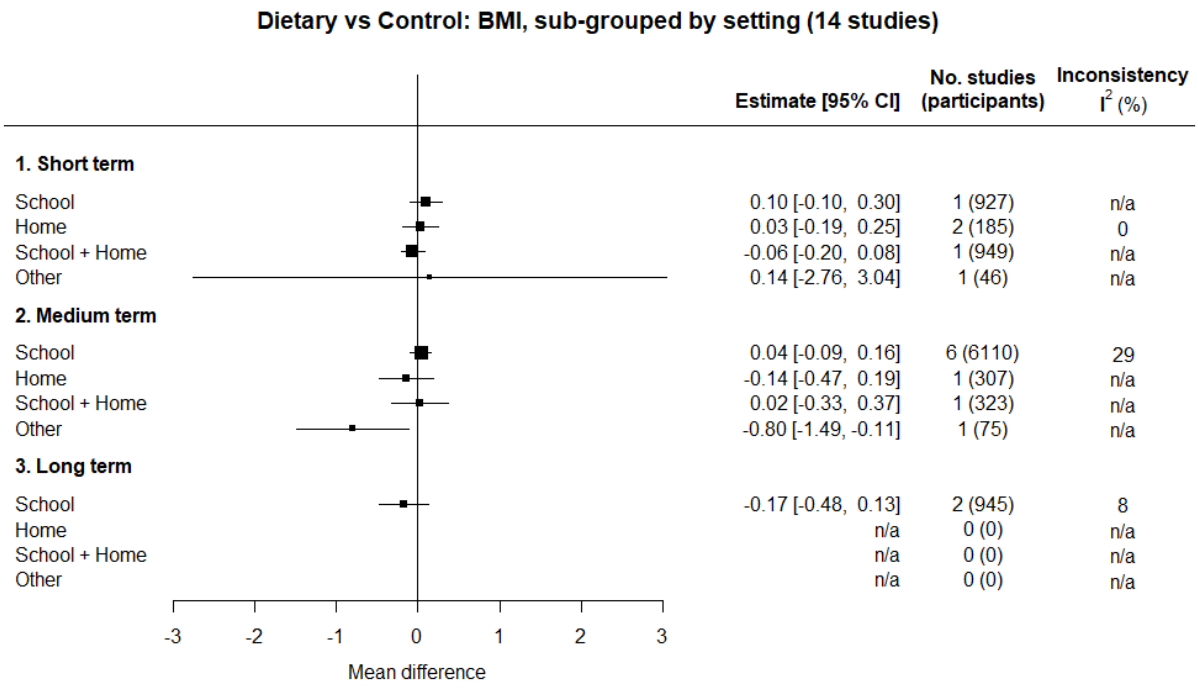
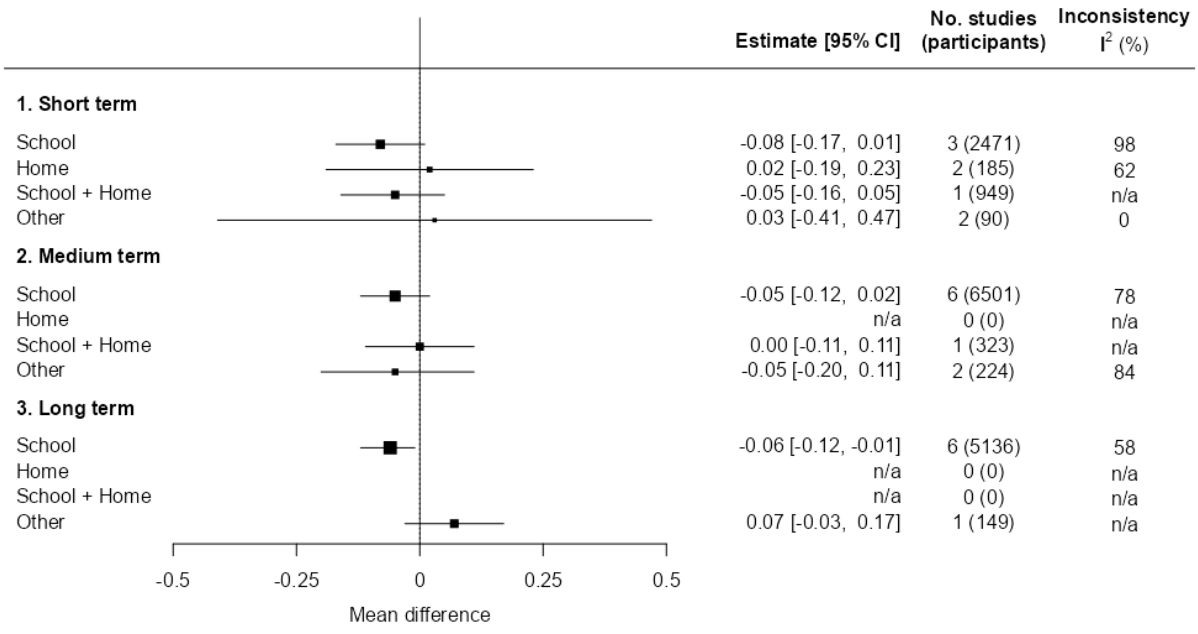


Figure 15



Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 16



Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 17

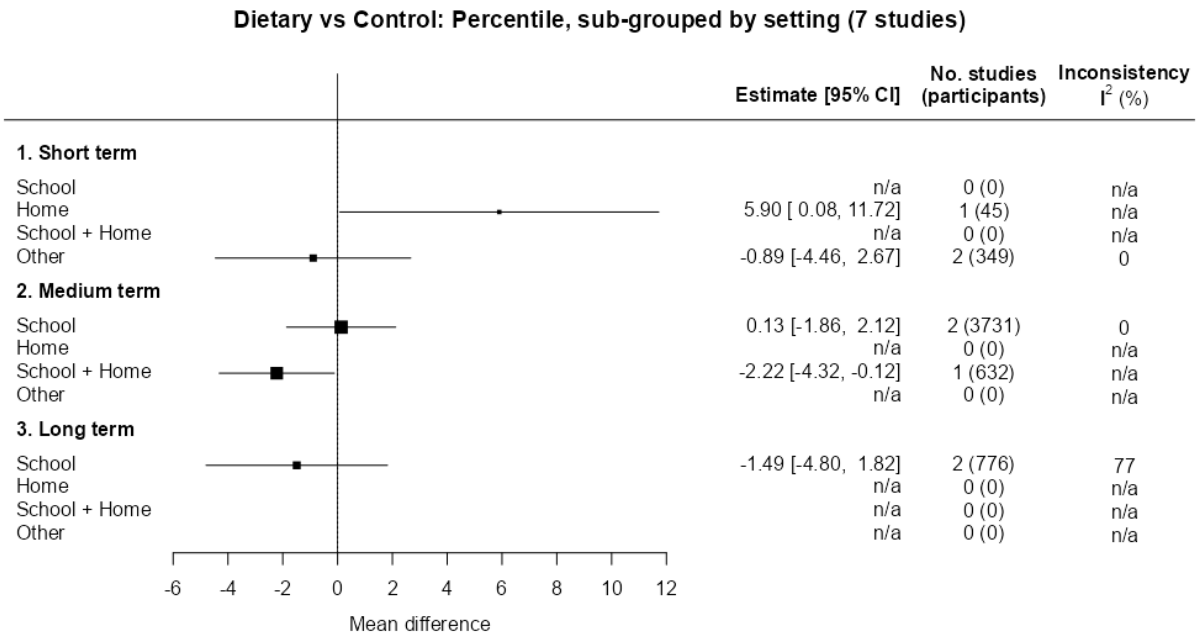
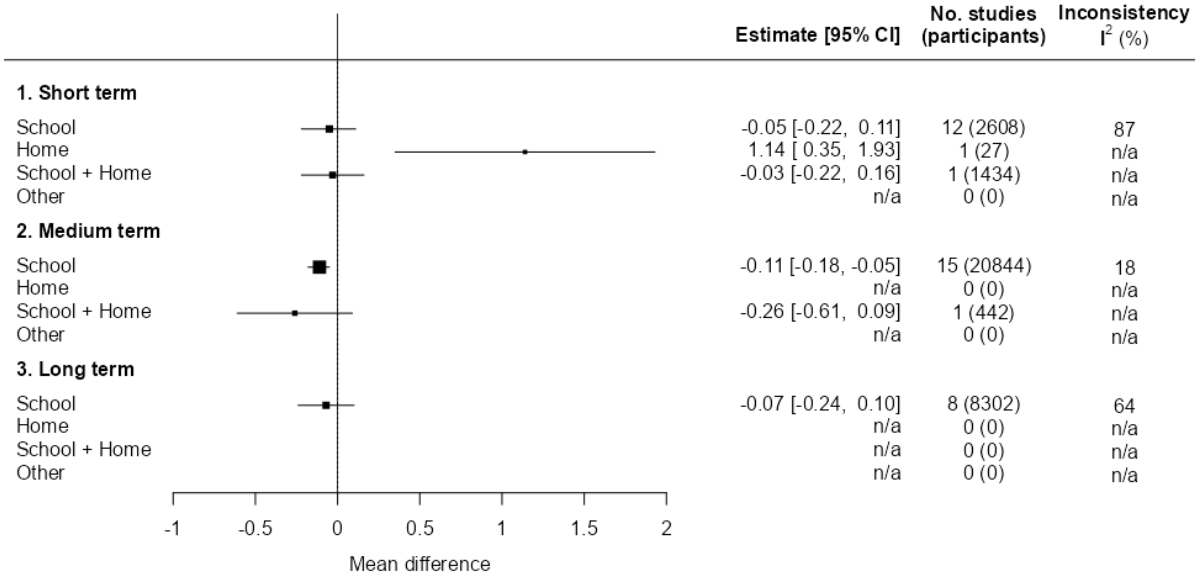
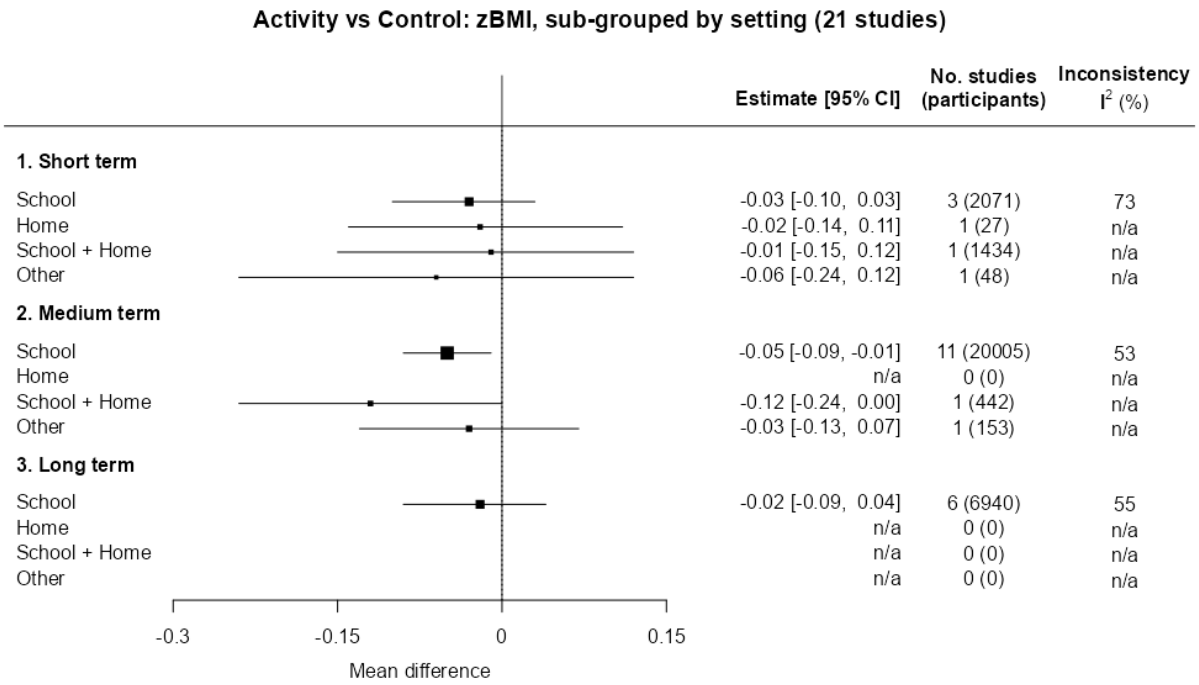


Figure 18



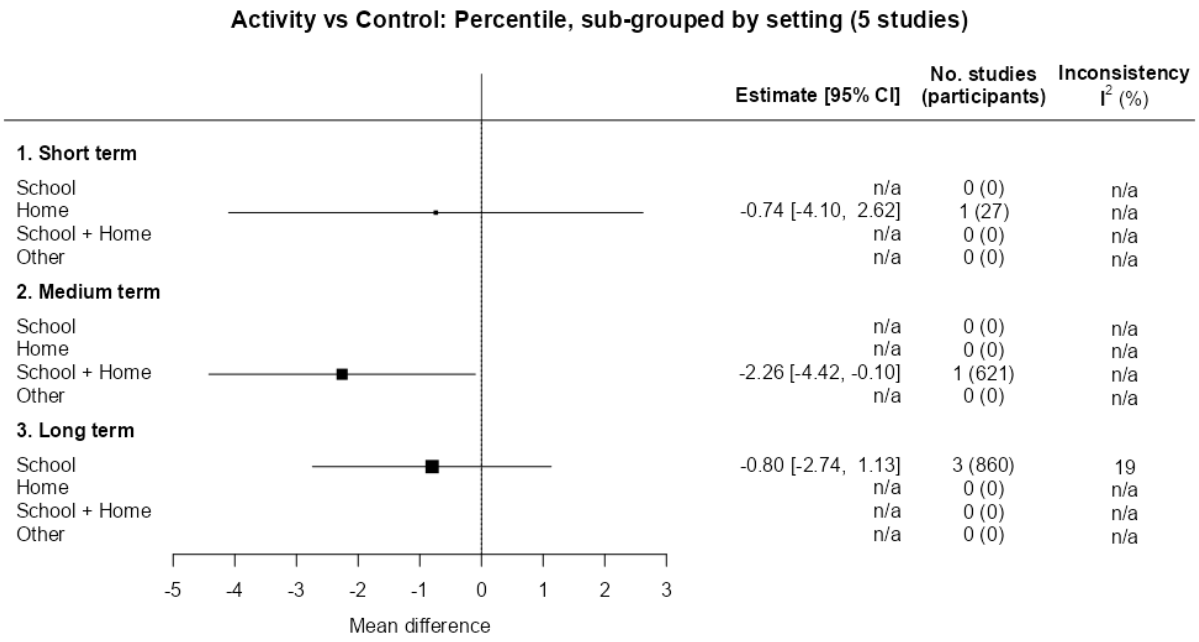
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 19



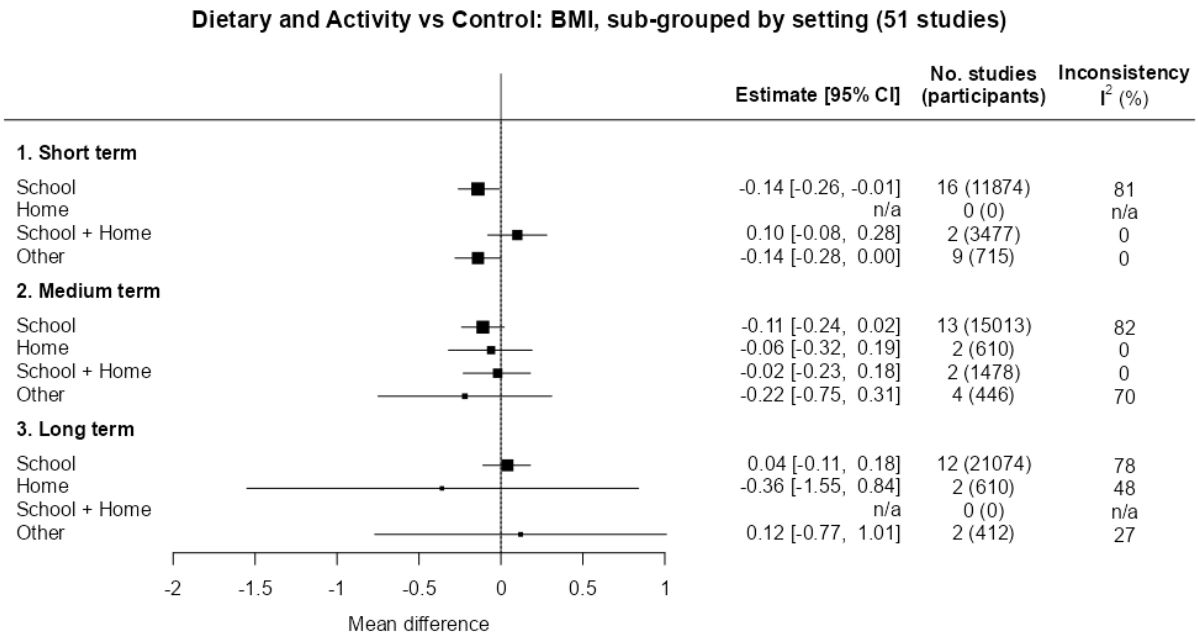
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 20



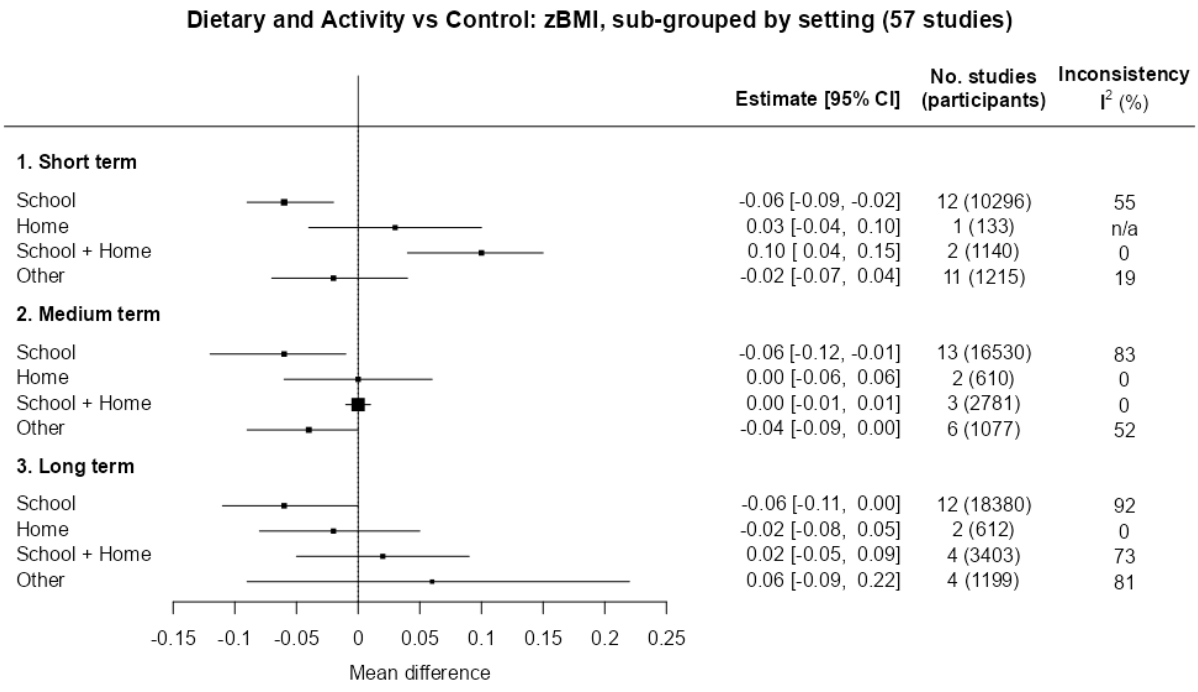
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 21



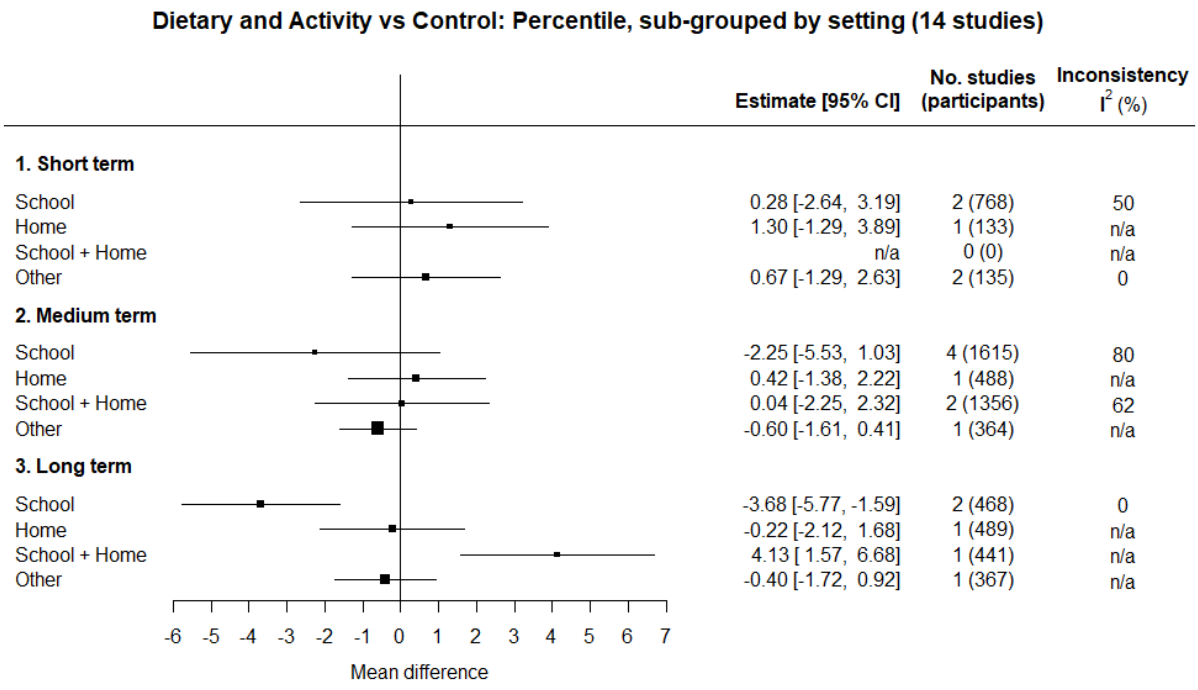
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 22



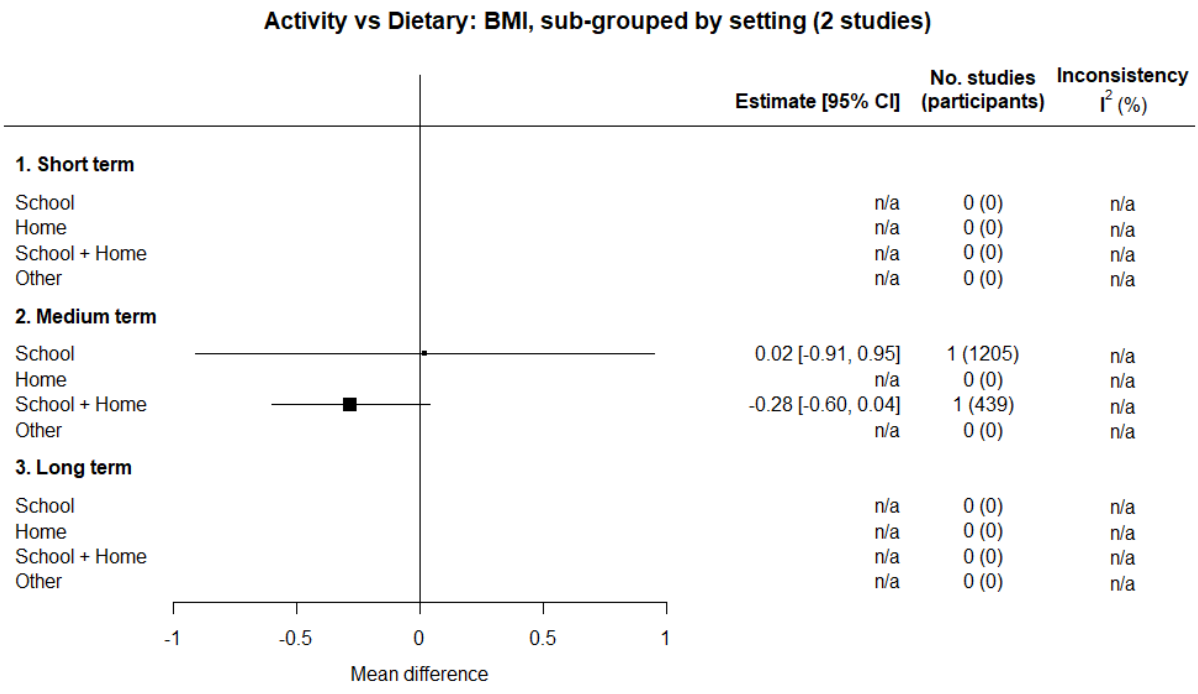
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 23



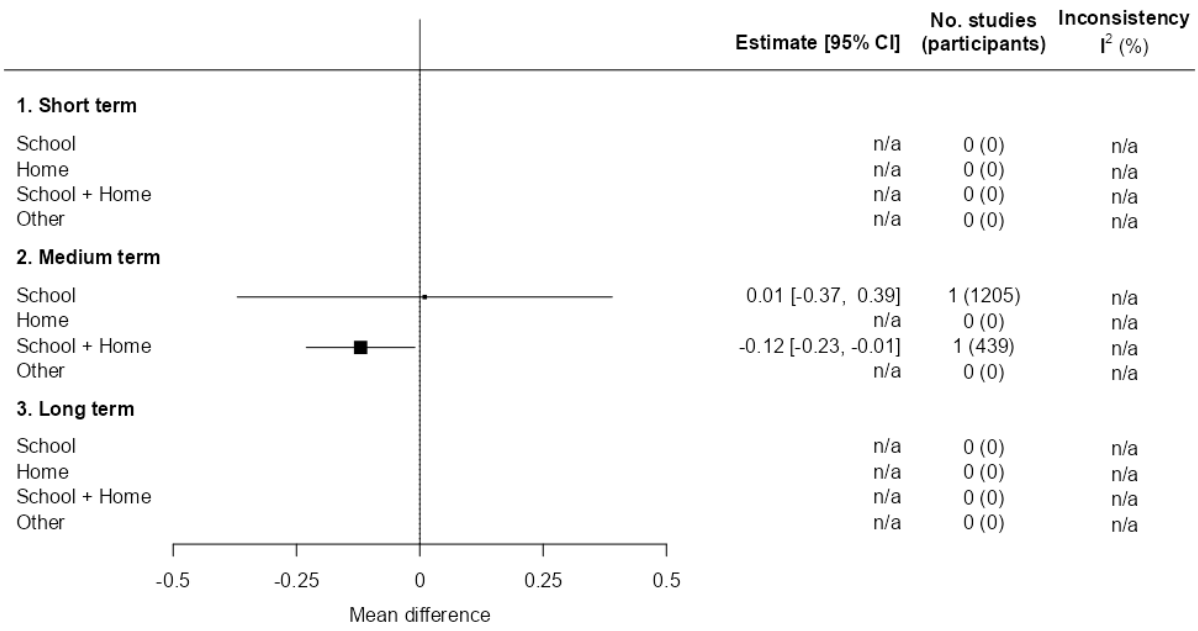
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 24



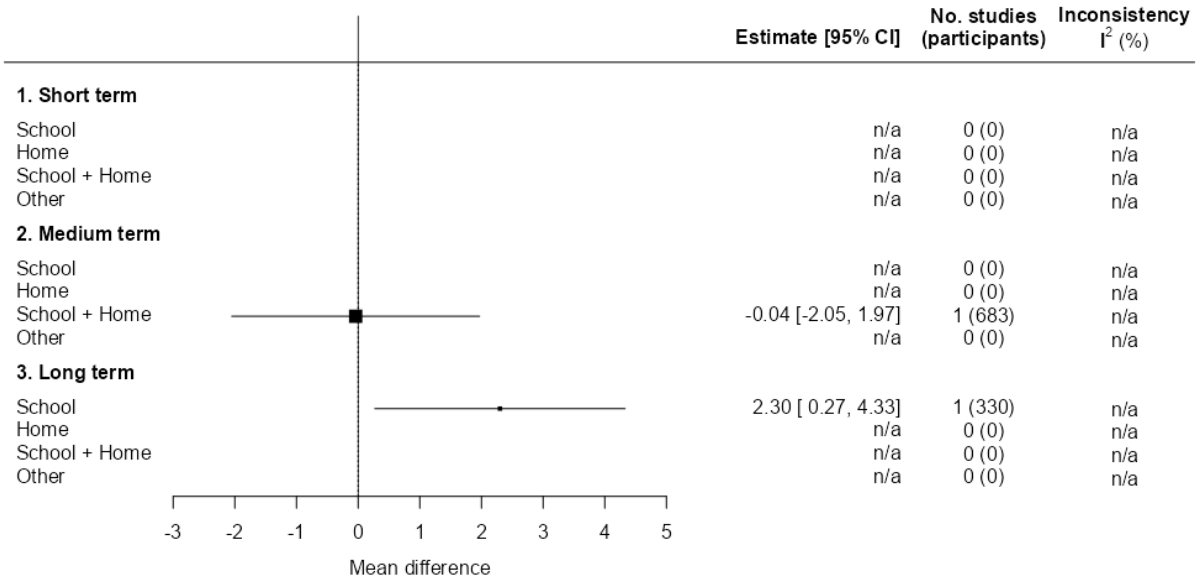
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 25



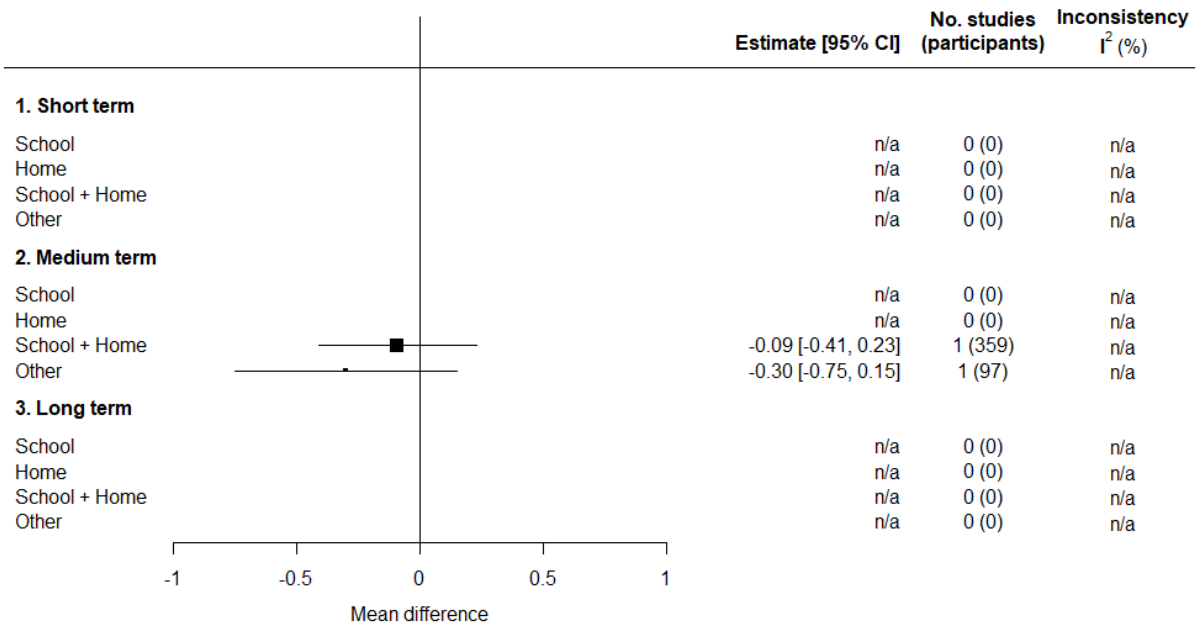
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 26



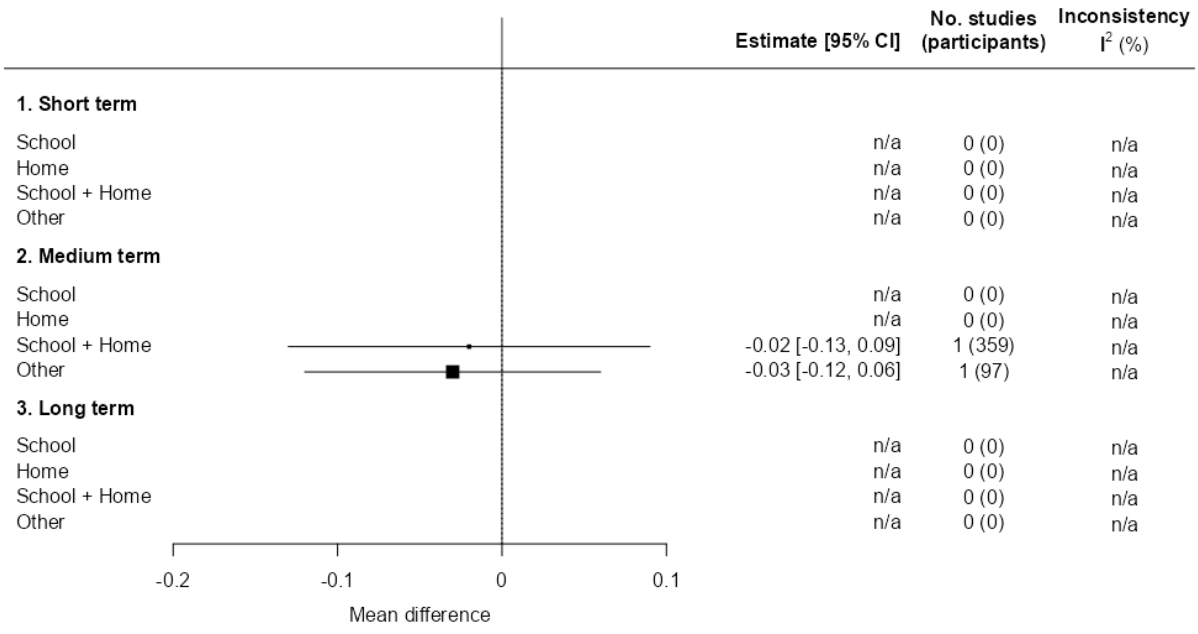
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 27



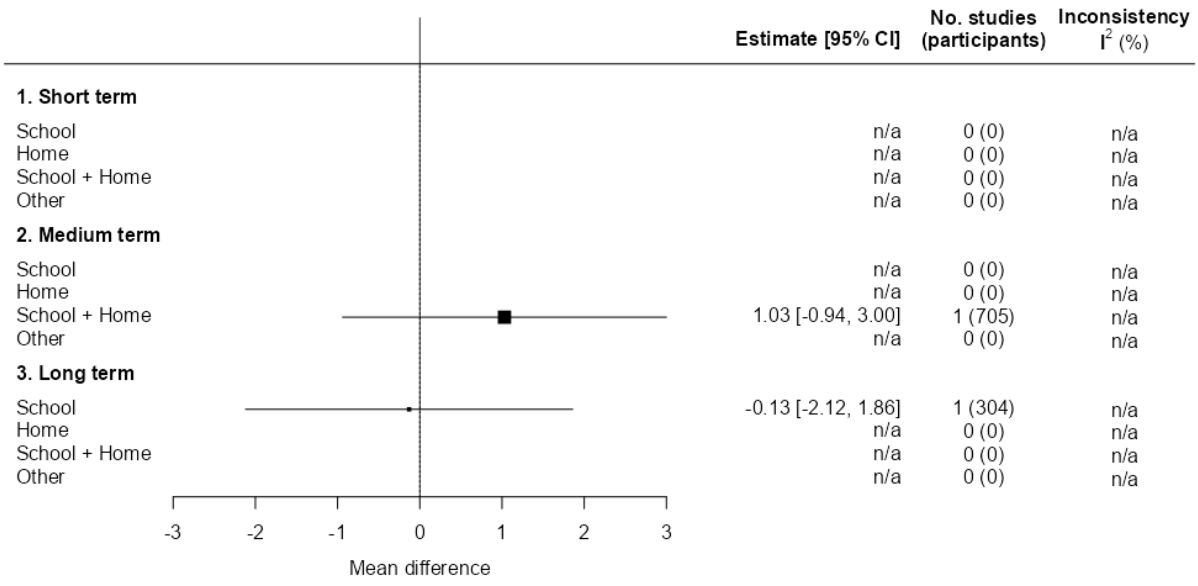
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 28



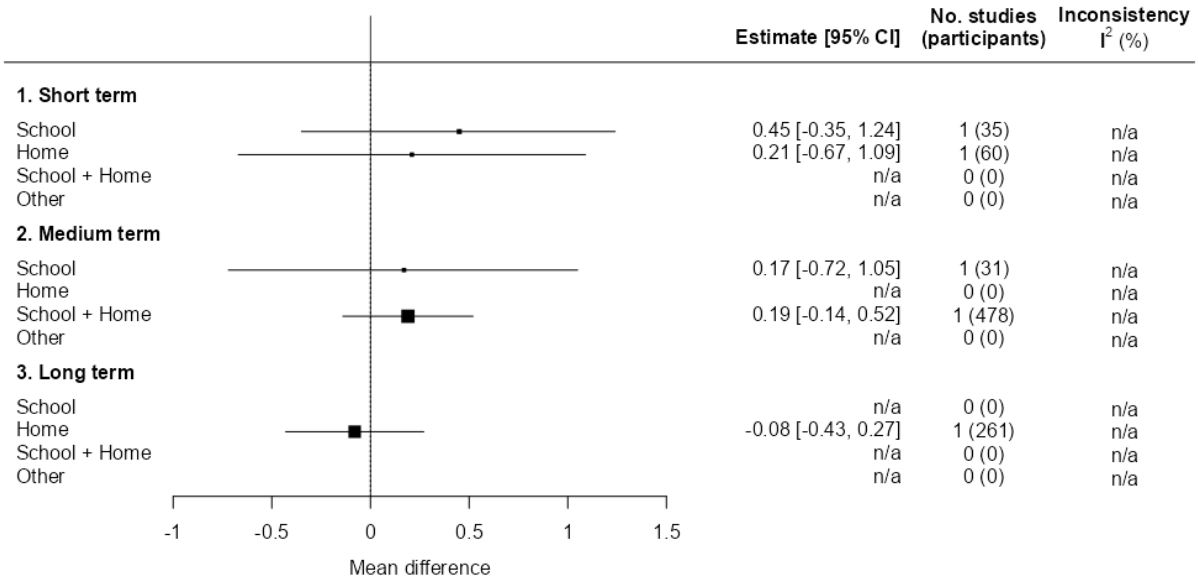
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 29



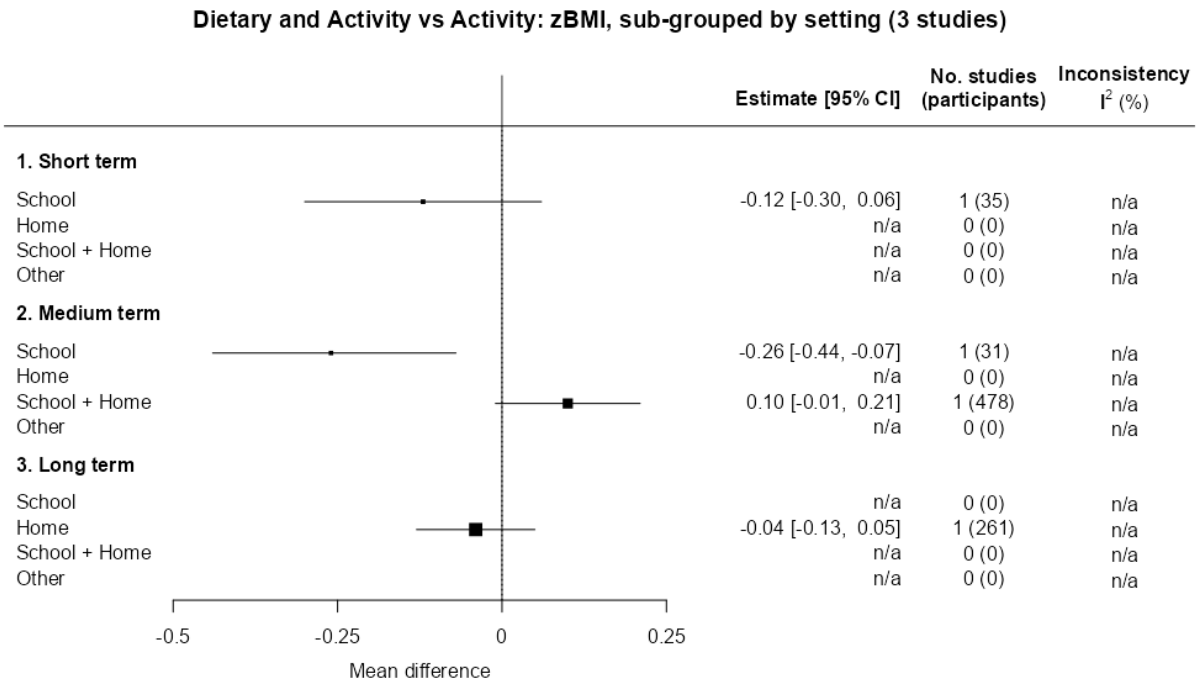
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 30



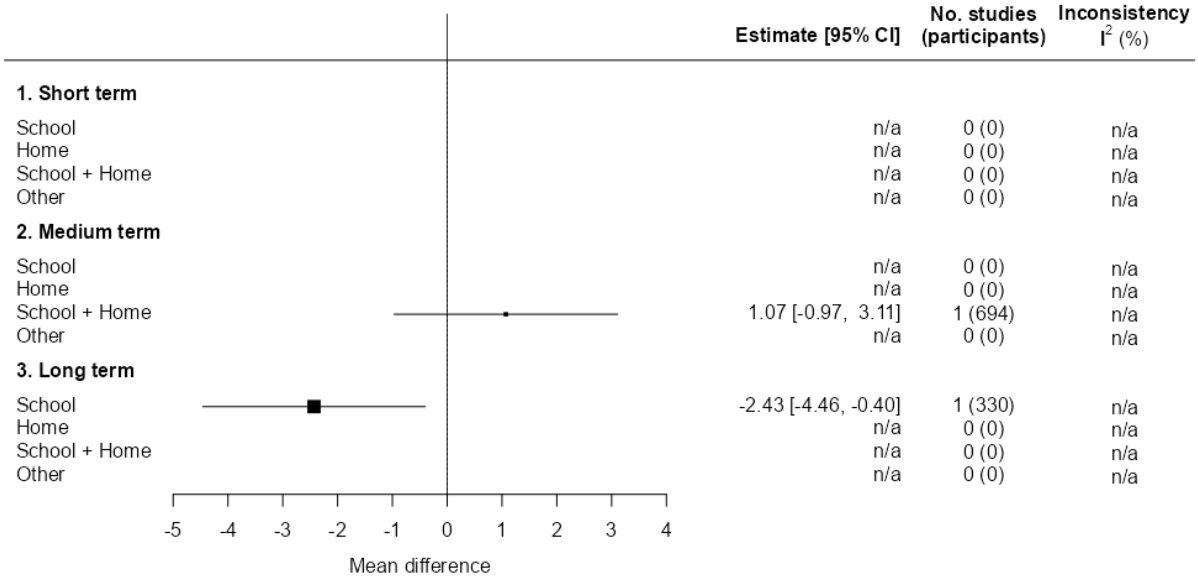
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 31



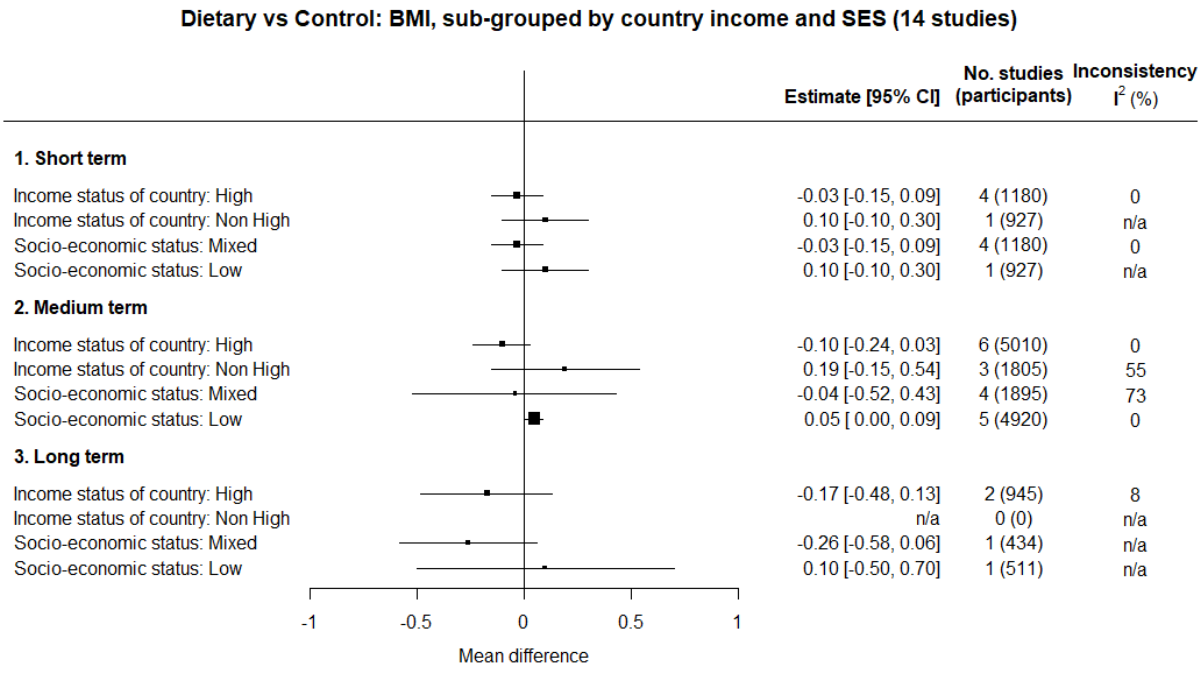
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 32



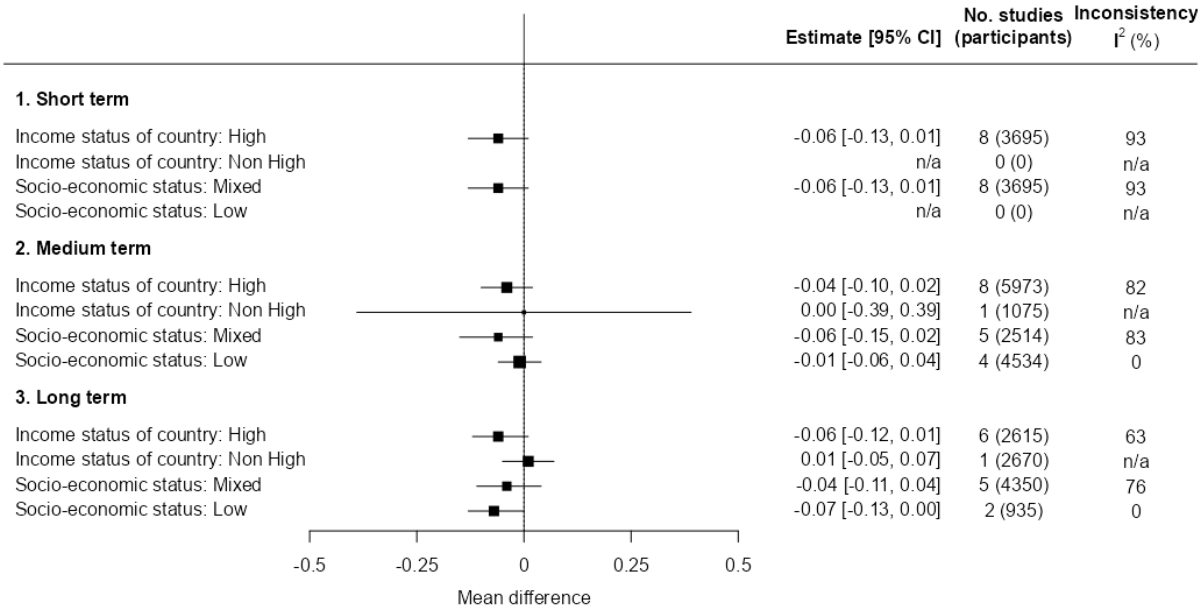
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 33



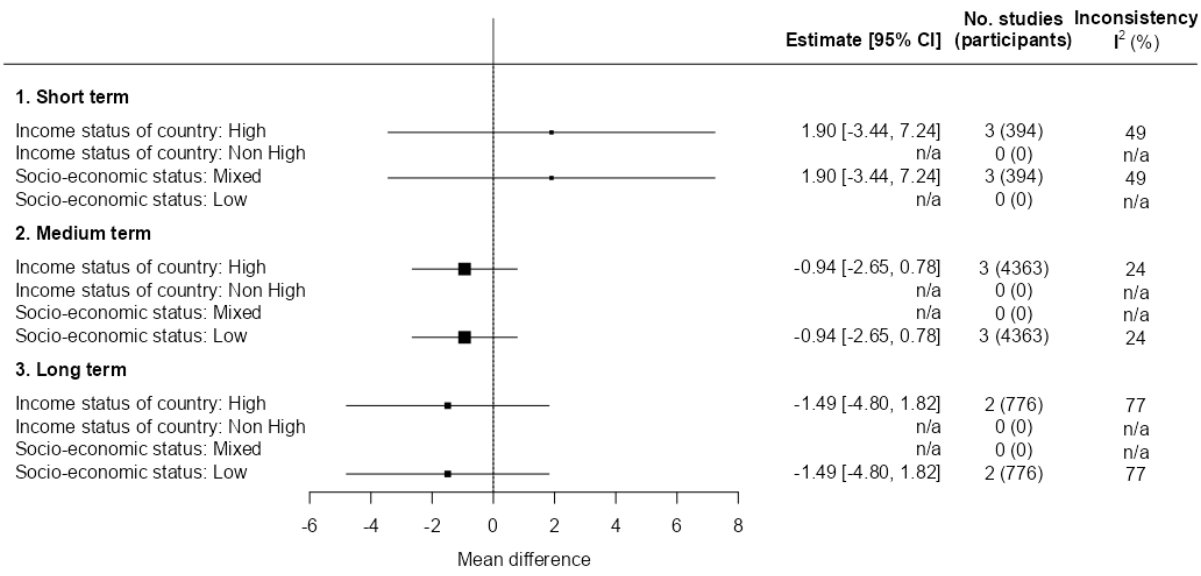
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 34



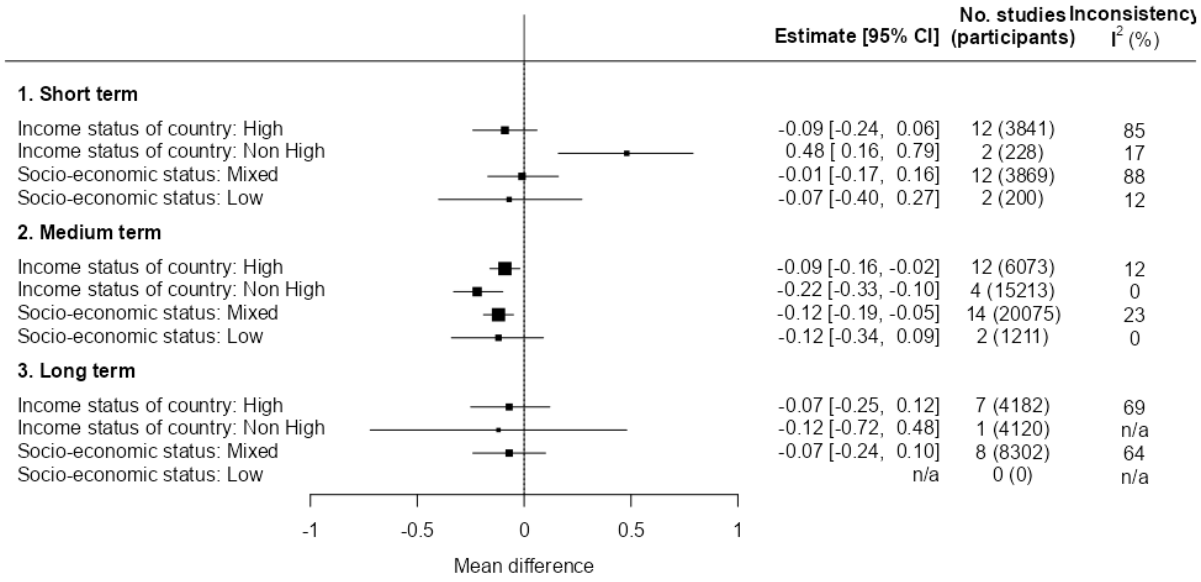
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 35



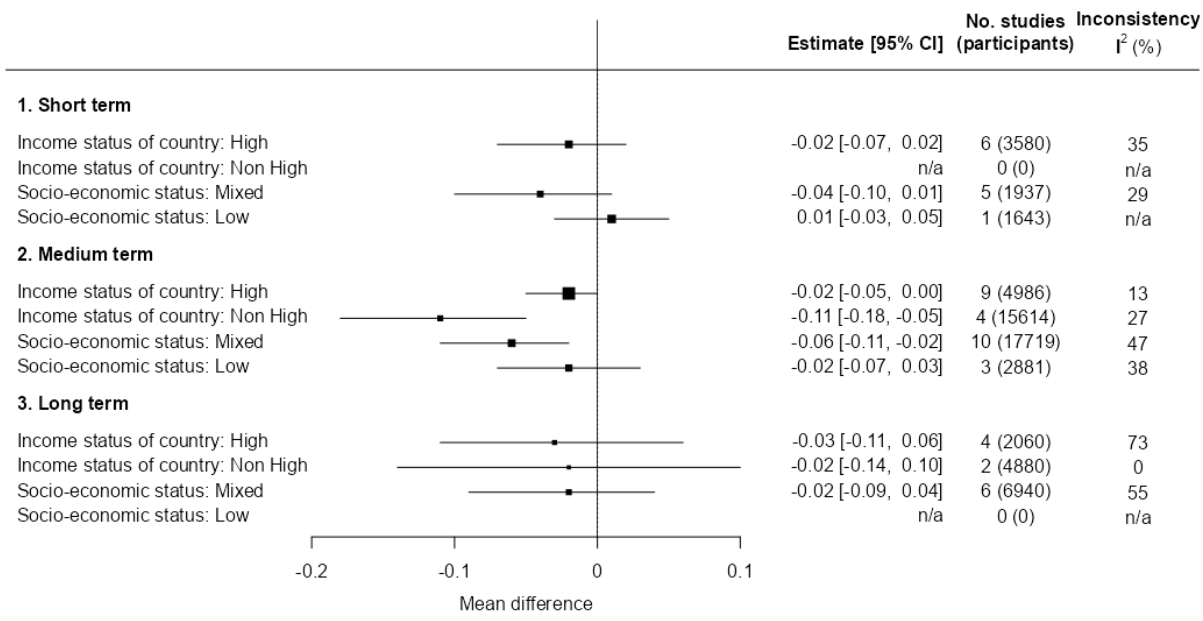
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 36



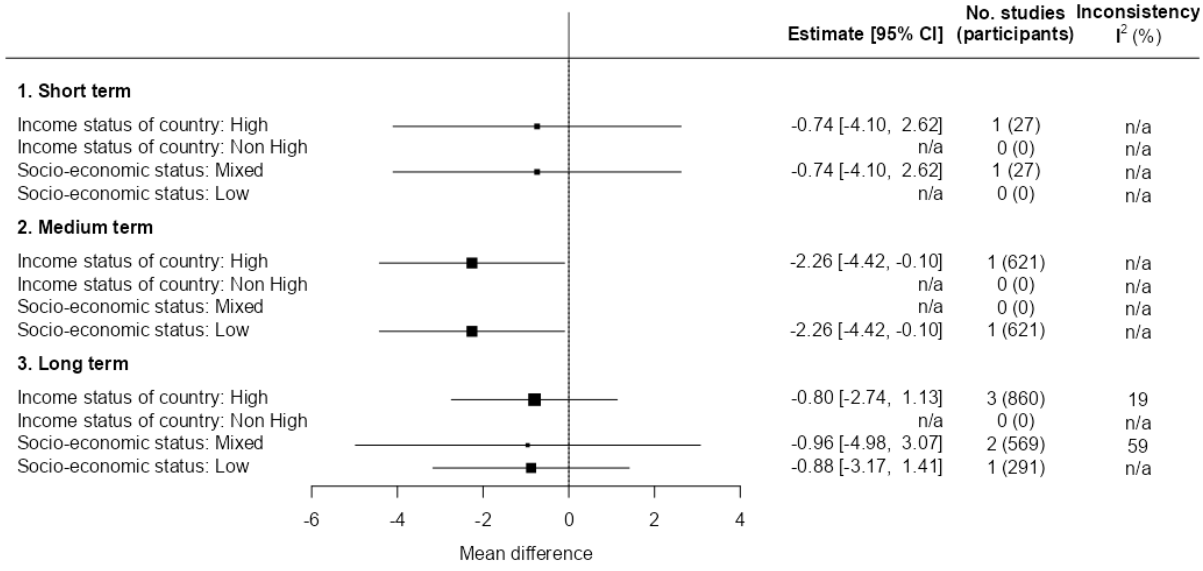
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 37



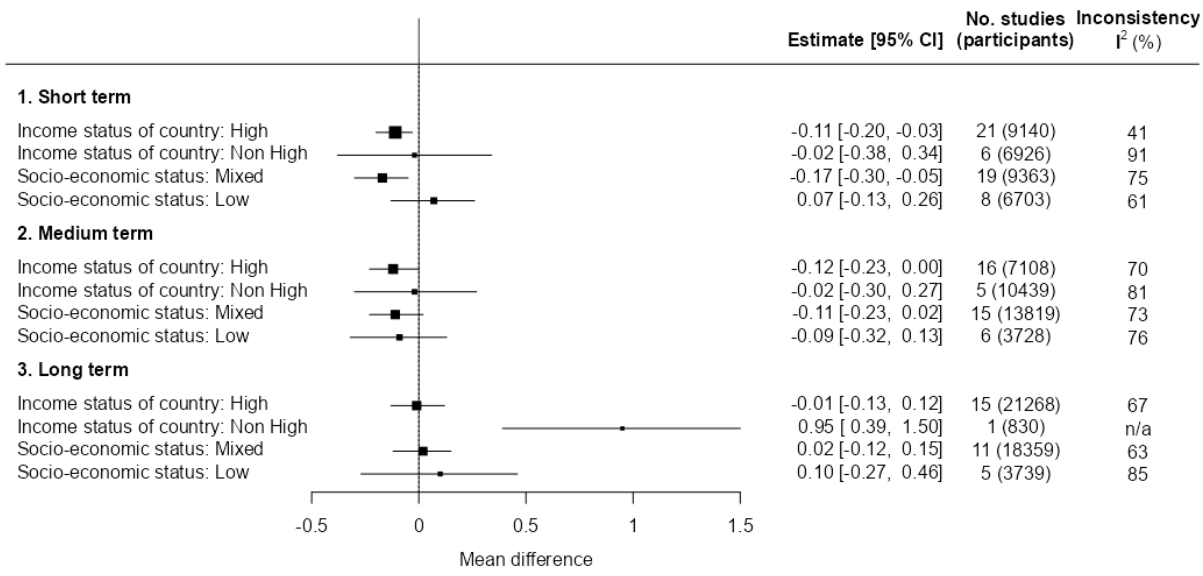
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 38



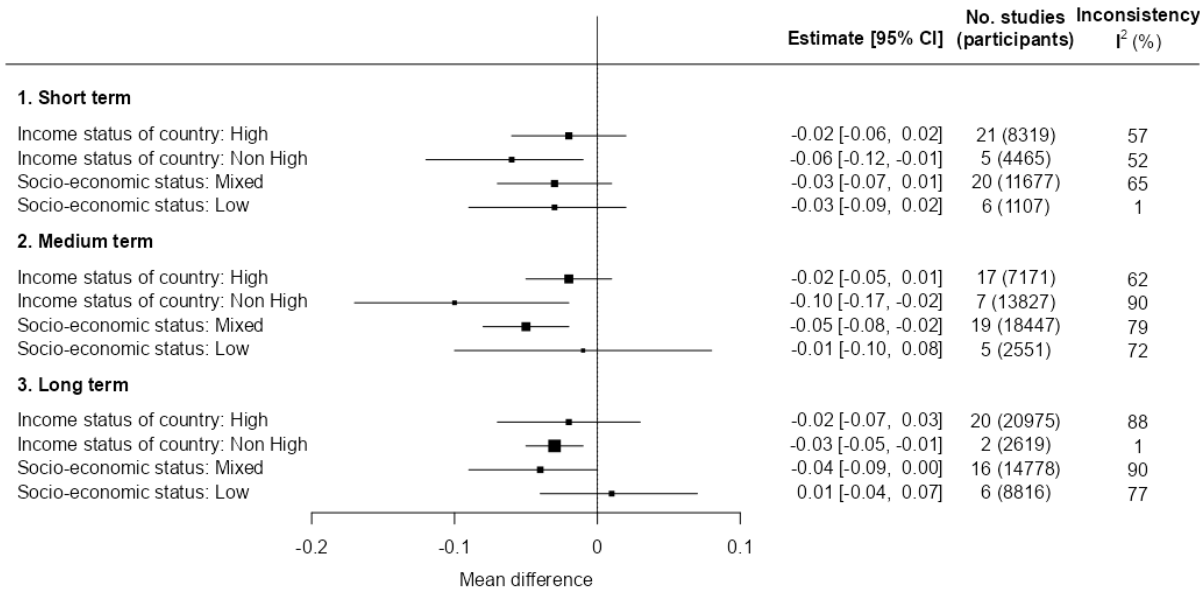
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 39



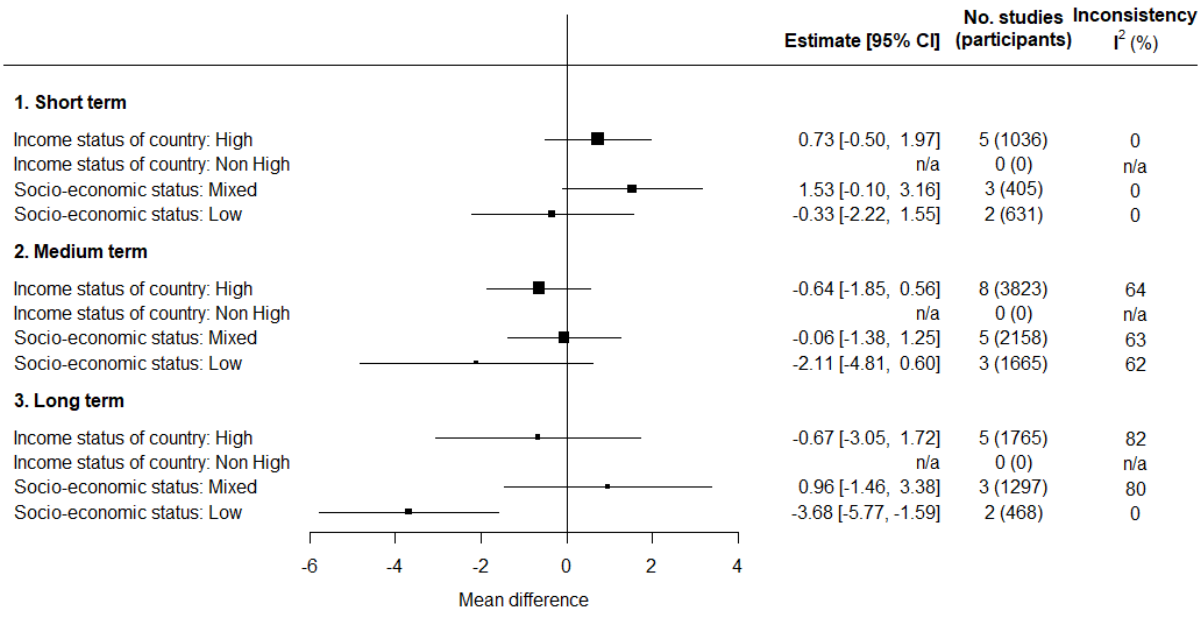
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 40



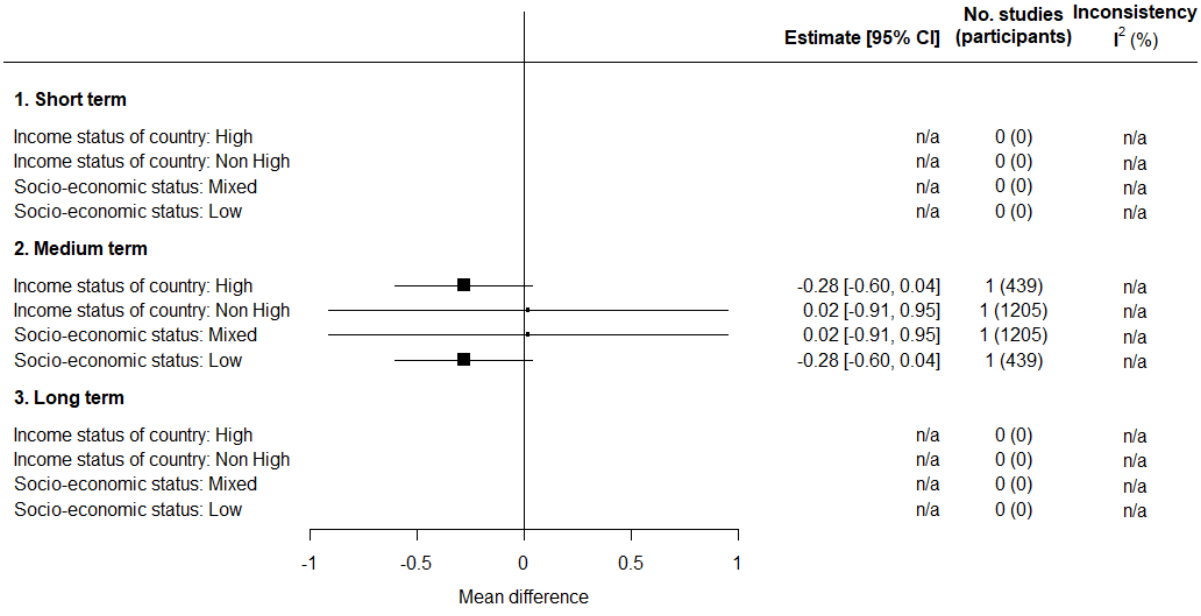
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 41



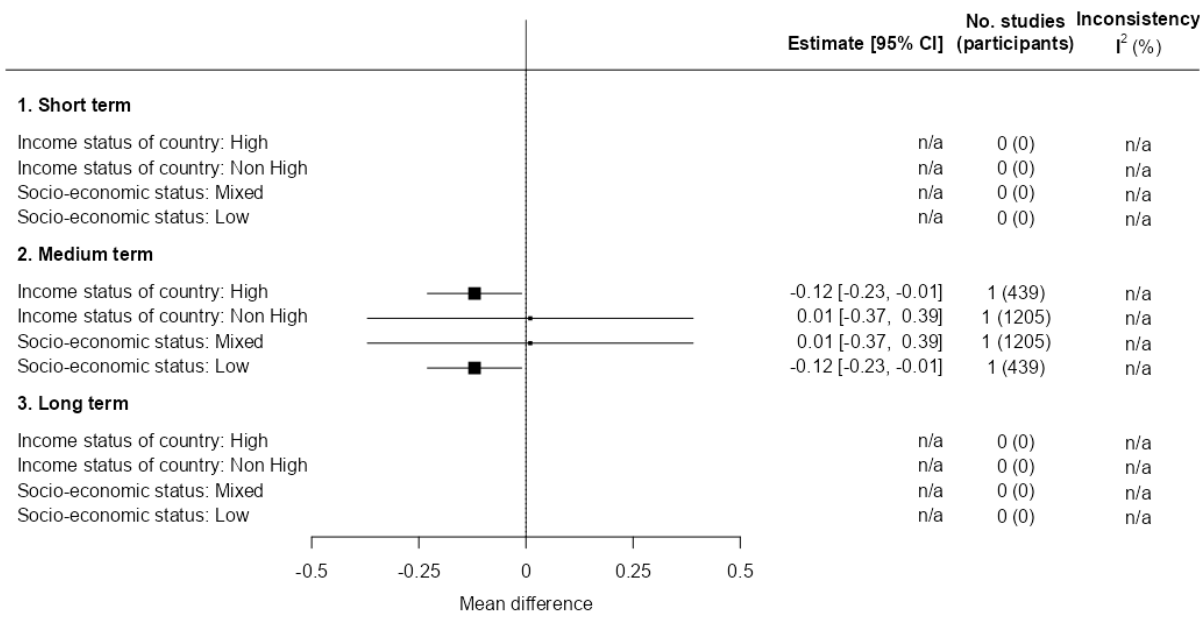
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 42



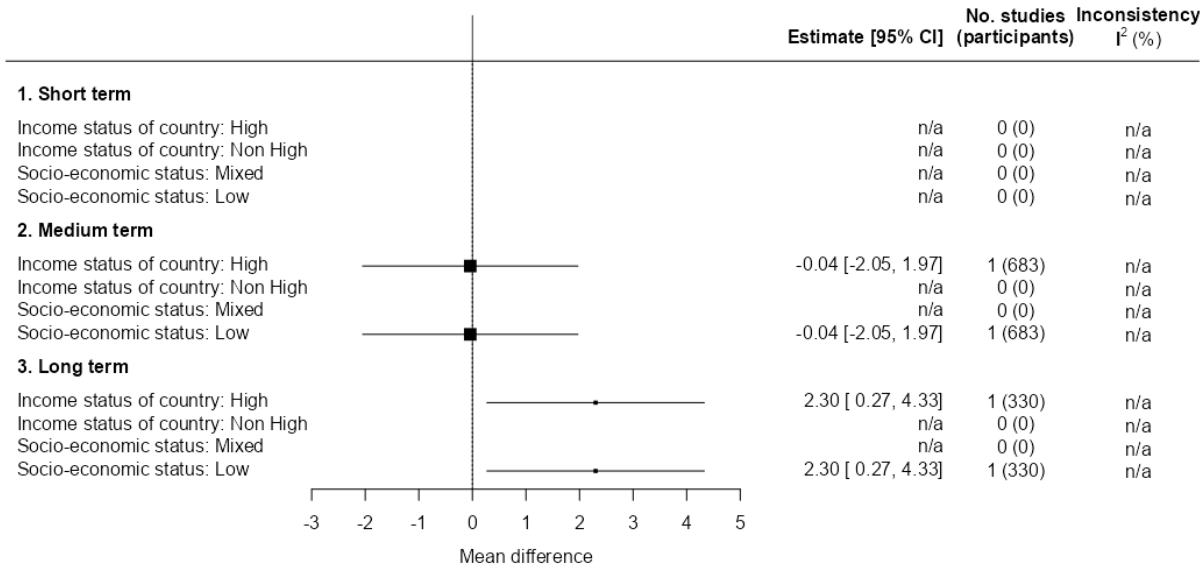
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 43



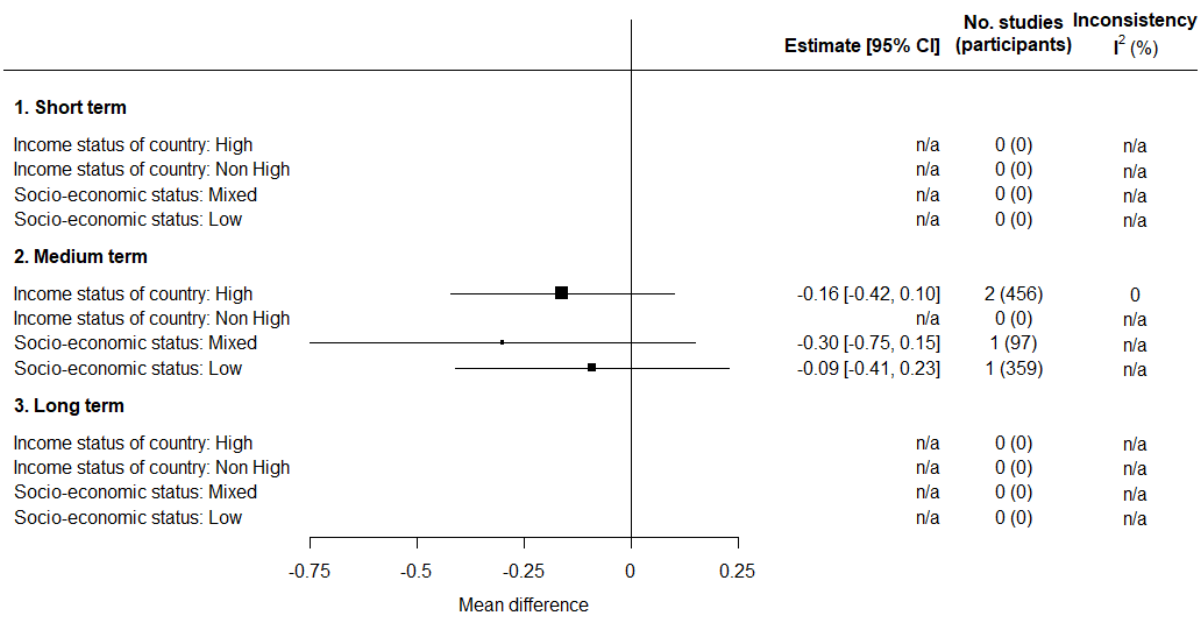
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 44



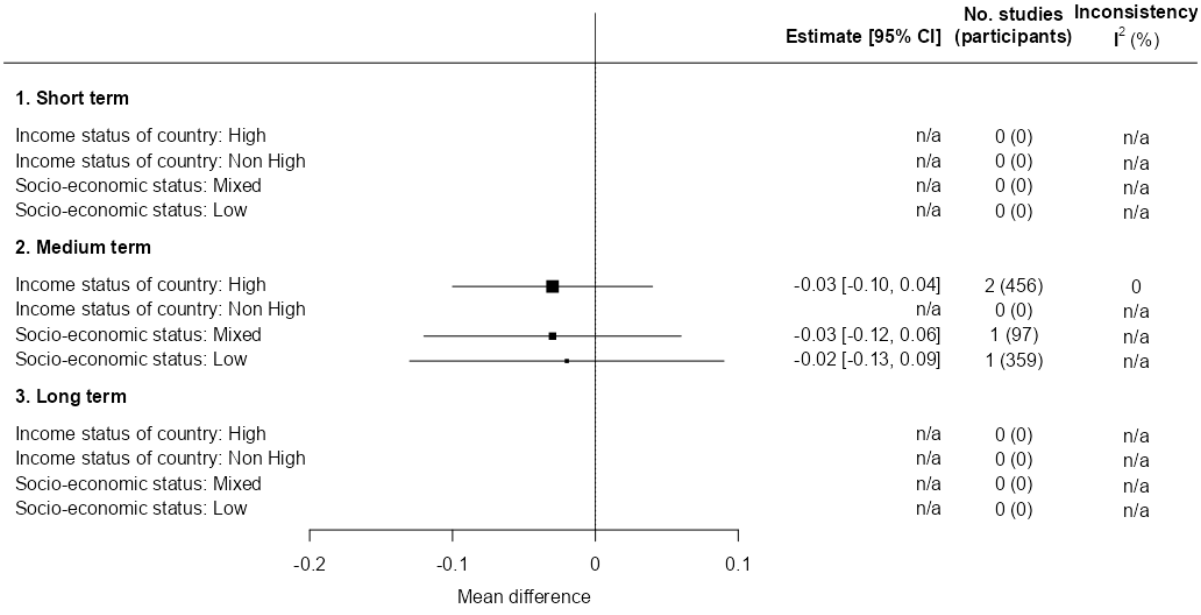
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 45



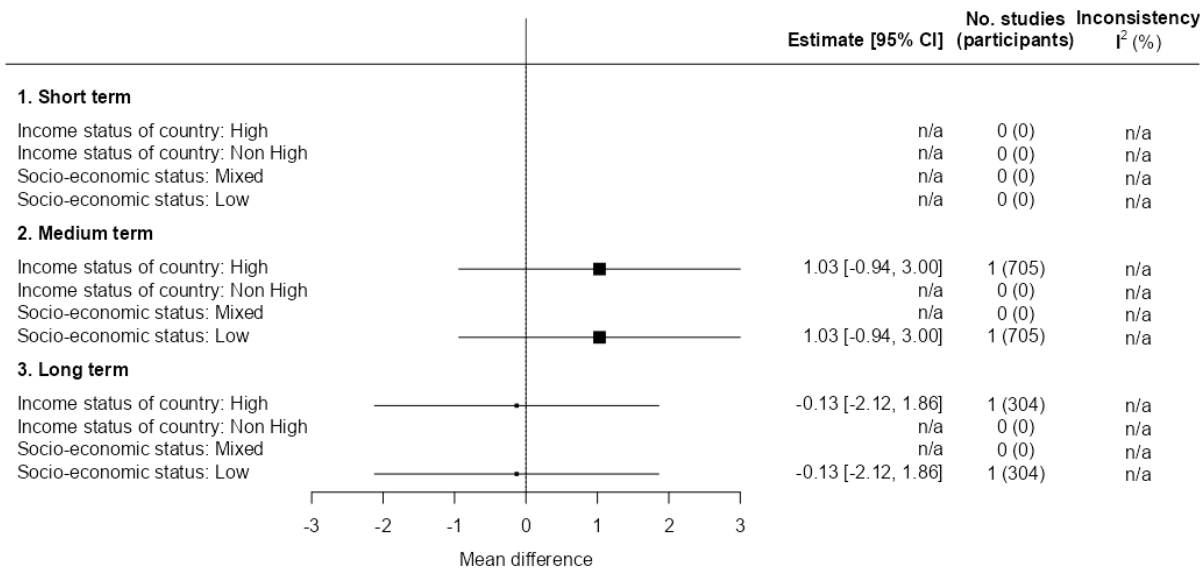
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 46



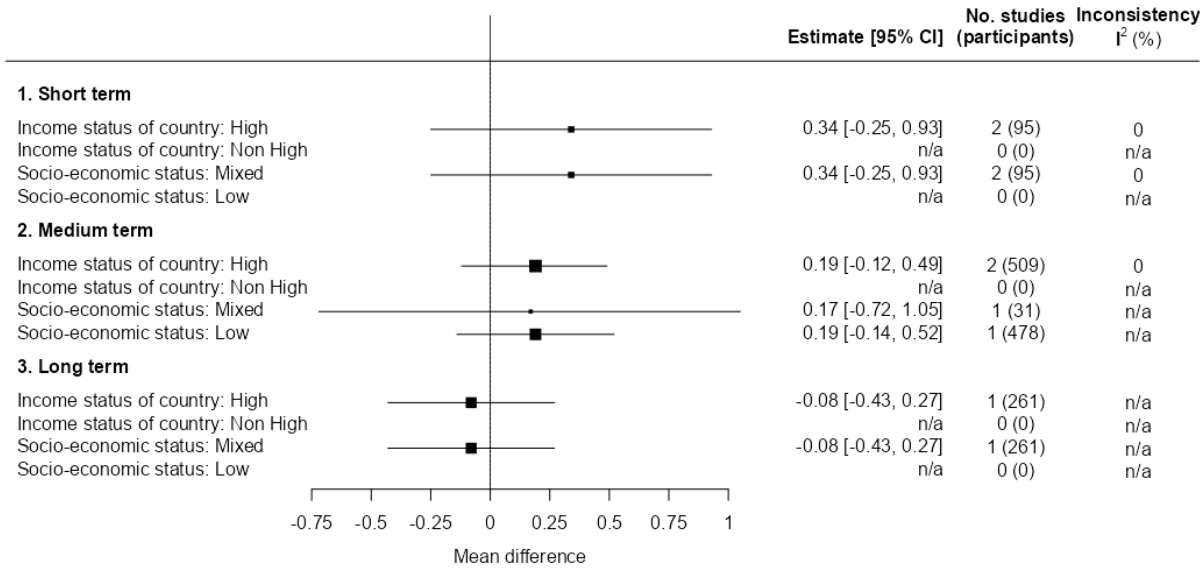
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 47



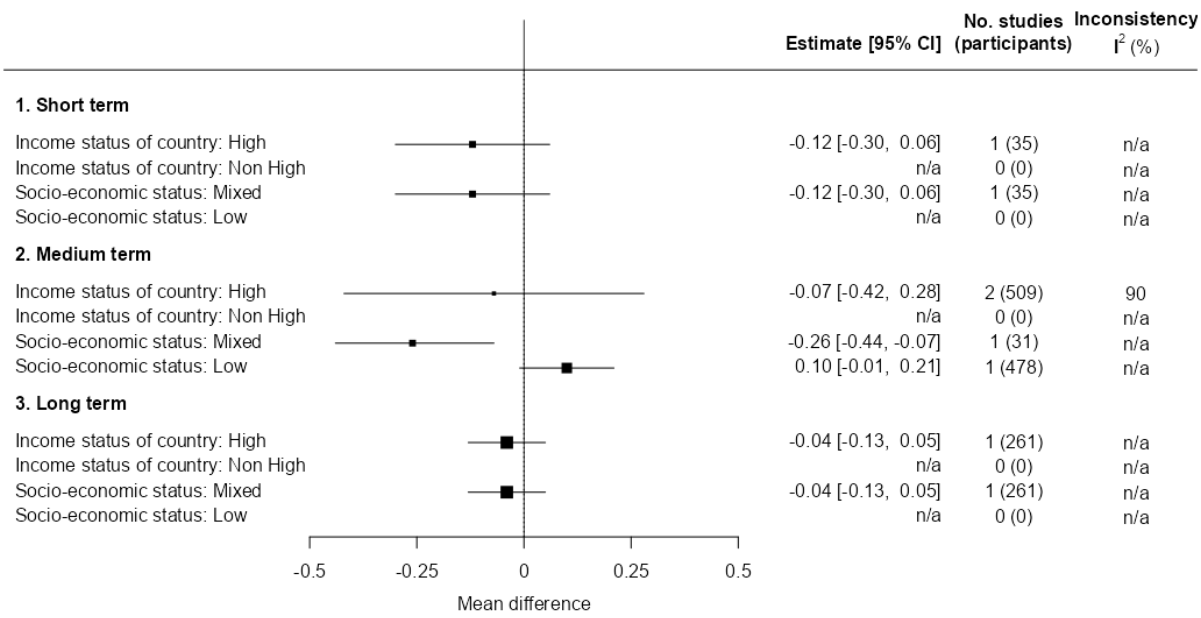
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 48



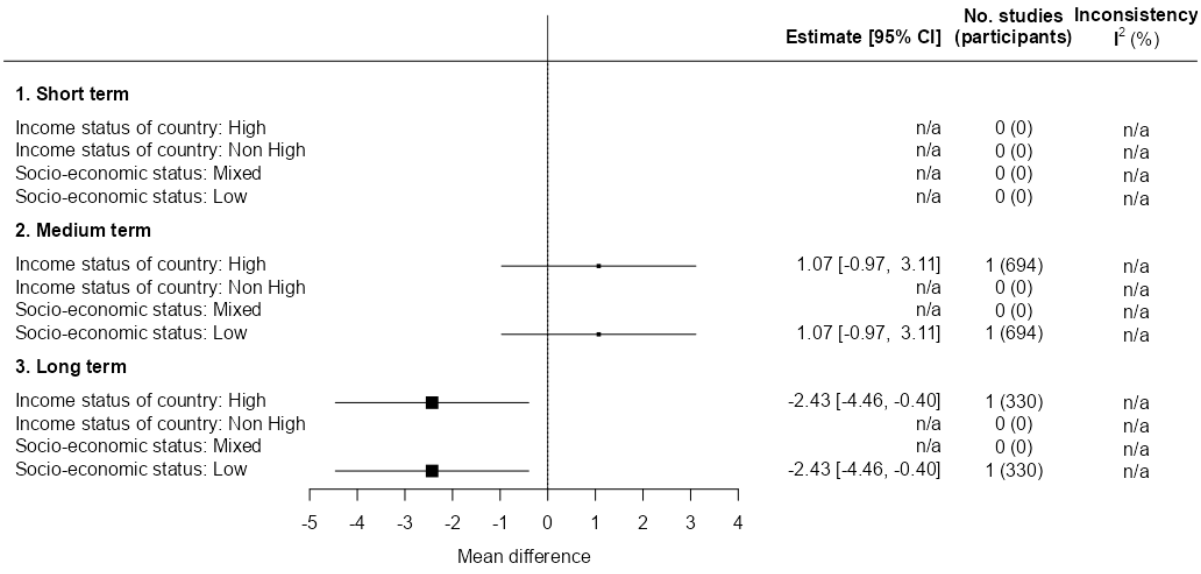
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 49



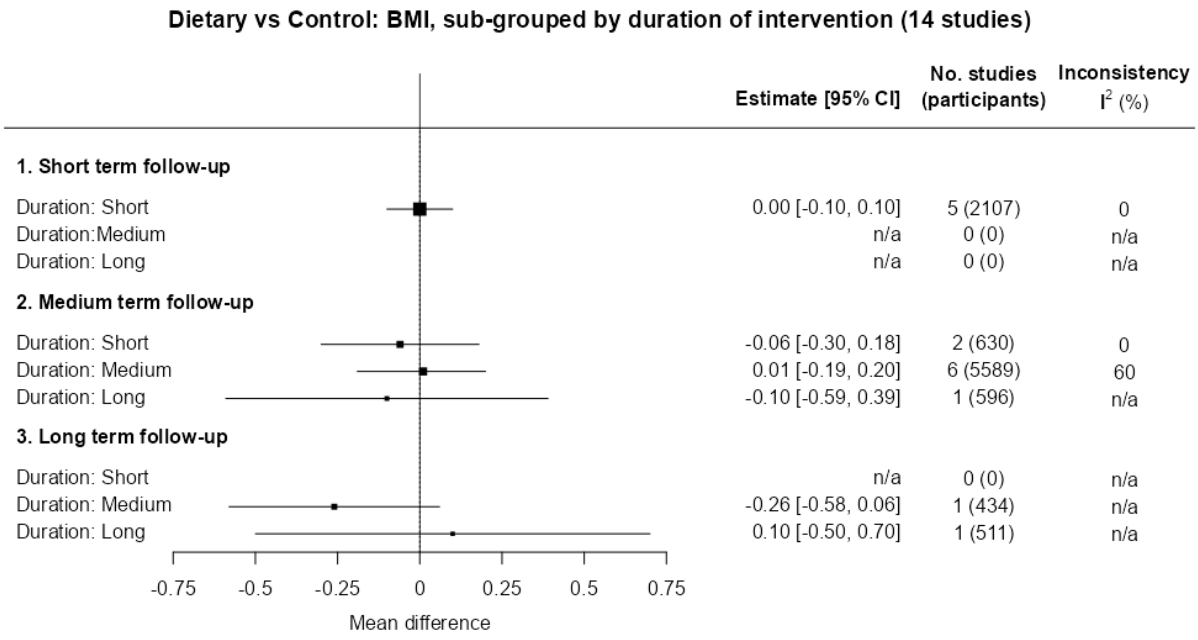
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 50



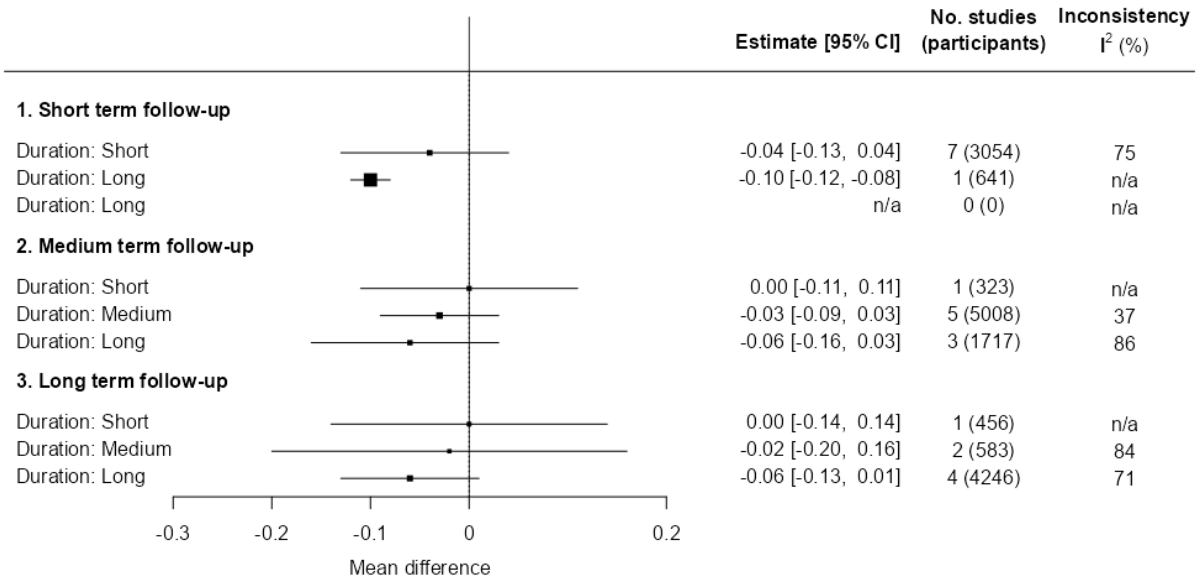
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 51



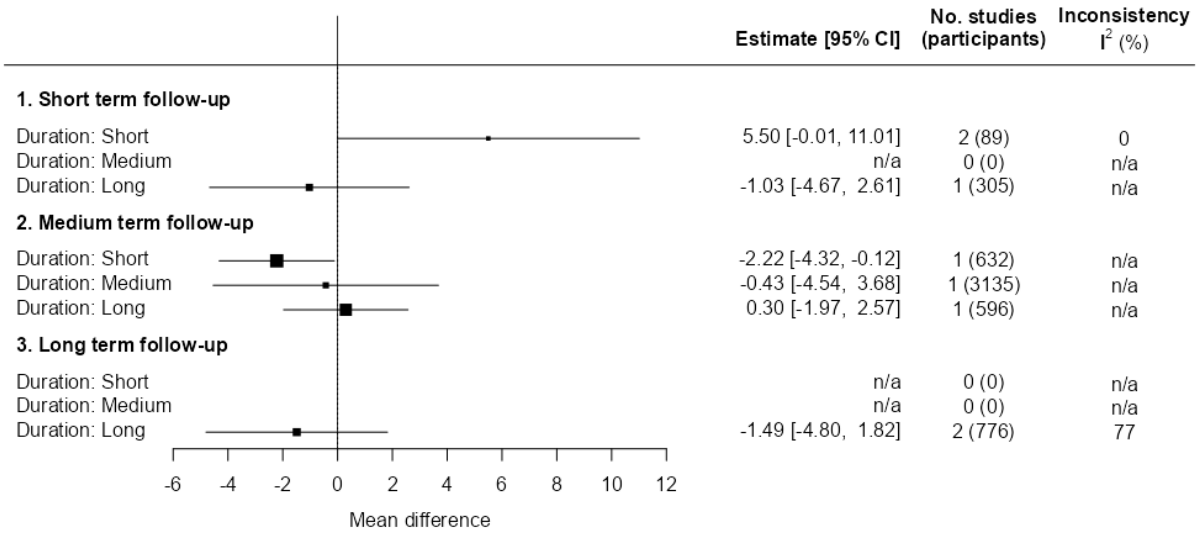
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 52



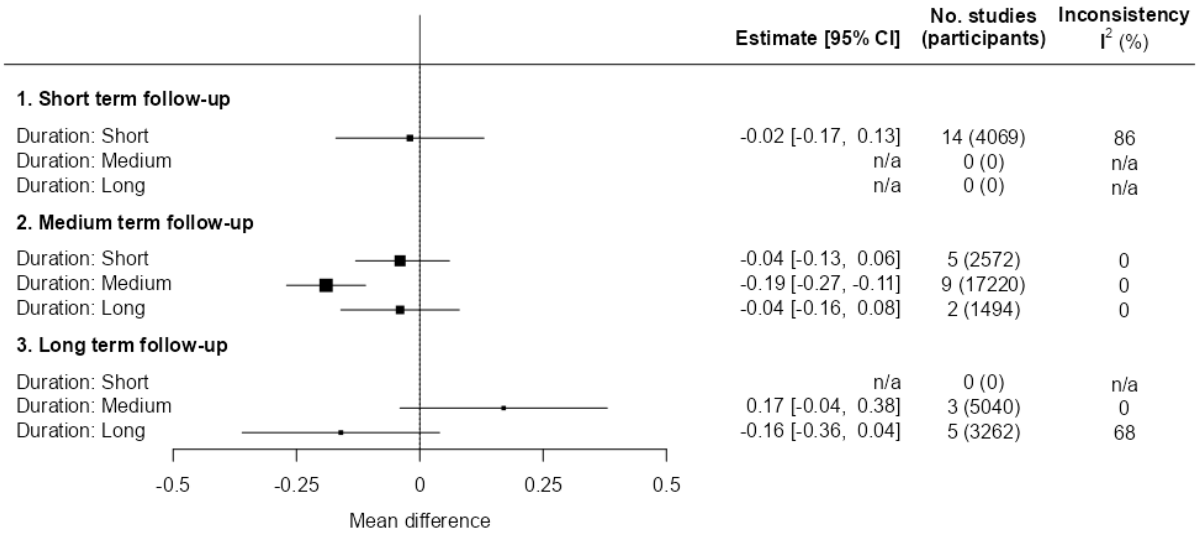
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 53



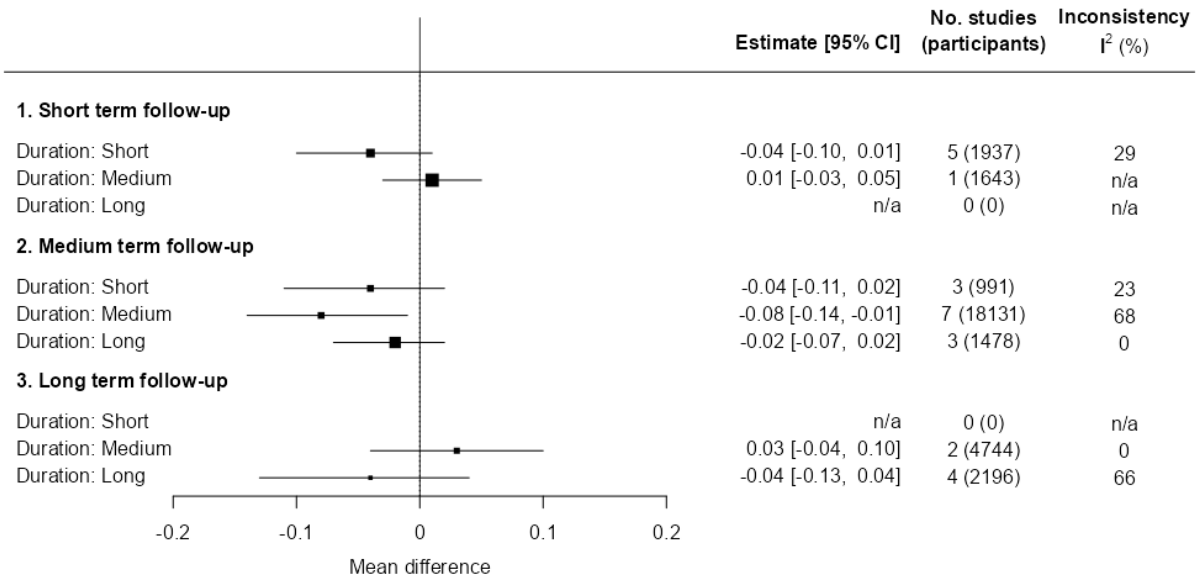
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 54



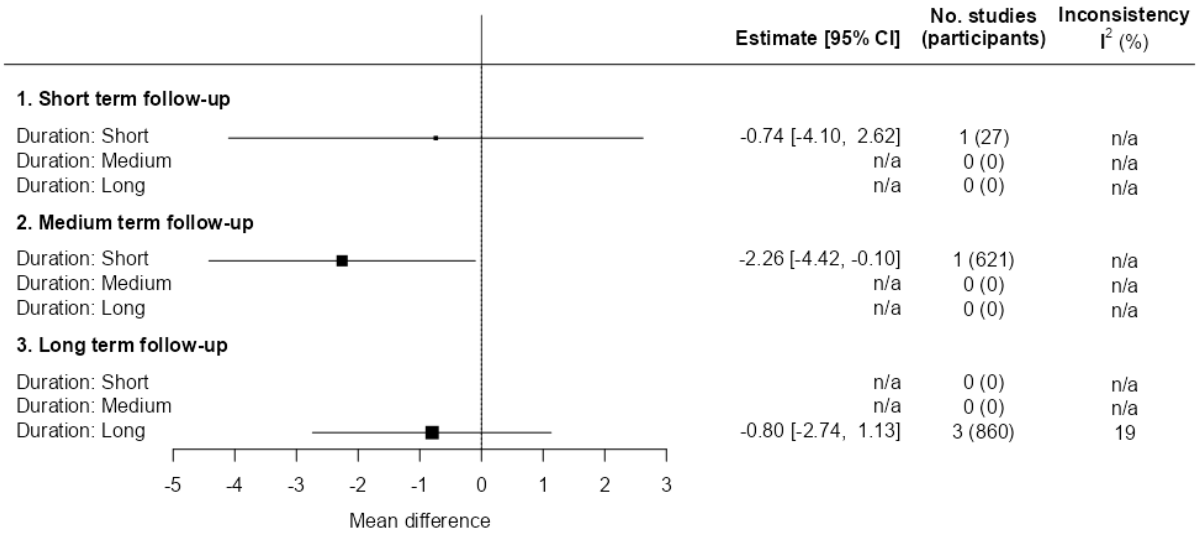
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 55



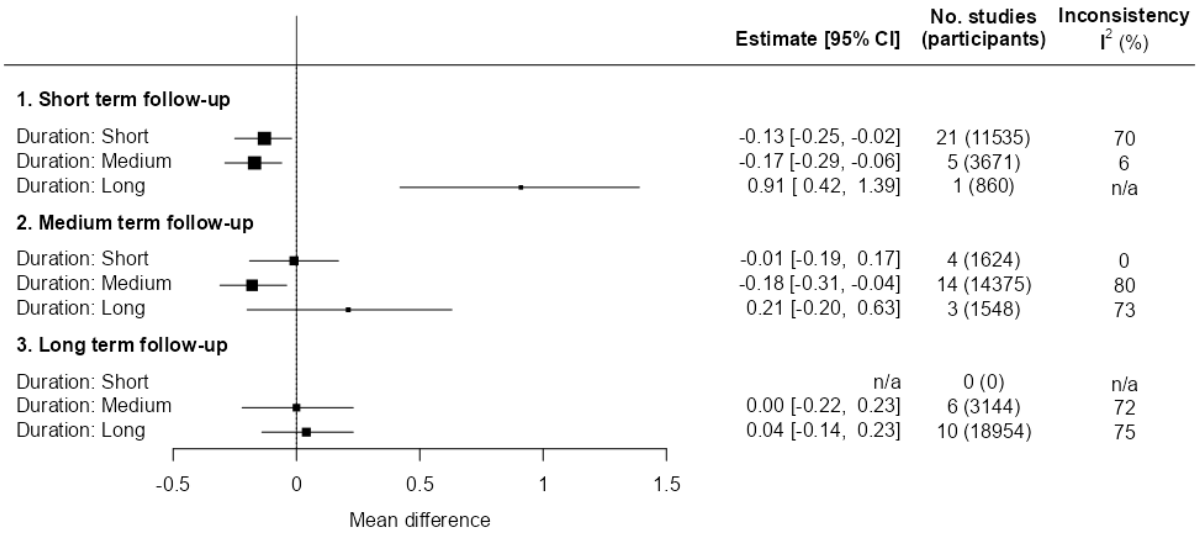
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 56



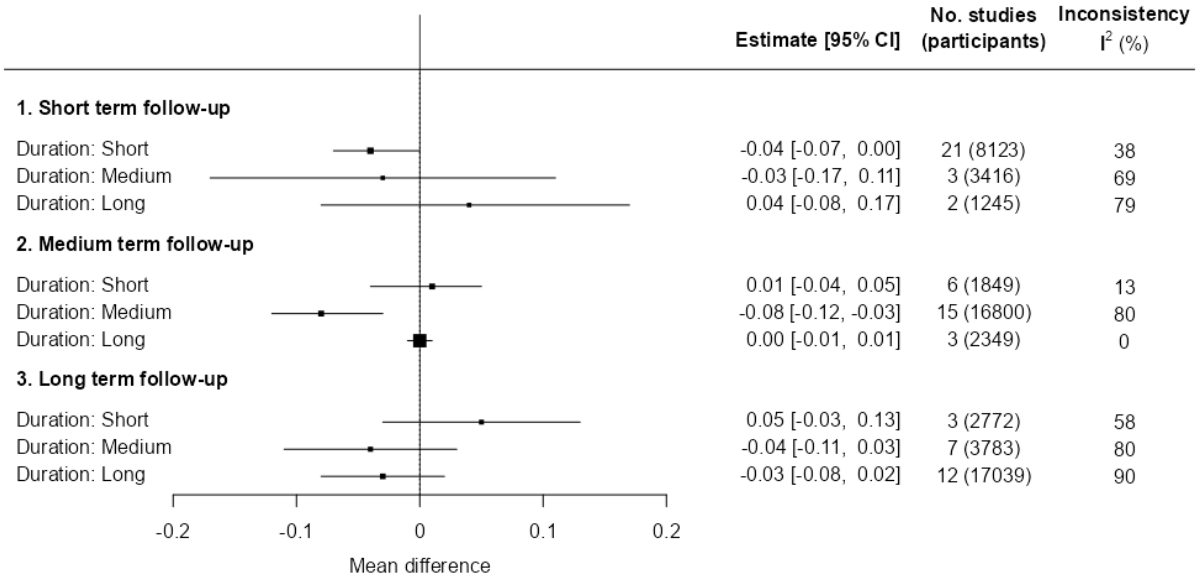
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 57



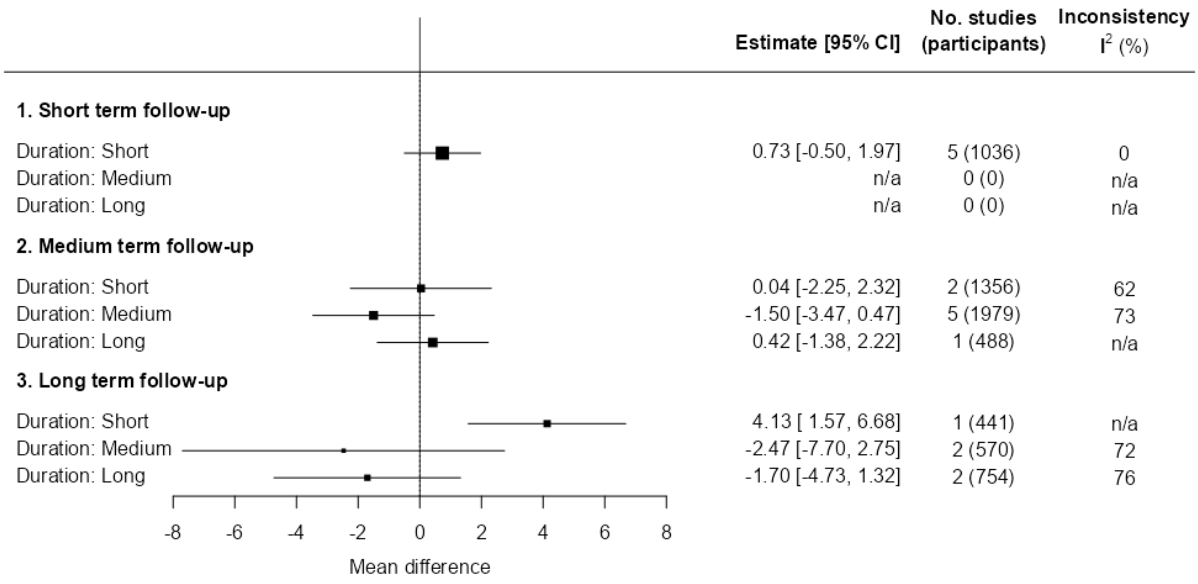
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 58



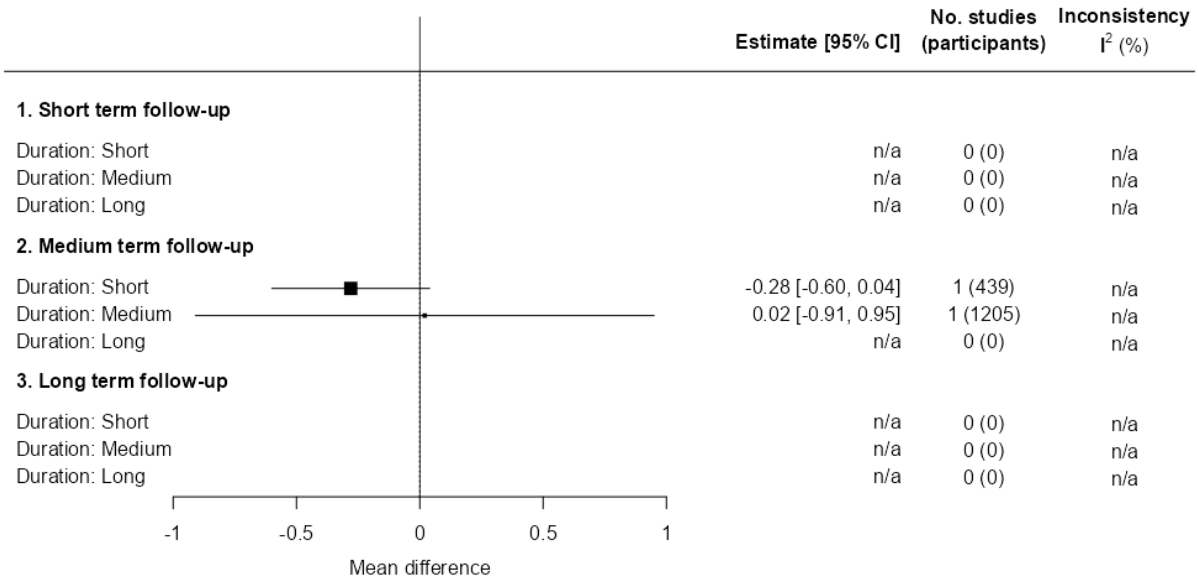
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 59



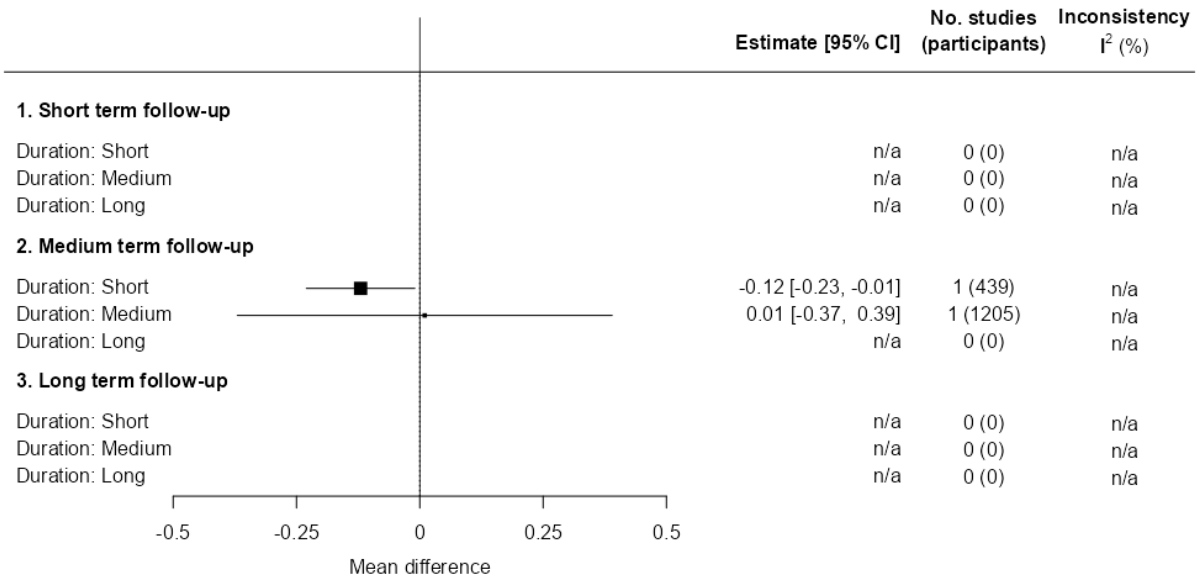
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 60



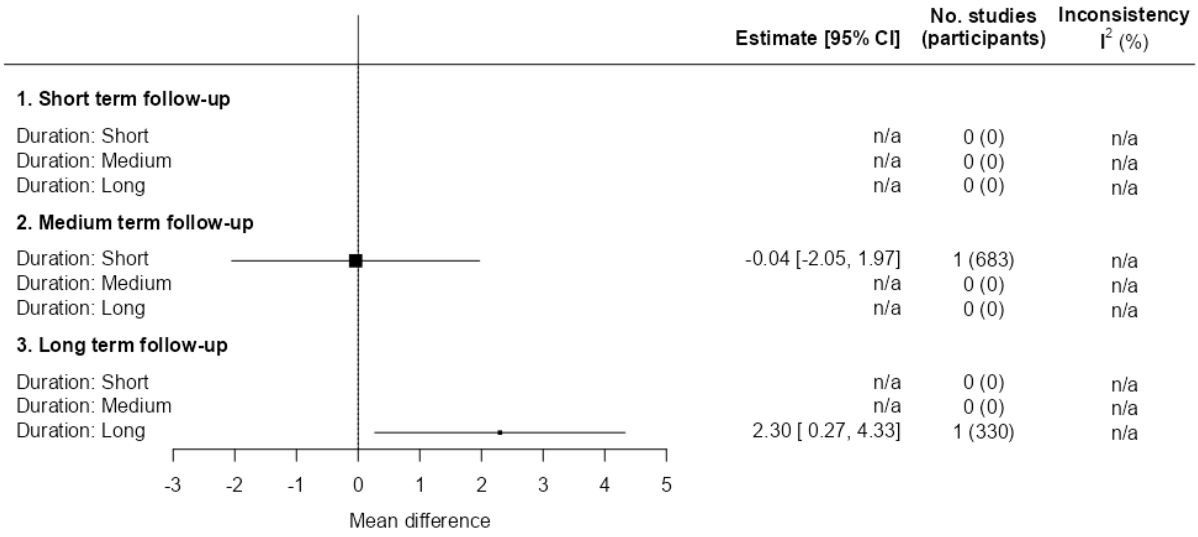
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 61



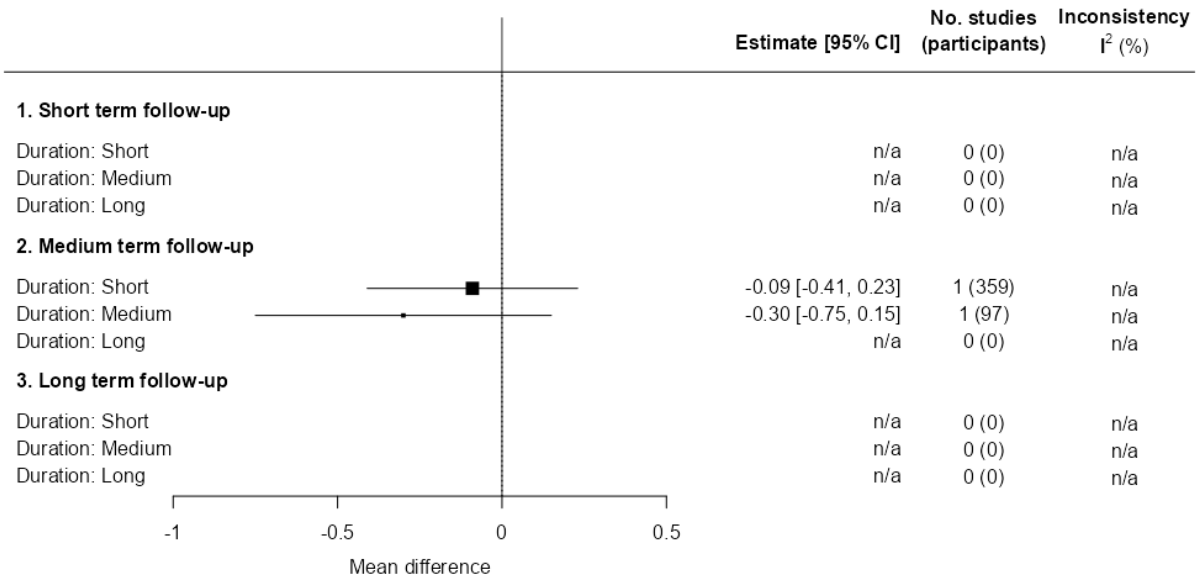
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 62



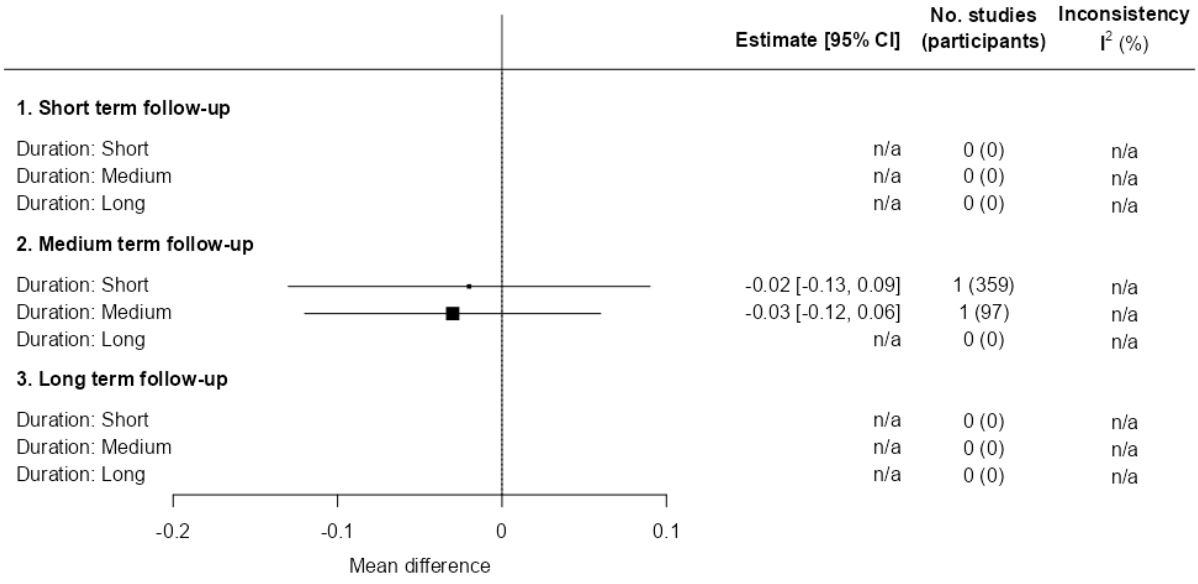
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 63



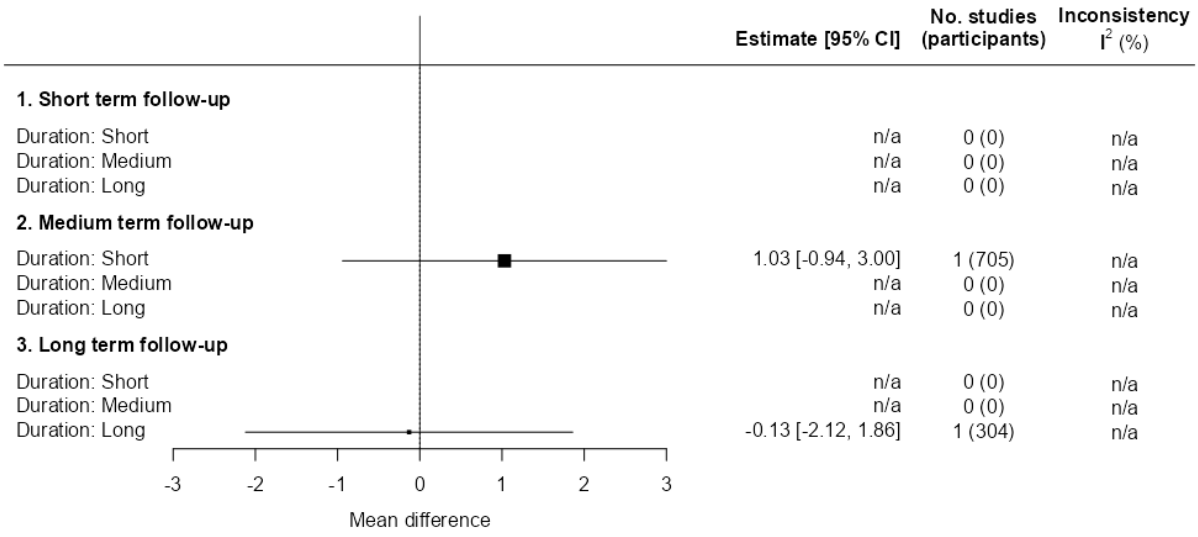
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 64



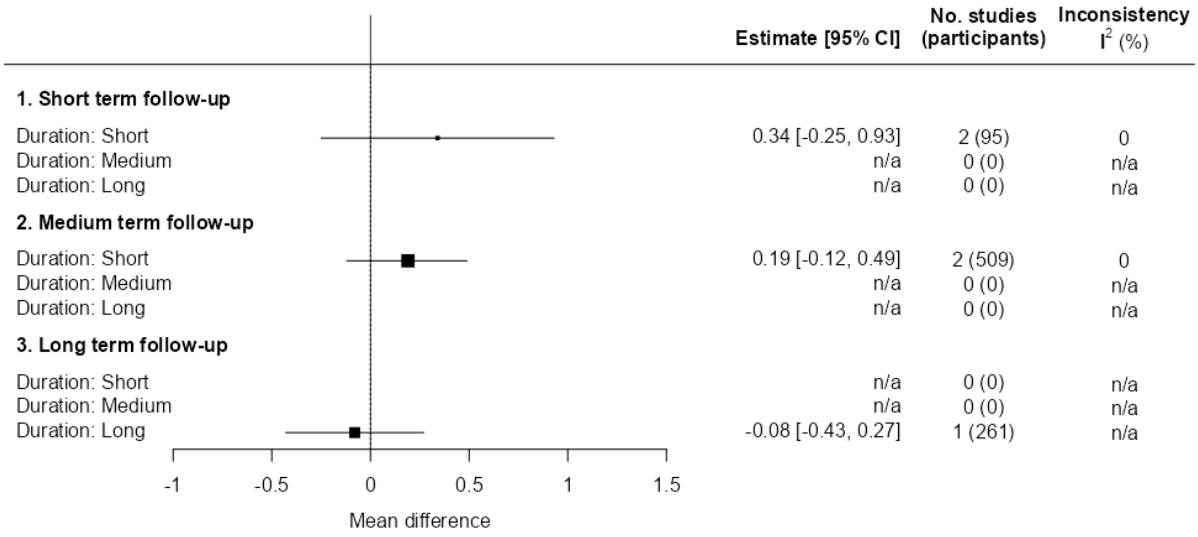
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 65



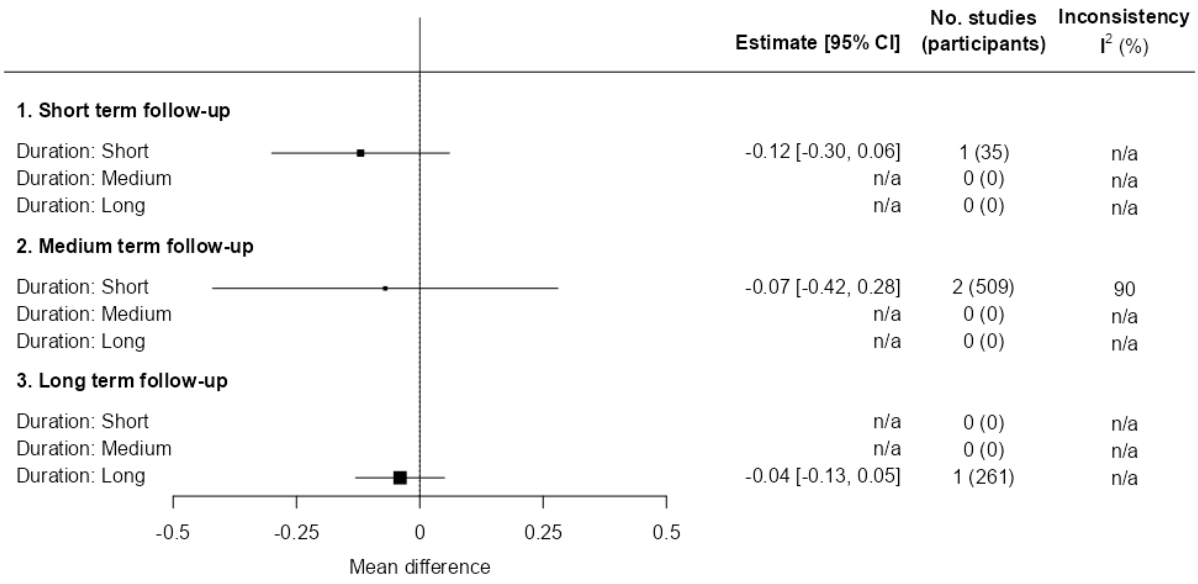
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 66



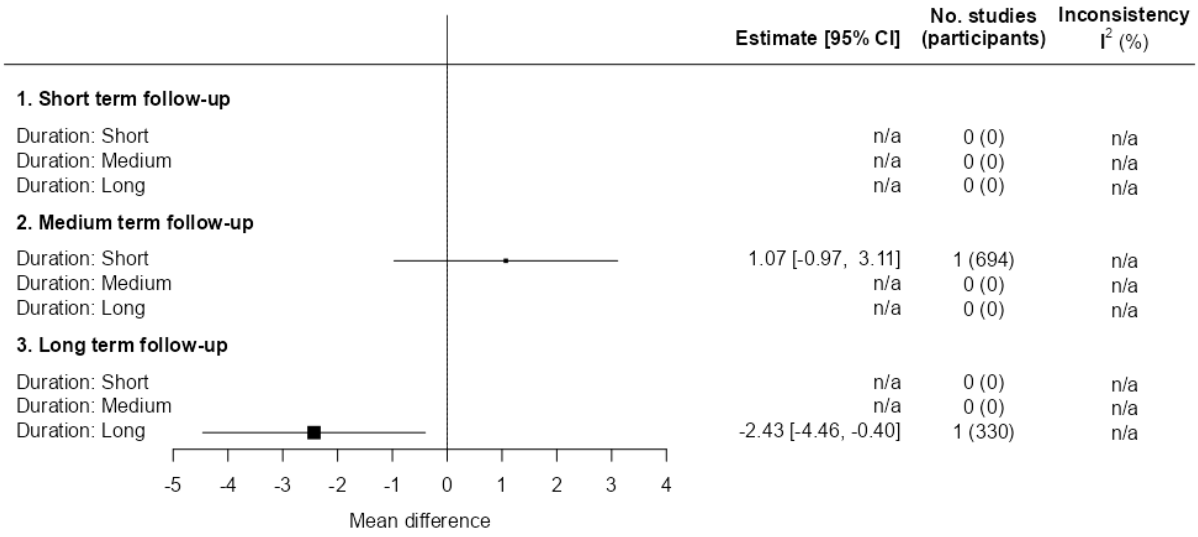
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 67



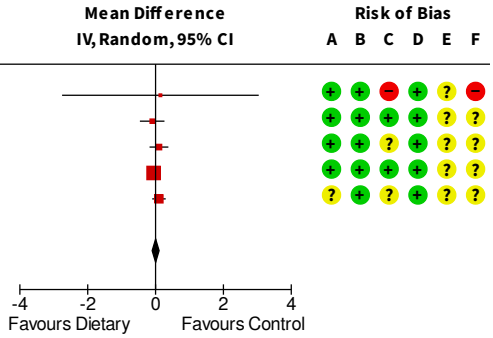
Abbreviations: CI= confidence interval; n/a = not applicable.

Figure 68



Abbreviations: CI= confidence interval; n/a = not applicable.

Analysis 1.1



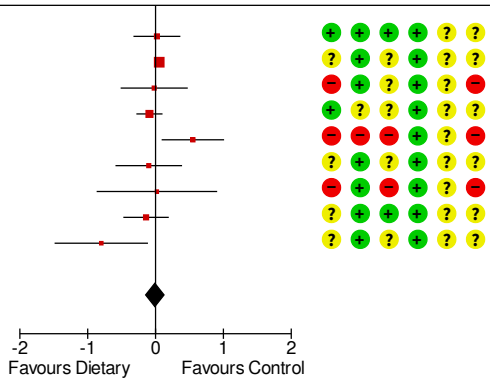
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Chai 2019	0.14264	1.478678	0.1%	0.14 [-2.76 , 3.04]	+ + − + ? −
Hendrie 2011	-0.1	0.184784379	8.0%	-0.10 [-0.46 , 0.26]	+ + + + ? ?
Nicholl 2021	0.1	0.141421356	13.6%	0.10 [-0.18 , 0.38]	+ + ? + ? ?
Paineau 2008	-0.059108	0.072559	51.8%	-0.06 [-0.20 , 0.08]	+ + + + ? ?
Sichieri 2008	0.1	0.101394774	26.5%	0.10 [-0.10 , 0.30]	? + ? + ? ?
Total (95% CI)			**100.0%**	**0.00 [-0.10 , 0.10]**	

Heterogeneity: Tau² = 0.00; Chi² = 2.44, df = 4 (P = 0.66); I² = 0%
Test for overall effect: Z = 0.03 (P = 0.97)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 1: BMI short term

Analysis 1.2



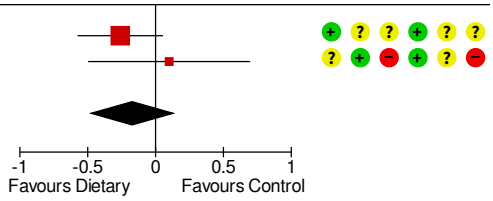
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0.02	0.176358365	10.6%	0.02 [-0.33 , 0.37]	+ + + + ? ?
Cunha 2013	0.054	0.023145676	33.0%	0.05 [0.01 , 0.10]	? + ? + ? ?
Davis 2021	-0.02	0.252356395	6.2%	-0.02 [-0.51 , 0.47]	− + ? + ? −
James 2004	-0.09	0.09824172	20.3%	-0.09 [-0.28 , 0.10]	+ ? ? + ? ?
Keshani 2016	0.55	0.234805267	6.9%	0.55 [0.09 , 1.01]	− − − + ? −
Lent 2014	-0.1	0.250365868	6.2%	-0.10 [-0.59 , 0.39]	? + ? + ? ?
Meng 2013 (Beijing)	0.02	0.453155602	2.2%	0.02 [-0.87 , 0.91]	− + − + ? −
NCT00224887 2005	-0.14	0.17078629	11.1%	-0.14 [-0.47 , 0.19]	? + + + ? ?
Stettler 2015	-0.8	0.351059205	3.5%	-0.80 [-1.49 , -0.11]	? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.01 [-0.15 , 0.12]**	

Heterogeneity: Tau² = 0.01; Chi² = 14.04, df = 8 (P = 0.08); I² = 43%
Test for overall effect: Z = 0.15 (P = 0.88)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 2: BMI medium term

Analysis 1.3



Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
James 2004	-0.26	0.160816113	75.8%	-0.26 [-0.58 , 0.06]	+ ? ? + ? ?
Lent 2014	0.1	0.304608104	24.2%	0.10 [-0.50 , 0.70]	? + − + ? −
Total (95% CI)			**100.0%**	**-0.17 [-0.48 , 0.13]**	

Heterogeneity: Tau² = 0.01; Chi² = 1.09, df = 1 (P = 0.30); I² = 8%
Test for overall effect: Z = 1.12 (P = 0.26)
Test for subgroup differences: Not applicable

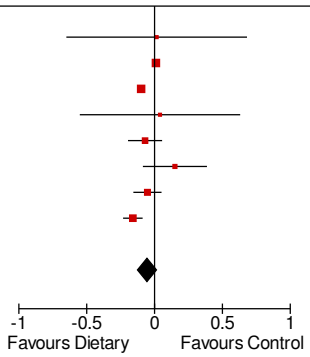
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 3: BMI long term

Analysis 1.4

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Chai 2019	0.015618	0.339583	1.1%	0.02 [-0.65 , 0.68]	+ + − + ? −
Damsgaard 2014	0.01	0.007653061	22.4%	0.01 [-0.00 , 0.02]	? + ? + + ?
de Ruyter 2012	-0.099	0.008858529	22.4%	-0.10 [-0.12 , -0.08]	+ + + + + +
Fulkerson 2010	0.04	0.301511345	1.3%	0.04 [-0.55 , 0.63]	? ? + + ? ?
Hendrie 2011	-0.07	0.064079987	13.1%	-0.07 [-0.20 , 0.06]	+ + + + ? ?
Nicholl 2021	0.15	0.120415946	6.3%	0.15 [-0.09 , 0.39]	+ + ? + ? ?
Paineau 2008	-0.052462	0.052933	15.1%	-0.05 [-0.16 , 0.05]	+ + + + ? ?
Viggiano 2018	-0.16	0.036708271	18.3%	-0.16 [-0.23 , -0.09]	− + ? + ? −
Total (95% CI)			**100.0%**	**-0.06 [-0.13 , 0.01]**	

Heterogeneity: Tau² = 0.01; Chi² = 100.58, df = 7 (P < 0.00001); I² = 93%
Test for overall effect: Z = 1.57 (P = 0.12)
Test for subgroup differences: Not applicable



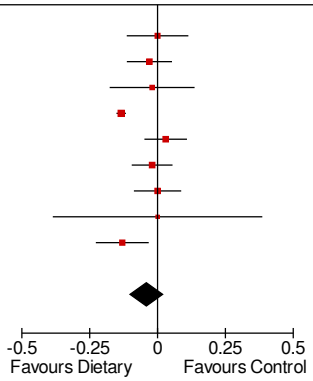
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 4: zBMI short term

Analysis 1.5

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0	0.05791636	10.5%	0.00 [-0.11 , 0.11]	+ + + + ? ?
Coleman 2012	-0.029971484	0.042438399	12.7%	-0.03 [-0.11 , 0.05]	− + − + ? −
Davis 2021	-0.02	0.079802099	7.8%	-0.02 [-0.18 , 0.14]	− + ? + ? −
de Ruyter 2012	-0.134	0.008861876	16.5%	-0.13 [-0.15 , -0.12]	+ + ? + + ?
Fulkerson 2015	0.03	0.04	13.0%	0.03 [-0.05 , 0.11]	? + ? + ? ?
James 2004	-0.02	0.038335374	13.3%	-0.02 [-0.10 , 0.06]	+ ? ? + ? ?
Lent 2014	0	0.044463864	12.4%	0.00 [-0.09 , 0.09]	? + ? + ? ?
Meng 2013 (Beijing)	0	0.19694754	2.1%	0.00 [-0.39 , 0.39]	− + − + ? −
Stettler 2015	-0.13	0.049719445	11.6%	-0.13 [-0.23 , -0.03]	? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.04 [-0.10 , 0.02]**	

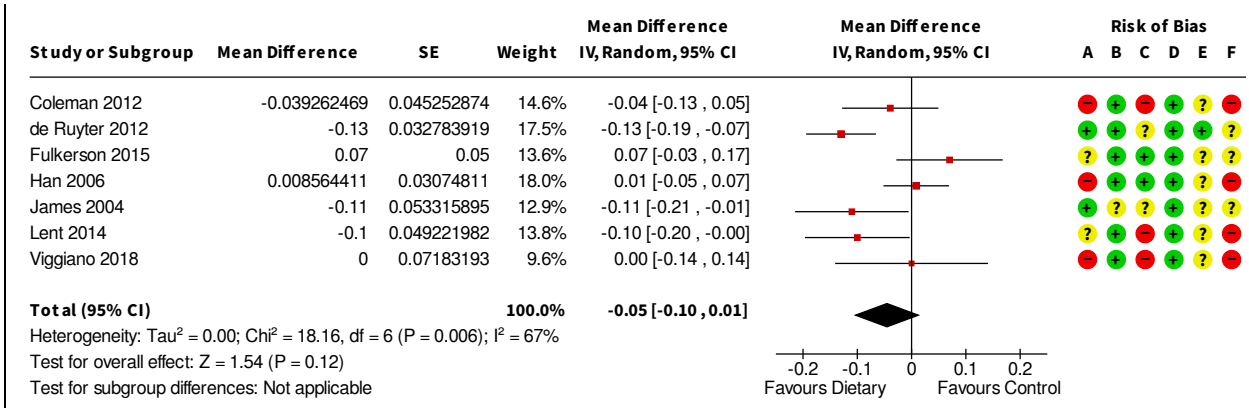
Heterogeneity: Tau² = 0.01; Chi² = 40.11, df = 8 (P < 0.00001); I² = 80%
Test for overall effect: Z = 1.35 (P = 0.18)
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 5: zBMI medium term

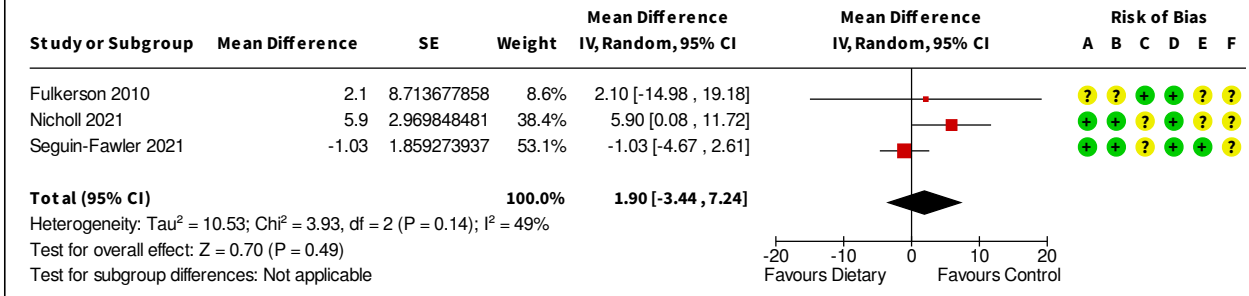
Analysis 1.6



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 6: zBMI long term

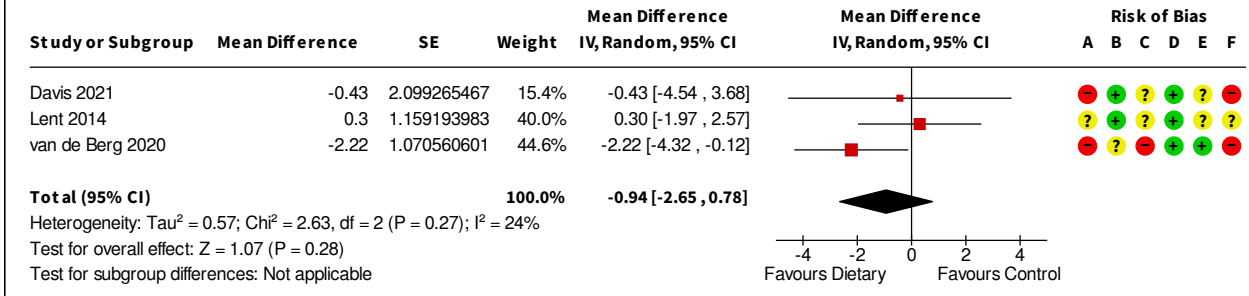
Analysis 1.7



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 7: Percentile short term

Analysis 1.8



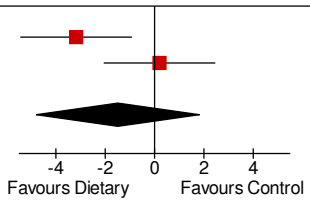
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 1: Dietary vs Control (All studies), Outcome 8: Percentile medium term

Analysis 1.9

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
Ickovics 2019	-3.18	1.154101074	50.0%	-3.18 [-5.44 , -0.92]
Lent 2014	0.2	1.153863095	50.0%	0.20 [-2.06 , 2.46]
Total (95% CI)			**100.0%**	**-1.49 [-4.80 , 1.82]**

Heterogeneity: Tau² = 4.38; Chi² = 4.29, df = 1 (P = 0.04); I² = 77%
Test for overall effect: Z = 0.88 (P = 0.38)
Test for subgroup differences: Not applicable



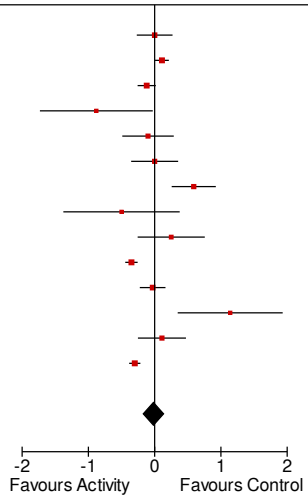
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

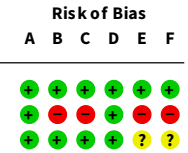
Comparison 1: Dietary vs Control (All studies), Outcome 9: Percentile long term

Analysis 2.1

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI
Clemes 2020	0	0.137631458	8.2%	0.00 [-0.27 , 0.27]
De Bock 2013	0.11	0.053090164	10.6%	0.11 [0.01 , 0.21]
de Greeff 2016	-0.12	0.07	10.2%	-0.12 [-0.26 , 0.02]
Diaz-Castro 2021	-0.88	0.434476697	2.5%	-0.88 [-1.73 , -0.03]
Drummy 2016	-0.1	0.198147635	6.5%	-0.10 [-0.49 , 0.29]
Ford 2013	0	0.180855351	7.0%	0.00 [-0.35 , 0.35]
Ha 2021	0.59	0.169814205	7.3%	0.59 [0.26 , 0.92]
Ketelhut 2022	-0.5	0.44790407	2.4%	-0.50 [-1.38 , 0.38]
Lau 2016	0.25	0.258444868	5.0%	0.25 [-0.26 , 0.76]
Lazaar 2007	-0.35026738	0.047652576	10.7%	-0.35 [-0.44 , -0.26]
Martinez-Vizcaino 2020	-0.030377296	0.098856891	9.4%	-0.03 [-0.22 , 0.16]
Newton 2014	1.14	0.404167847	2.8%	1.14 [0.35 , 1.93]
Rhodes 2019	0.11	0.184874193	6.8%	0.11 [-0.25 , 0.47]
Thivel 2011	-0.3	0.04312279	10.7%	-0.30 [-0.38 , -0.22]
Total (95% CI)			**100.0%**	**-0.02 [-0.17 , 0.13]**

Heterogeneity: Tau² = 0.05; Chi² = 94.31, df = 13 (P < 0.00001); I² = 86%
Test for overall effect: Z = 0.24 (P = 0.81)
Test for subgroup differences: Not applicable

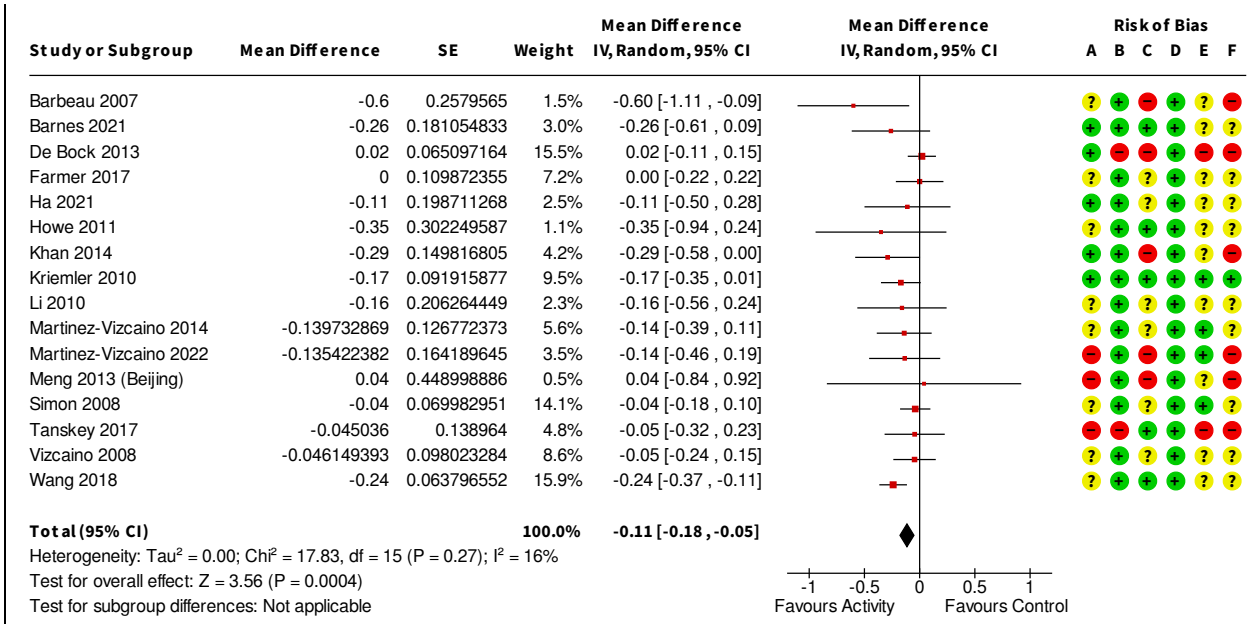




Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 1: BMI short term

Analysis 2.2

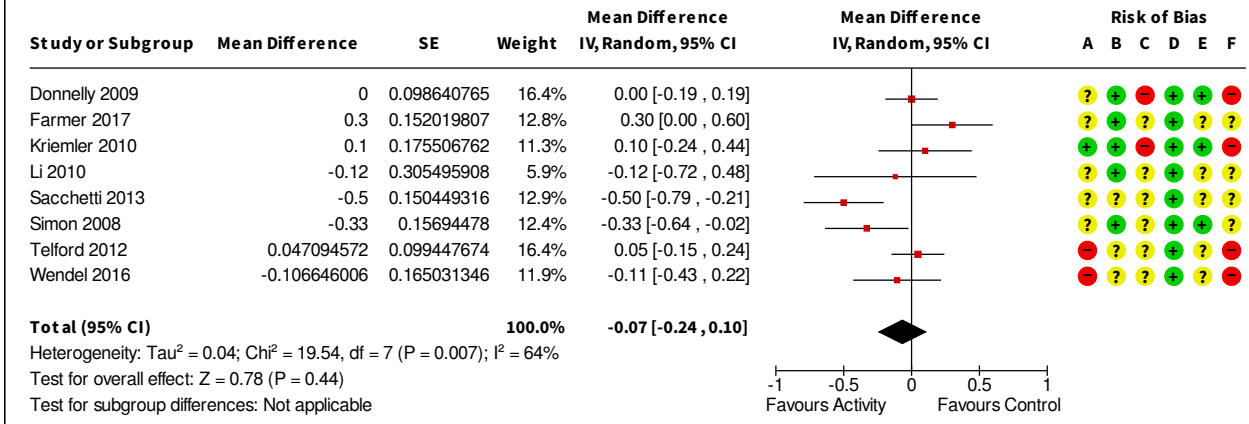


Heterogeneity: Tau² = 0.00; Chi² = 17.83, df = 15 (P = 0.27); I² = 16%
Test for overall effect: Z = 3.56 (P = 0.0004)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 2: BMI medium term

Analysis 2.3

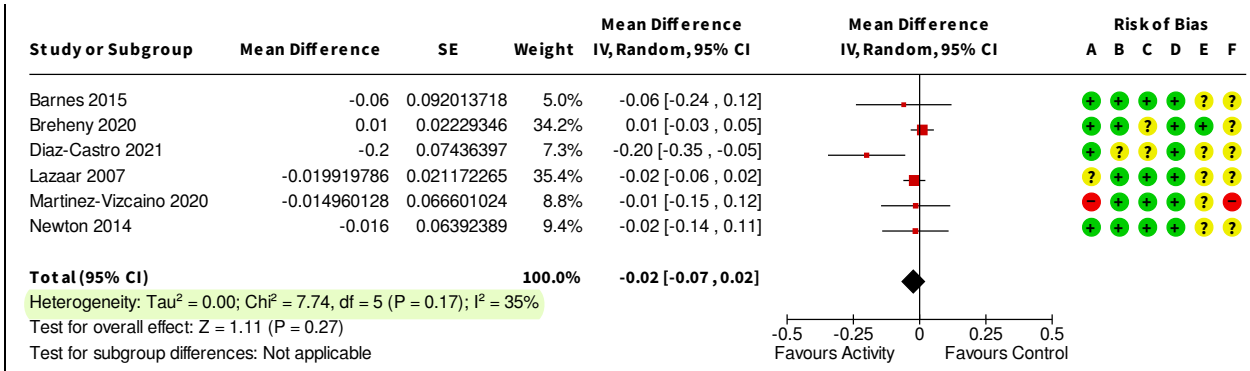


Heterogeneity: Tau² = 0.04; Chi² = 19.54, df = 7 (P = 0.007); I² = 64%
Test for overall effect: Z = 0.78 (P = 0.44)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 3: BMI long term

Analysis 2.4

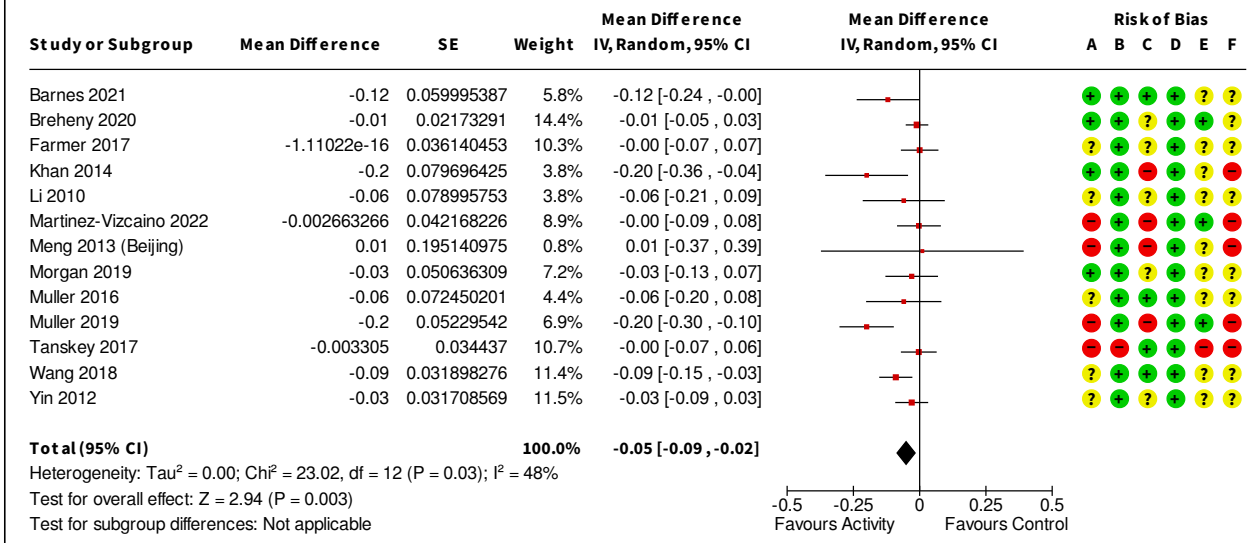


Heterogeneity: Tau² = 0.00; Chi² = 7.74, df = 5 (P = 0.17); I² = 35%
Test for overall effect: Z = 1.11 (P = 0.27)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 4: zBMI short term

Analysis 2.5



Heterogeneity: Tau² = 0.00; Chi² = 23.02, df = 12 (P = 0.03); I² = 48%
Test for overall effect: Z = 2.94 (P = 0.003)
Test for subgroup differences: Not applicable

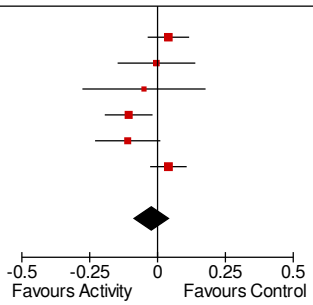
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 5: zBMI medium term

Analysis 2.6

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Farmer 2017	0.04	0.038972075	22.2%	0.04 [-0.04 , 0.12]	? + ? + ? ?
Kovalskys 2016	-0.004	0.073025766	12.3%	-0.00 [-0.15 , 0.14]	− ? − + ? −
Li 2010	-0.05	0.115754234	6.3%	-0.05 [-0.28 , 0.18]	? + ? + ? ?
Salmon 2022	-0.106471	0.044891	20.1%	-0.11 [-0.19 , -0.02]	+ + ? + + ?
Simon 2008	-0.11	0.06133069	15.1%	-0.11 [-0.23 , 0.01]	? + ? + + ?
Yin 2012	0.04	0.034325163	24.0%	0.04 [-0.03 , 0.11]	? + − + ? −
Total (95% CI)			**100.0%**	**-0.02 [-0.09 , 0.04]**	

Heterogeneity: Tau² = 0.00; Chi² = 11.17, df = 5 (P = 0.05); I² = 55%
Test for overall effect: Z = 0.72 (P = 0.47)
Test for subgroup differences: Not applicable

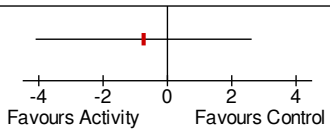


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 6: zBMI long term

Analysis 2.7

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Newton 2014	-0.74	1.713344522	-0.74 [-4.10 , 2.62]	+ + + + ? ?

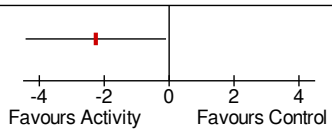


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 7: Percentile short term

Analysis 2.8

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
van de Berg 2020	-2.26	1.10390217	-2.26 [-4.42 , -0.10]	− ? − + + −



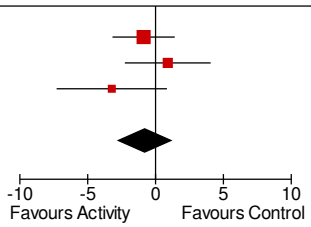
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 8: Percentile medium term

Analysis 2.9

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Ickovics 2019	-0.88	1.17043276	49.6%	-0.88 [-3.17 , 1.41]	? + − + ? −
Muller 2016	0.9	1.61274105	30.5%	0.90 [-2.26 , 4.06]	? + ? + ? ?
Wendel 2016	-3.225390266	2.073909081	19.9%	-3.23 [-7.29 , 0.84]	− ? ? + ? −
Total (95% CI)			**100.0%**	**-0.80 [-2.74 , 1.13]**	

Heterogeneity: Tau² = 0.60; Chi² = 2.48, df = 2 (P = 0.29); I² = 19%
Test for overall effect: Z = 0.81 (P = 0.42)
Test for subgroup differences: Not applicable



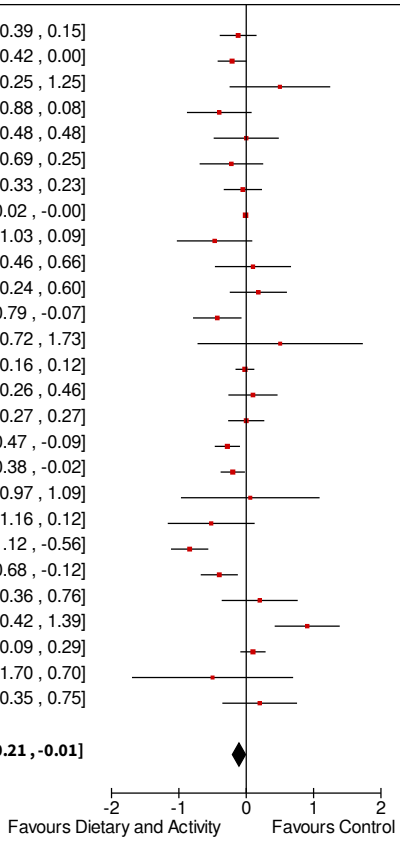
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2: Activity vs Control (All studies), Outcome 9: Percentile long term

Analysis 3.1

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Annesi 2016	-0.12	0.13940871	4.9%	-0.12 [-0.39 , 0.15]	− + ? + ? −
Annesi 2017	-0.21	0.109401895	5.8%	-0.21 [-0.42 , 0.00]	− + ? + ? −
Baranowski 2003	0.5	0.381119536	1.4%	0.50 [-0.25 , 1.25]	? + + + ? ?
Beech 2003	-0.4	0.244949	2.7%	-0.40 [-0.88 , 0.08]	+ + + + ? ?
Brown 2013	0	0.246589642	2.7%	0.00 [-0.48 , 0.48]	? + ? + ? ?
Chen 2010	-0.22	0.240816042	2.8%	-0.22 [-0.69 , 0.25]	+ + − + ? −
De Heer 2011	-0.05	0.144895375	4.8%	-0.05 [-0.33 , 0.23]	? + + + ? ?
Duncan 2019	-0.01	0.004	8.1%	-0.01 [-0.02 , -0.00]	? + ? + ? ?
Fairclough 2013	-0.47	0.285714286	2.2%	-0.47 [-1.03 , 0.09]	? + − + ? −
Gentile 2009	0.1	0.288252574	2.2%	0.10 [-0.46 , 0.66]	? − ? + ? −
Habib-Mourad 2014	0.18	0.216466205	3.2%	0.18 [-0.24 , 0.60]	? + + + ? ?
Hopper 2005	-0.43	0.183619085	3.9%	-0.43 [-0.79 , -0.07]	− + ? + ? −
Hull 2018	0.504	0.626020408	0.6%	0.50 [-0.72 , 1.73]	+ + − + + −
Jansen 2011	-0.019370921	0.07131428	6.9%	-0.02 [-0.16 , 0.12]	− + ? + ? −
Kipping 2008	0.1	0.18622449	3.8%	0.10 [-0.26 , 0.46]	? + − + ? −
Liu 2019	3.55271e-15	0.136934972	5.0%	0.00 [-0.27 , 0.27]	? + + + ? ?
Liu 2022	-0.28	0.095430955	6.2%	-0.28 [-0.47 , -0.09]	+ + + + + +
Morgan 2014	-0.2	0.091978349	6.3%	-0.20 [-0.38 , -0.02]	+ + ? + + ?
Nollen 2014	0.06	0.524995711	0.8%	0.06 [-0.97 , 1.09]	? + ? − ? −
Pena 2021	-0.52	0.329081633	1.8%	-0.52 [-1.16 , 0.12]	− + ? + ? −
Rerksuppaphol 2017	-0.84	0.141237098	4.9%	-0.84 [-1.12 , -0.56]	? + + + ? ?
Rosario 2012	-0.4	0.140497044	4.9%	-0.40 [-0.68 , -0.12]	+ + ? + ? ?
Rosenkranz 2010	0.2	0.287866519	2.2%	0.20 [-0.36 , 0.76]	? + + + ? ?
Safdie 2013	0.905294	0.246296	2.7%	0.91 [0.42 , 1.39]	? ? + + ? ?
Sgambato 2019	0.1	0.09557333	6.2%	0.10 [-0.09 , 0.29]	+ + + + ? ?
Stolley 1997	-0.5	0.610323643	0.6%	-0.50 [-1.70 , 0.70]	? ? − + ? −
Story 2003	0.2	0.282842712	2.2%	0.20 [-0.35 , 0.75]	+ + + + ? ?
Total (95% CI)			**100.0%**	**-0.11 [-0.21 , -0.01]**	

Heterogeneity: Tau² = 0.03; Chi² = 92.45, df = 26 (P < 0.00001); I² = 72%
Test for overall effect: Z = 2.17 (P = 0.03)
Test for subgroup differences: Not applicable



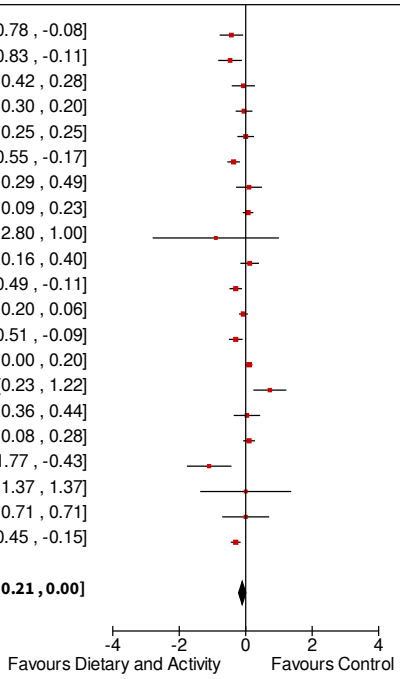
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 1: BMI short term

Analysis 3.2

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Annesi 2016	-0.43	0.180365223	4.4%	-0.43 [-0.78 , -0.08]	
Annesi 2017	-0.47	0.182340541	4.3%	-0.47 [-0.83 , -0.11]	
Barnes 2021	-0.07	0.178687757	4.4%	-0.07 [-0.42 , 0.28]	
Elder 2014	-0.05	0.129054784	5.6%	-0.05 [-0.30 , 0.20]	
Gentile 2009	0	0.127625818	5.7%	0.00 [-0.25 , 0.25]	
Kain 2014	-0.363225284	0.096267192	6.5%	-0.36 [-0.55 , -0.17]	
Klesges 2010	0.1	0.197989899	4.0%	0.10 [-0.29 , 0.49]	
Kobel 2017	0.07	0.081753919	6.9%	0.07 [-0.09 , 0.23]	
Kubik 2021	-0.9	0.968756547	0.3%	-0.90 [-2.80 , 1.00]	
Liu 2019	0.12	0.143091594	5.3%	0.12 [-0.16 , 0.40]	
Liu 2022	-0.3	0.095565721	6.5%	-0.30 [-0.49 , -0.11]	
Nemet 2011a	-0.07	0.068430013	7.2%	-0.07 [-0.20 , 0.06]	
Nemet 2011b	-0.3	0.104613575	6.3%	-0.30 [-0.51 , -0.09]	
Puder 2011	0.1	0.053328248	7.5%	0.10 [-0.00 , 0.20]	
Safdie 2013	0.726938	0.253174	3.0%	0.73 [0.23 , 1.22]	
Sekhavat 2014	0.036792453	0.203268858	3.9%	0.04 [-0.36 , 0.44]	
Siegrist 2013	0.1	0.090321488	6.7%	0.10 [-0.08 , 0.28]	
Stettler 2015	-1.1	0.34176976	2.0%	-1.10 [-1.77 , -0.43]	
Stolley 1997	-3.55271e-15	0.698360273	0.6%	-0.00 [-1.37 , 1.37]	
Xu 2015	0	0.360768766	1.8%	0.00 [-0.71 , 0.71]	
Xu 2017 (5 other cities)	-0.3	0.075900097	7.0%	-0.30 [-0.45 , -0.15]	
Total (95% CI)			**100.0%**	**-0.11 [-0.21 , 0.00]**	

Heterogeneity: Tau² = 0.04; Chi² = 77.27, df = 20 (P < 0.00001); I² = 74%
Test for overall effect: Z = 1.89 (P = 0.06)
Test for subgroup differences: Not applicable



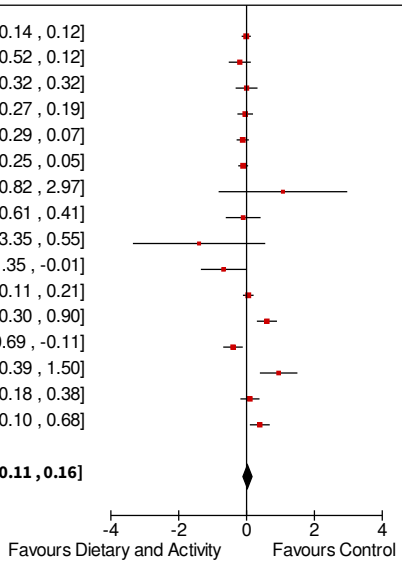
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 2: BMI medium term

Analysis 3.3

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Brandstetter 2012	-0.01	0.068877551	9.7%	-0.01 [-0.14 , 0.12]	
Caballero 2003	-0.2	0.165816327	6.6%	-0.20 [-0.52 , 0.12]	
Elder 2014	0	0.164397081	6.7%	0.00 [-0.32 , 0.32]	
Foster 2008	-0.04	0.117346939	8.2%	-0.04 [-0.27 , 0.19]	
Greve 2015	-0.113	0.092	9.0%	-0.11 [-0.29 , 0.07]	
Grydeland 2014	-0.1	0.074279732	9.6%	-0.10 [-0.25 , 0.05]	
Hull 2018	1.072	0.967346939	0.5%	1.07 [-0.82 , 2.97]	
Klesges 2010	-0.1	0.261725047	4.2%	-0.10 [-0.61 , 0.41]	
Kubik 2021	-1.4	0.9950738	0.5%	-1.40 [-3.35 , 0.55]	
Llargues 2012	-0.68	0.340095862	3.0%	-0.68 [-1.35 , -0.01]	
Lloyd 2018	0.05	0.080163844	9.4%	0.05 [-0.11 , 0.21]	
Magnusson 2012	0.6	0.151041901	7.1%	0.60 [0.30 , 0.90]	
Nemet 2011b	-0.4	0.146919892	7.2%	-0.40 [-0.69 , -0.11]	
Safdie 2013	0.945519	0.282174	3.8%	0.95 [0.39 , 1.50]	
Siegrist 2018	0.1	0.143449544	7.3%	0.10 [-0.18 , 0.38]	
Story 2012	0.39	0.149532605	7.1%	0.39 [0.10 , 0.68]	
Total (95% CI)			**100.0%**	**0.03 [-0.11 , 0.16]**	

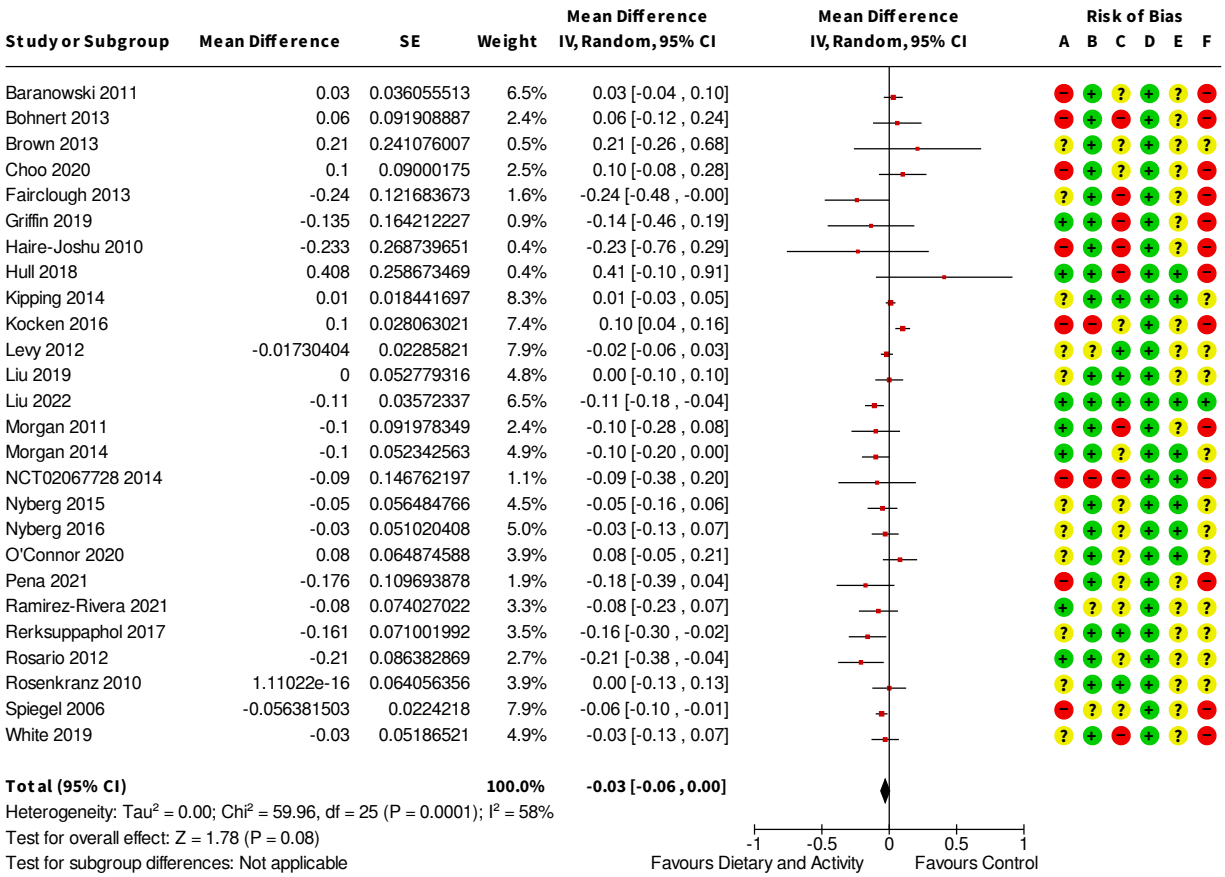
Heterogeneity: Tau² = 0.04; Chi² = 54.36, df = 15 (P < 0.00001); I² = 72%
Test for overall effect: Z = 0.39 (P = 0.70)
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 3: BMI long term

Analysis 3.4



Risk of bias legend

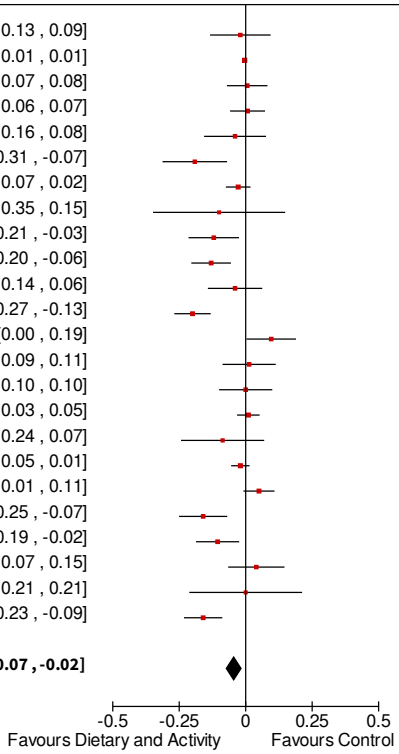
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 4: zBMI short term

Analysis 3.5

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.02	0.058125335	3.2%	-0.02 [-0.13 , 0.09]	+ + + + ? ?
Cao 2015	-0.004	0.004813688	7.1%	-0.00 [-0.01 , 0.01]	? + ? + ? ?
Crespo 2012	0.005638	0.03894	4.6%	0.01 [-0.07 , 0.08]	? + ? + ? ?
Elder 2014	0.007	0.033511851	5.1%	0.01 [-0.06 , 0.07]	? + ? + ? ?
Fulkerson 2022	-0.04	0.059407008	3.1%	-0.04 [-0.16 , 0.08]	? + - + ? -
Kain 2014	-0.191498644	0.061984102	3.0%	-0.19 [-0.31 , -0.07]	- + - - ? -
Keller 2009	-0.0283	0.023622995	6.0%	-0.03 [-0.07 , 0.02]	? - - + ? -
Kubik 2021	-0.1	0.12676708	1.1%	-0.10 [-0.35 , 0.15]	? + ? + + ?
Li 2019	-0.12	0.048458283	3.9%	-0.12 [-0.21 , -0.03]	+ + + + + +
Lichtenstein 2011	-0.13	0.038023276	4.7%	-0.13 [-0.20 , -0.06]	- + + + ? -
Liu 2019	-0.04	0.052151424	3.6%	-0.04 [-0.14 , 0.06]	? + + + ? ?
Liu 2022	-0.2	0.034892844	5.0%	-0.20 [-0.27 , -0.13]	+ + + + + +
Nyberg 2015	0.096057971	0.047483819	3.9%	0.10 [0.00 , 0.19]	? + ? + + ?
Nyberg 2016	0.013	0.051020408	3.7%	0.01 [-0.09 , 0.11]	? + ? + + ?
Sahota 2001	0	0.051020408	3.7%	0.00 [-0.10 , 0.10]	? ? ? + ? ?
Santos 2014	0.01	0.021646126	6.1%	0.01 [-0.03 , 0.05]	+ + ? + ? ?
Sekhavat 2014	-0.086792453	0.079809395	2.2%	-0.09 [-0.24 , 0.07]	? + ? + ? ?
Sherwood 2019	-0.02	0.017696763	6.4%	-0.02 [-0.05 , 0.01]	+ + ? + + ?
Siegrist 2013	0.05	0.029797706	5.4%	0.05 [-0.01 , 0.11]	? + ? + ? ?
Stettler 2015	-0.16	0.0462155	4.0%	-0.16 [-0.25 , -0.07]	? + ? + ? ?
Wang 2012	-0.105661855	0.041438109	4.4%	-0.11 [-0.19 , -0.02]	- ? ? - ? -
White 2019	0.04	0.054037024	3.5%	0.04 [-0.07 , 0.15]	? + - + ? -
Xu 2015	0	0.10823063	1.4%	0.00 [-0.21 , 0.21]	? + + + + ?
Xu 2017 (5 other cities)	-0.16	0.036783783	4.8%	-0.16 [-0.23 , -0.09]	? + + + ? ?
Total (95% CI)			**100.0%**	**-0.05 [-0.07 , -0.02]**	

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 101.08$, df = 23 (P < 0.00001); $I^2 = 77\%$
Test for overall effect: Z = 3.21 (P = 0.001)
Test for subgroup differences: Not applicable



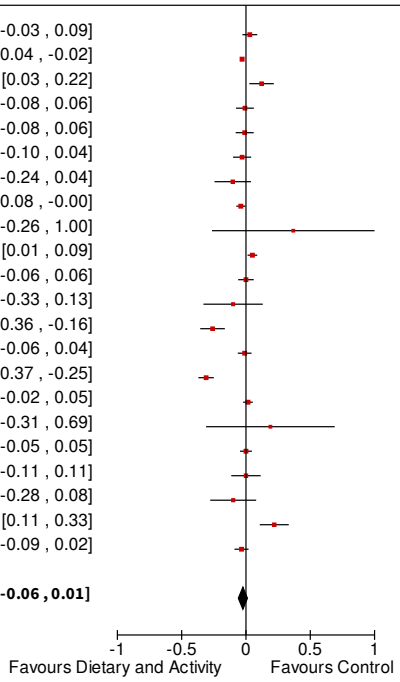
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 5: zBMI medium term

Analysis 3.6

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Adab 2018	0.03	0.02940647	5.6%	0.03 [-0.03 , 0.09]	+ + ? + + ?
Cao 2015	-0.03	0.006789227	6.6%	-0.03 [-0.04 , -0.02]	? + ? + ? ?
Crespo 2012	0.121325	0.048522	4.5%	0.12 [0.03 , 0.22]	? + - + ? -
Elder 2014	-0.008	0.03542037	5.3%	-0.01 [-0.08 , 0.06]	? + ? + ? ?
Foster 2008	-0.01	0.035714286	5.3%	-0.01 [-0.08 , 0.06]	- + - + ? -
Grydeland 2014	-0.03	0.035931741	5.2%	-0.03 [-0.10 , 0.04]	? - ? + ? -
Habib-Mourad 2020	-0.103	0.072249567	3.2%	-0.10 [-0.24 , 0.04]	- + - + ? -
HEALTHY Study Group 2010	-0.04	0.018044788	6.2%	-0.04 [-0.08 , -0.00]	? + ? + + ?
Hull 2018	0.368	0.32244898	0.3%	0.37 [-0.26 , 1.00]	+ + - + + -
Kipping 2014	0.05	0.019109879	6.2%	0.05 [0.01 , 0.09]	? + + + + ?
Kocken 2016	0	0.030801952	5.6%	0.00 [-0.06 , 0.06]	- - - + ? -
Kubik 2021	-0.1	0.117640293	1.7%	-0.10 [-0.33 , 0.13]	? + ? + + ?
Lichtenstein 2011	-0.26	0.048887188	4.5%	-0.26 [-0.36 , -0.16]	- + ? + ? -
Lloyd 2018	-0.01	0.027301405	5.8%	-0.01 [-0.06 , 0.04]	+ + + + + +
Marcus 2009	-0.31	0.03071497	5.6%	-0.31 [-0.37 , -0.25]	- + ? + ? -
Rush 2012	0.015754438	0.019123882	6.2%	0.02 [-0.02 , 0.05]	- ? - + + -
Sahota 2019	0.19	0.255114796	0.5%	0.19 [-0.31 , 0.69]	? + ? + ? ?
Sherwood 2019	0	0.023570708	6.0%	0.00 [-0.05 , 0.05]	+ + ? + + ?
Story 2012	5.55112e-17	0.058309519	3.9%	0.00 [-0.11 , 0.11]	? + - + ? -
Topham 2021	-0.099327	0.091172	2.5%	-0.10 [-0.28 , 0.08]	- + - + - -
White 2019	0.22	0.057532599	4.0%	0.22 [0.11 , 0.33]	? + - + ? -
Williamson 2012	-0.034548	0.027966	5.7%	-0.03 [-0.09 , 0.02]	? + ? + + ?
Total (95% CI)			**100.0%**	**-0.02 [-0.06 , 0.01]**	

Heterogeneity: Tau² = 0.00; Chi² = 168.30, df = 21 (P < 0.00001); I² = 88%
Test for overall effect: Z = 1.33 (P = 0.18)
Test for subgroup differences: Not applicable



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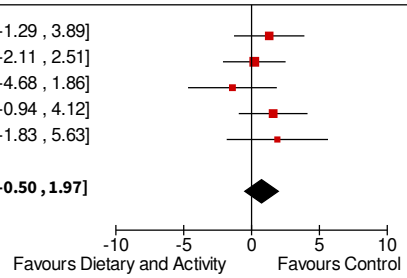
Comparison 3: Dietary and Activity vs Control (All studies), Outcome 6: zBMI long term

Analysis 3.7

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Baranowski 2011	1.3	1.323102415	22.6%	1.30 [-1.29 , 3.89]	- + ? + ? -
Brown 2013	0.2	1.177164273	28.6%	0.20 [-2.11 , 2.51]	? + ? + ? ?
De Heer 2011	-1.41	1.668873804	14.2%	-1.41 [-4.68 , 1.86]	? + + + ? ?
Hendy 2011	1.59	1.292705858	23.7%	1.59 [-0.94 , 4.12]	? ? + + ? ?
Rosenkranz 2010	1.9	1.904268301	10.9%	1.90 [-1.83 , 5.63]	? + + + ? ?
Total (95% CI)			**100.0%**	**0.73 [-0.50 , 1.97]**	

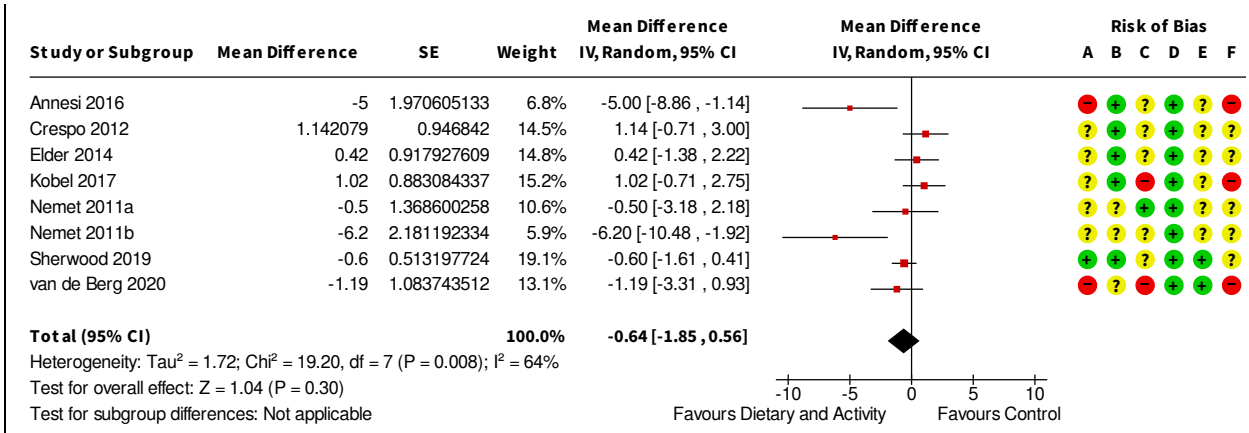
Heterogeneity: Tau² = 0.00; Chi² = 2.85, df = 4 (P = 0.58); I² = 0%
Test for overall effect: Z = 1.17 (P = 0.24)
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 7: Percentile short term

Analysis 3.8

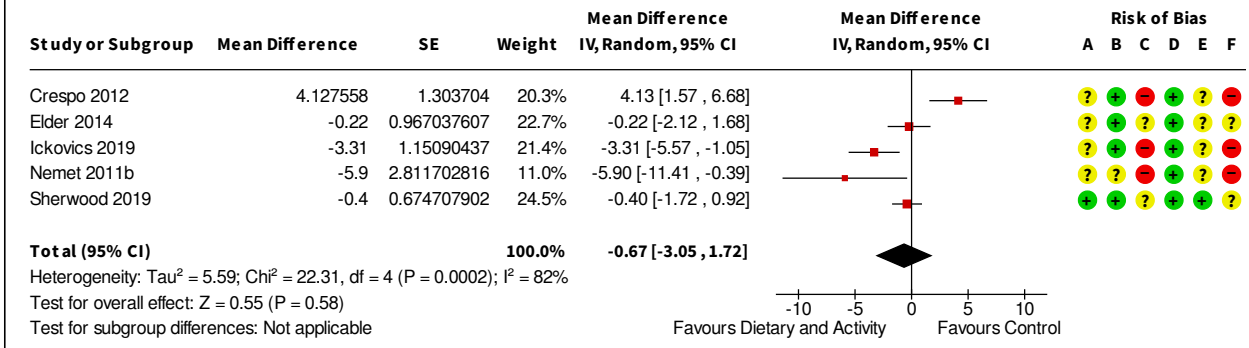


Heterogeneity: Tau² = 1.72; Chi² = 19.20, df = 7 (P = 0.008); I² = 64%
Test for overall effect: Z = 1.04 (P = 0.30)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 8: Percentile medium term

Analysis 3.9

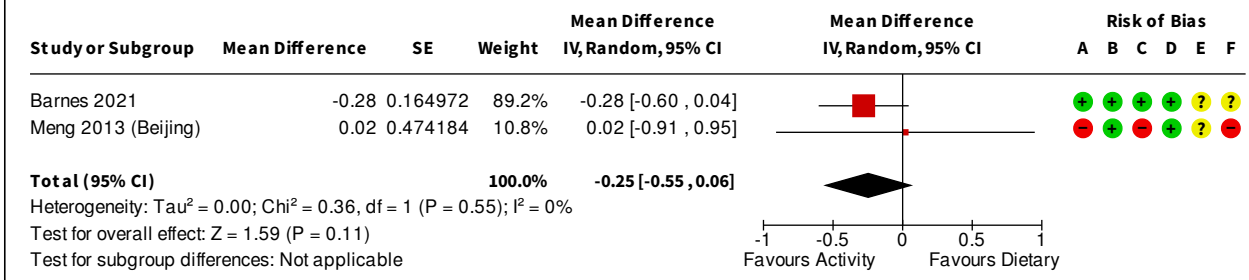


Heterogeneity: Tau² = 5.59; Chi² = 22.31, df = 4 (P = 0.0002); I² = 82%
Test for overall effect: Z = 0.55 (P = 0.58)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 3: Dietary and Activity vs Control (All studies), Outcome 9: Percentile long term

Analysis 4.1

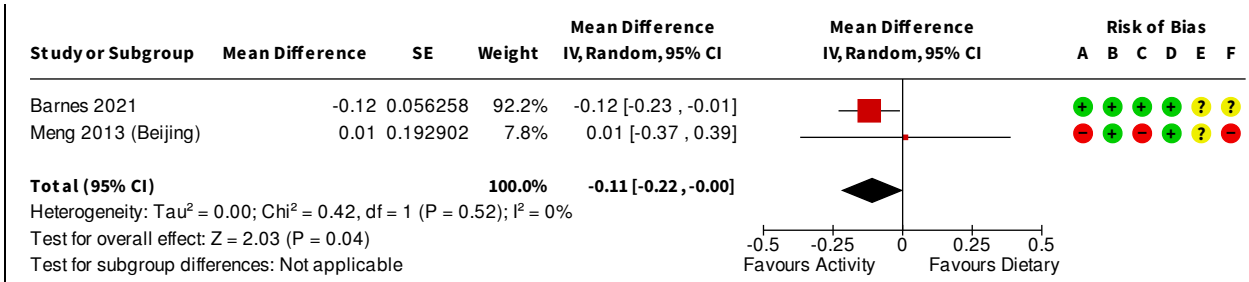


Heterogeneity: Tau² = 0.00; Chi² = 0.36, df = 1 (P = 0.55); I² = 0%
Test for overall effect: Z = 1.59 (P = 0.11)
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 4: Activity vs Dietary (All studies), Outcome 1: BMI medium term

Analysis 4.2

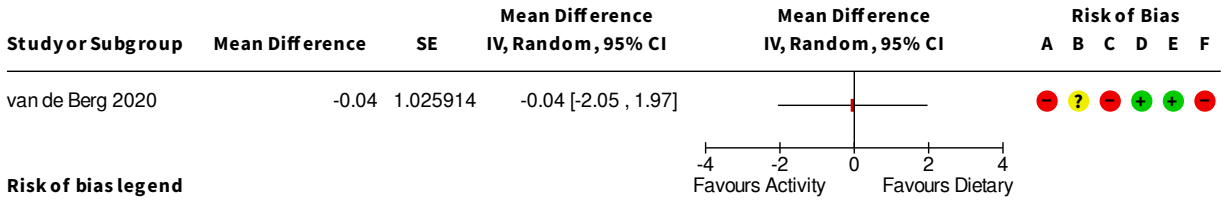


Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 4: Activity vs Dietary (All studies), Outcome 2: zBMI medium term

Analysis 4.3

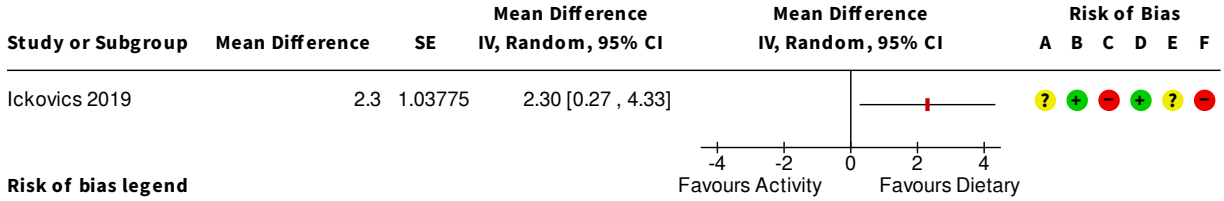


Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 4: Activity vs Dietary (All studies), Outcome 3: Percentile medium term

Analysis 4.4

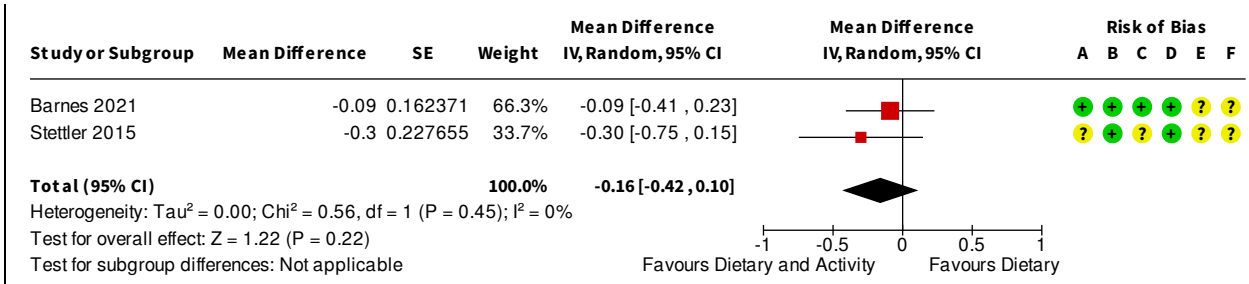


Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 4: Activity vs Dietary (All studies), Outcome 4: Percentile long term

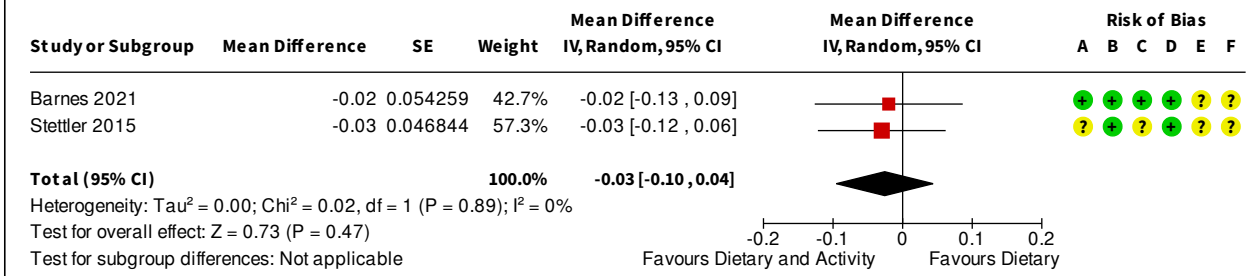
Analysis 5.1



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 5: Dietary and Activity vs Dietary (All studies), Outcome 1: BMI medium term

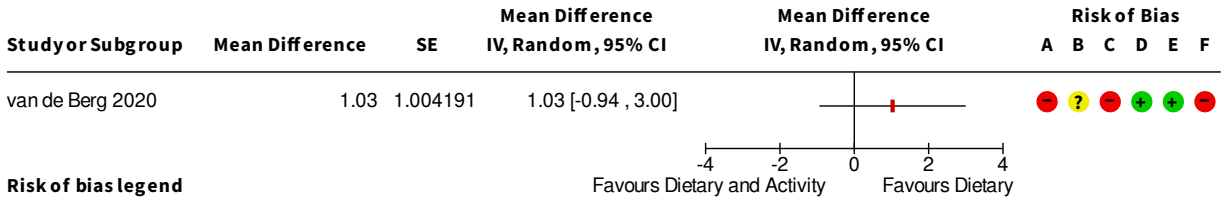
Analysis 5.2



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 5: Dietary and Activity vs Dietary (All studies), Outcome 2: zBMI medium term

Analysis 5.3

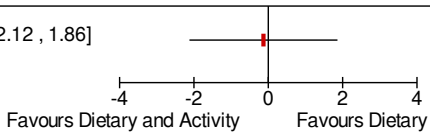


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 5: Dietary and Activity vs Dietary (All studies), Outcome 3: Percentile medium term

Analysis 5.4

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Ickovics 2019	-0.13	1.015673	-0.13 [-2.12 , 1.86]		? + − + ? −



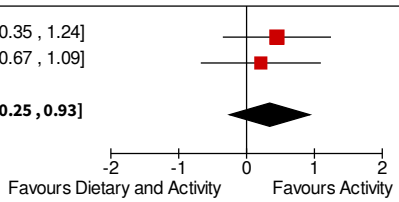
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 5: Dietary and Activity vs Dietary (All studies), Outcome 4: Percentile long term

Analysis 6.1

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Jones 2015	0.447098383	0.40661596	55.2%	0.45 [-0.35 , 1.24]		+ + + + ? ?
Robinson 2003	0.21	0.451361998	44.8%	0.21 [-0.67 , 1.09]		+ + + + ? ?
Total (95% CI)			**100.0%**	**0.34 [-0.25 , 0.93]**		

Heterogeneity: Tau² = 0.00; Chi² = 0.15, df = 1 (P = 0.70); I² = 0%
Test for overall effect: Z = 1.13 (P = 0.26)
Test for subgroup differences: Not applicable



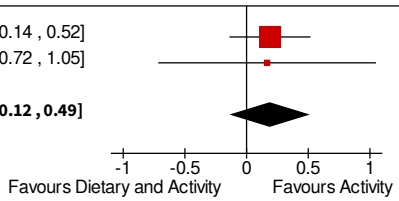
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 1: BMI short term

Analysis 6.2

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0.19	0.16746	87.8%	0.19 [-0.14 , 0.52]		+ + + + ? ?
Jones 2015	0.16619152	0.450251931	12.2%	0.17 [-0.72 , 1.05]		+ + ? + ? ?
Total (95% CI)			**100.0%**	**0.19 [-0.12 , 0.49]**		

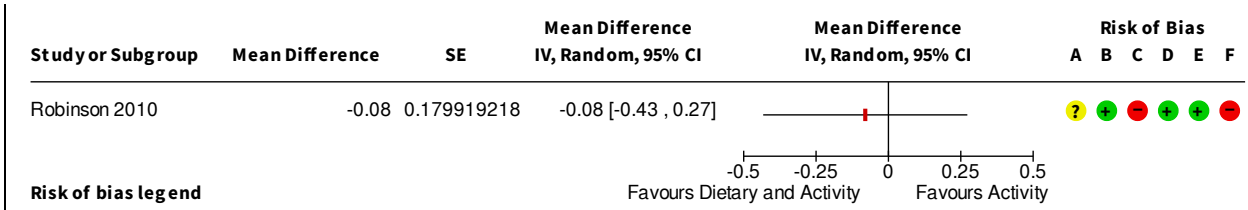
Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.96); I² = 0%
Test for overall effect: Z = 1.19 (P = 0.23)
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 2: BMI medium term

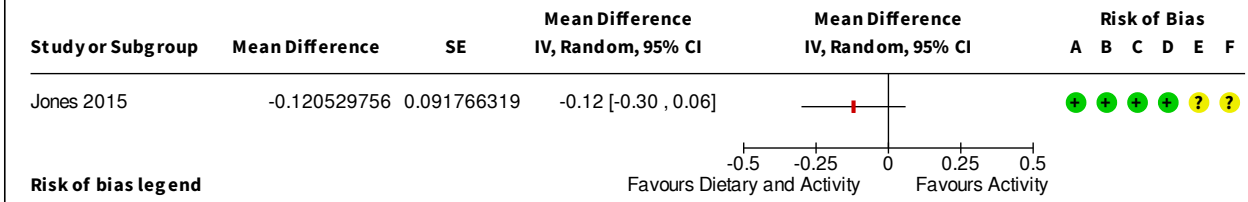
Analysis 6.3



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 3: BMI long term

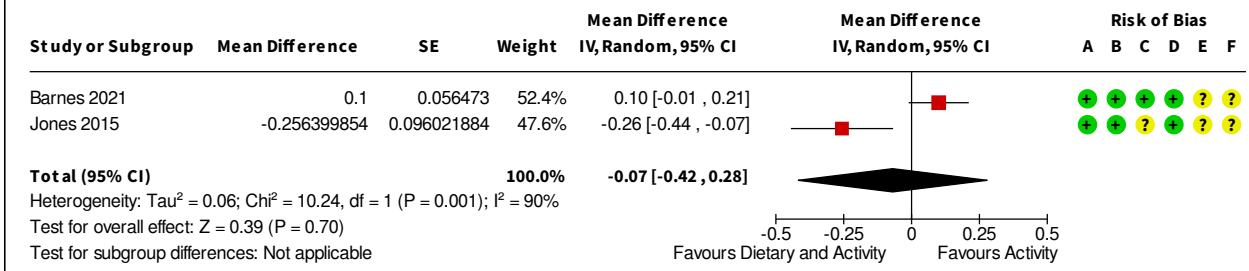
Analysis 6.4



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 4: zBMI short term

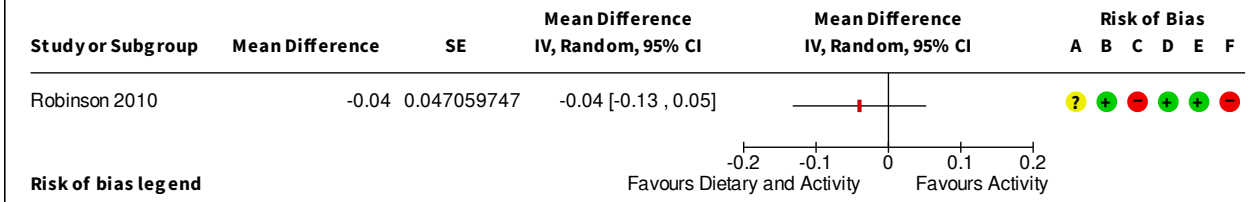
Analysis 6.5



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 5: zBMI medium term

Analysis 6.6

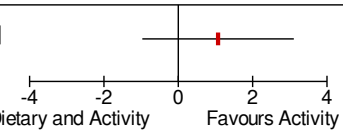


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 6: zBMI long term

Analysis 6.7

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
van de Berg 2020	1.07	1.039663	1.07 [-0.97 , 3.11]		− ? − + + −



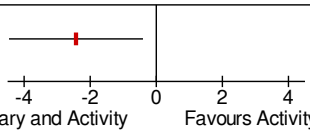
Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 7: Percentile medium term

Analysis 6.8

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Ickovics 2019	-2.43	1.034193	-2.43 [-4.46 , -0.40]		? + − + ? −



Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 6: Dietary and Activity vs Activity (All studies), Outcome 8: Percentile long term