National Institute for Health and Care Excellence

Final

Overweight and obesity management: preventing, assessing and managing overweight and obesity

[H] Evidence reviews for the effectiveness of healthy living programmes in preventing overweight and obesity in children and young people

NICE guideline NG246

Evidence reviews underpinning recommendations 1.6.1 to 1.6.8

January 2025

Final

These evidence reviews were developed by NICE

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1.1 Review question

What is the effectiveness and cost effectiveness of healthy living programmes for preventing overweight or obesity in children and young people?

1.1.1 Introduction

The prevention and management of obesity are complex problems. Currently, NICE's guidance on obesity prevention (CG43) highlighted that the preschool years (age 2-5) are a key time for shaping lifelong attitudes and behaviours, and childcare providers can create opportunities for children to be active and develop healthy eating habits and can act as positive role models. In the guideline it was recommended that all nurseries and childcare facilities should ensure that preventing excess weight gain and improving children's diet and activity levels are priorities.

The guideline also specified that during school years, people often develop life-long patterns of behaviour that affect their ability to keep a healthy weight. Schools play an important role in this by providing opportunities for children to be active and develop healthy eating habits, and by providing role models. Improving children's diet and activity levels may have wider benefits: regular physical activity is associated with higher academic achievement, better health in childhood and later life, higher motivation at school and reduced anxiety and depression. In the guideline, it was recommended that all schools should ensure that improving the diet and activity levels of children and young people is a priority for action to help prevent excess weight gain. A whole-school approach should be used to develop life-long healthy eating and physical activity practices.

The aim of this review is to identify the effectiveness of healthy living programmes in preventing overweight and obesity in children and young people. This review specifically focuses on early years settings (such as nurseries, childcare facilities, children's trusts and children's centres) and school settings.

As part of a collaboration between the NICE Guideline Development Team and Cochrane, the evidence presented in this review was provided by the University of Bristol and Durham University who led the update of the Brown 2019 Cochrane review on interventions for preventing obesity in children. Evidence presented in this review was drawn from the following systematic reviews, prior to publication, and used as academic in confidence:

- Interventions to prevent obesity in children aged 2 to 4 years old (Phillips et al. 2025) [this published after the guideline had published]
- Interventions to prevent obesity in children aged 5 to 11 years old (Spiga et al. 2024)
- Interventions to prevent obesity in children aged 12 to 18 years old (Spiga et al. 2024)

We thank University of Bristol, Durham University and Cochrane Public Health for their assistance in providing data for these review questions prior to their publication.

1.1.2 Summary of the protocol

The table below provides a combined summary of the following Cochrane review protocols for the Cochrane reviews:

- Interventions to prevent obesity in children aged 2 to 4 years old (Moore 2022)
- Interventions to prevent obesity in children aged 5 to 11 years old (Moore 2022)

- Interventions to prevent obesity in children aged 12 to 18 years old (Moore 2022)

Table 1: Summary of the Cochrane protocols (PICO table)

Population	Children with a mean age within the specified review-specific age range, at baseline (either aged 2 to 4, 5 to 11 or 12 to 18 years) Meeting any one of following criteria: • targeted children are from the general population; • included children are part of a family group receiving the intervention, if outcome data can be extracted separately for the children; • targeted children are 'at risk' for overweight and/or obesity (e.g., because a parent is overweight or obese) • targeted children are from specific place-based areas (e.g., high deprivation) or specific settings (e.g. religious settings) where population known to have relatively low levels of physical activity, high levels of energy intake, and/or high levels of obesity. Exclusion • all children are living with overweight or obesity at baseline; • all children have critical illness or severe co-morbidities.
Intervention	• Interventions that provide opportunities for children to do more physical activity in school/ preschool time. • Interventions that alter the food environment within the school canteen/ pre-school • Interventions that provide education to children and adolescents and their families on how to have a healthier diet and to do more physical activity. • Interventions that provide education to parents/carers (including grandparents) and preschool staff on how to provide a healthier diet and more physical activity opportunities to young children. • Interventions that regulate how HFSS foods are advertised to children within, and in proximity to, educational settings/ are advertised to young children in supermarkets and on the television. • Digital interventions that are accessed by young people on their smart phones that use interactive games to educate on nutritional value of certain food. In any setting (including the home, healthcare settings, childcare, nursery, schools, the wider community, and will include digital interventions) Exclusions • 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.
Comparator	• Another eligible intervention (i.e., dietary intake vs physical activity/movement behaviours vs both) • no intervention control group (no intervention or usual care)
Outcome	• Standardized BMI (zBMI) • BMI • Serious adverse events (eating disorders, body dysmorphia disorder, body image disturbance or injuries sufficient to seek medical attention)

	Timepoints – data collected for all reported time points from 12 weeks onwards. Analysis will group timepoints as follows: • 12 weeks from baseline to < 9 months • 9 months from baseline to <15 months (corresponding to approximately 1 [school] year) • long term (15 months or more from baseline)

1.1.3 Methods and process

During the development of the NICE review, a Cochrane review on interventions for preventing obesity in children by produced by Brown 2019 was identified. Upon further investigation, it was highlighted that the Cochrane review was due to be updated. As part of the update, it was proposed that the 2019 Cochrane review would be split into 4 different reviews:

- Interventions to prevent obesity in children under 2 years old.
- Interventions to prevent obesity in children aged 2 to 4 years old.
- Interventions to prevent obesity in children aged 5 to 11 years old.
- Interventions to prevent obesity in children aged 12 to 18 years old.

Protocols covering children and young people aged 2-18 years old were identified as being relevant to the NICE review. These protocols were discussed with the committee, who agreed that these reviews would sufficiently answer the review question. The review on interventions to prevent obesity in children under 2 years old was not considered for inclusion as the guideline does not cover children aged under 2 years old.

As part of the collaboration, authors based at Bristol University and Durham University preformed:

- The literature search, screening of records and study selection.
- Data extraction and production of evidence tables.
- Risk of bias assessment of included studies using Cochrane Risk of bias tool 2
- Publication bias assessment using funnel plots.
- Data analysis, including pairwise meta-analysis, subgroup analysis by setting.
- Presentation of evidence to guideline committee.

The NICE Development Team assisted in the data extraction, risk of bias and data analysis included in the review covering children aged 2-4 years old.

Primary outcomes

The Cochrane reviews focused on three primary outcomes: zBMI, BMI and serious adverse events. Upon discussion of protocols with the guideline committee, it was agreed that zBMI was the primary outcome of interest, so it was agreed with the authors of the Cochrane reviews that evidence specifically on zBMI would be used in the NICE review. Where available, data on BMI would also be incorporated. Serious adverse events were also prioritised as a primary outcome, and were defined as eating disorders, body dysmorphia disorder, body image disturbance or injuries sufficient to seek medical attention. Due to the diversity of measures used to define adverse events, and the sparsity of data for this outcome, the authors tabulated information about serious adverse effects and summarised the results narratively.

Subgroup analyses

Several subgroup analyses were planned for the Cochrane reviews. These were: main setting of the intervention (childcare/pre-school, school, other educational settings, health service, wider community, home), duration of active intervention period, income status of country, socioeconomic status, and sex. The committee discussed these and agreed that subgroup analysis by setting would be most useful for decision making as existing recommendations in NICE guidance CG43 specifically focused on early years and school settings, so the Cochrane review authors agreed to focus on evidence in these settings for the purposes of the NICE review. Other subgroup analyses planned by Cochrane were not considered relevant for this review, so although they are presented in the Cochrane reviews, they were not used for decision making by the NICE guideline committee.

Cochrane publications and available data

The Cochrane authors prepared data specific to the NICE review and presented this to the guideline committee. These Cochrane reviews are now at the pre-publication stage and are expected to publish sometime in 2024. For the purposes of consistency and transparency, the current review contains the summary of findings tables, forest plots and GRADE ratings that were presented to the committee and on which they based their decision making. When the final drafts of the Cochrane reviews are published, there may be some small differences between the evidence presented to the committee and the way it is presented in the final published Cochrane reviews. Any major discrepancies between the original evidence and the newly published evidence will be presented to the committee at the time of publication if so required, but it is anticipated that there will be very few discrepancies, and any discrepancies identified will be minor in nature and will not change the overall findings of the reviews. A pdf of PowerPoint slides containing evidence presented to the committee is available for the 2-4 years review, and pre-publication review drafts are available for the 5-11 and 12-18 years reviews.

Permission to reproduce and include additional material and analysis from the Cochrane review content was made as per the terms of the Collaboration Agreement for published evidence review collaboration stated in the section 2.1 Principles of fair use of Cochrane reviews in NICE guidelines of the Guideline support document: Cochrane reviews and NICE guideline development.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Review methodsThis evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document.

While Cochrane's methods are closely aligned to standard NICE methods, there were some minor deviations, which, where relevant to the topic area, were highlighted to the committee and taken into account in discussions of the evidence:

- A number of databases were searched which are not typically used by NICE due to the timeframe of NICE reviews. This includes:
  - Australian Education Index (AEI) (EBSCOhost);
  - British Education Index (BEI) (EBSCOhost);
  - ERIC (Education Resources Information Center) (EBSCOhost)
  - ClinicalTrials.gov
  - WHO international clinical trials registry platform
  - Electronic Theses Online Service (EThOS) – British Library (ethos.bl.uk/Home.do);
  - DART – Europe e-theses Portal (dart-europe.eu/basic[1]search.php);
  - Networked Digital Library of Theses and Dissertations (NDLTD) (ndltd.org);
  - Open Access Theses and Dissertations (OATD) (oatd.org);

  - Proquest Dissertations & Theses Global (search.proquest.com/ pqdtglobal/dissertations/)

- The GRADE criteria used by Cochrane for judging certainty in the evidence differed slightly from the approach used by NICE in other reviews for this guideline: please see appendix M for the GRADE criteria used for the Cochrane reviews.
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- Random-effects meta-analyses were conducted regardless of statistical heterogeneity
- The final Cochrane reviews provide summary of findings tables with overall GRADE ratings for interventions in all settings only (these are presented in section 1.1.6 of this review). Results of subgroup analyses by setting will not be reported in the main body of this review, but forest plots for these analyses are included in appendix E. The Cochrane reviews do not provide GRADE ratings for these subgroup analyses. GRADE tables for findings for all settings were developed by the NICE team and are provided in appendix F. For the purposes of the committee meetings, the Cochrane authors presented slides providing summary of findings for all settings and for subgroups by setting and follow up. The quality of the evidence was discussed narratively and GRADE tables were not reported.
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- The Cochrane reviews included countries from a broader range of income categories than the majority of the other reviews in this guideline. The committee took this into account during their consideration of the evidence, and noted that the majority of evidence came from studies conducted in the US, UK, Australia, New Zealand and Europe.

1.1.4 Effectiveness evidence

1.1.4.1 Included studies

Three Cochrane reviews were included in this report, which included Phillips (submitted for publication; children aged 2 to 4 years), Summerbell (submitted for publication; children aged 5 to 11 years) and Spiga (submitted for publication; children aged 12 to 18 years).

For children aged 2 to 4 years, the authors identified 31 individually randomised controlled trials and 40 cluster randomised controlled trials for the Cochrane review. However, due to differences in included settings and primary outcomes between the Cochrane review protocol and the NICE protocol, as determined by the committee and their needs for decision making, only 22 of these trials were included. This is because they were the studies that were conducted in early years settings and reported outcomes for BMI or zBMI. Furthermore, 6 of these trials reported outcome data in a format that could not be used in the meta-analyses, so only 16 trials are reported in this review for that age group (1 RCT and 15 cluster RCTs).

For children aged 5 to 11 years, 172 studies were identified that covered BMI, zBMI and BMI percentile data. Forty-six studies were individual RCTs and 126 were cluster RCTs. The majority of the studies presented in the review were conducted in the USA; 15 studies were conducted in the UK. Amongst the included studies, 32% (55/172) targeted disadvantaged (low income) participants and/or those living in disadvantaged communities. Out of the 172 included studies, 115 studies were conducted in school settings, 13 were conducted at home, 11 were conducted in school and at home, and 33 were conducted in other settings such as community or clinical settings.

For children aged 12 to 18 years, 74 studies were identified that covered BMI, zBMI and BMI percentile data. There were 25 individually randomised controlled trials and 49 cluster

randomised controlled trials. Thirty-three studies were conducted in the USA and 2 studies were conducted in the UK.

Details of individual studies are summarised in Table 2 for children aged 2 to 4 years, Table 3 for children aged 5 to 11 years, and Table 4 for children aged 12 to 18 years.

See list of included studies in section 1.1.14 and for further details of the included studies see the full evidence tables in Appendix D.

1.1.4.2 Excluded studies

See list of excluded studies in Appendix K.

1.1.5 Summary of studies included in the effectiveness evidence

Children aged 2 to 4 years

Table 2: Summary of studies for children aged 2 to 4 years

The table below lists the studies supplied by authors that specifically focused on BMI-z data and childcare settings (n=16). The final Cochrane review will include summary tables of all studies included in the review.

Study	Design (n clusters)	Setting and country	Population and N	Intervention type	Intervention	Comparator
Alkon 2014	CRCT (18)	Childcare centres USA	Children aged 3-5 (N not reported)	Diet and physical activity (DPA)	**Nutrition And Physical Activity Self Assessment for Child Care (NAP SACC) intervention** Workshops for child care providers and other staff on (1) childhood obesity, (2) healthy eating for young children, (3) physical activity for young children, (4) personal health and wellness, and (5) working with families to promote healthy behaviours.	No intervention
Barber 2016	CRCT (10)	Preschools UK	164 children	Physical activity (PA)	**Preschoolers in the Playground (PiP)** A physical activity intervention for pre-school children	No intervention
Davis 2016	CRCT (16)	Head start centres USA	1816 children (2-5 years)	DPA	**Child Health Initiative for Lifelong Eating and Exercise (CHILE)** Classroom curriculum, teacher and food service training, family engagement, grocery store participation and healthcare provider support	Standard curriculum
Dennison 2004	CRCT (16)	Preschools USA	176 children (2.6-5.5g years)	PA	**'Brocodile the Crocodile' health promotion programme**	Safety and injury prevention program

Study	Design (n clusters)	Setting and country	Population and N	Intervention type	Intervention	Comparator
					Preschool- and daycare centre-based intervention delivered by one early childhood teacher and a music teacher. Weekly 20-minute interactive educational sessions to encourage reduction of TV viewing for both parents and children.	
Fitzgibbon 2005	CRCT (12)	Preschools USA	409 children	DPA	**Hip Hop to Health Junior** Child intervention: Nutrition activities introducing a healthy eating or exercise concept with activity aerobic activity based on PA Parent intervention: Weekly newsletters that mirrored the children's curriculum. Accompanying homework assignments designed to be an interactive activity between children and parents	General health concepts program
Fitzgibbon 2006	CRCT (12)	Head start centres USA	401 children	DPA	**Hip Hop to Health Junior** Child intervention: Nutrition activities introducing a healthy eating or exercise concept with activity aerobic activity based on PA Parent intervention: Weekly newsletters that mirrored the children's curriculum. Accompanying homework assignments designed to be an interactive activity between children and parents	General health concepts
Fitzgibbon 2011/Kong 2016	CRCT (18)	Head start centres USA	729 children (3-5 years)	DPA	**Hip Hop to Health Junior** Child intervention: Nutrition activities introducing a healthy eating or exercise concept with activity aerobic activity based on PA	General health session

Study	Design (n clusters)	Setting and country	Population and N	Intervention type	Intervention	Comparator
					Parent intervention: Weekly newsletters that mirrored the children's curriculum. Accompanying homework assignments designed to be an interactive activity between children and parents	
Goldfield 2016	CRCT (6)	Childcare centres Canada	83 children (3-5 years)	PA	Training workshops to child care providers, with resources from **Healthy Opportunities for Preschoolers**. The intervention goals were to increase PA and included "booster" sessions in the child care centres by the master trainer.	No intervention
Hodgkinson 2019	CRCT (10)	Childcare centres UK	81 children (2 year olds)	DPA	A staff training intervention using **Be Active, Eat Healthy** resources. Child intervention using the **Healthy Heroes Activity Pack** to promote healthy eating and physical activity in a fun, interactive way.	No intervention
Iaia 2017	CRCT (16)	Childcare centres Italy	425 children (3 year olds)	DPA	Motivational interviews with parents to encourage children's healthy behaviours at home.	Usual care
Malden 2019	CRCT (6)	Preschools Scotland, UK	42 children (3-5 years)	DPA	**ToyBox-Scotland** Practitioner-led physical activity and sedentary behaviour sessions in preschools, with an additional interactive home component	Usual care: standard curriculum
Reilly 2006	CRCT (36)	Nursery and home Scotland, UK	545 children	PA	**Movement and Activity in Glasgow intervention in children (MAGIC) trial** Nursery element: an enhanced physical activity programme consisting of three 30 minute sessions of physical activity each week over 24 weeks.	Usual curriculum

Study	Design (n clusters)	Setting and country	Population and N	Intervention type	Intervention	Comparator
					Home element: families received a resource pack of materials with guidance on linking physical play at nursery and at home. They were also encouraged to seek opportunities to reduce the time spent watching television.	
Slusser 2012	RCT	Family Clinics, pre-schools, Head Start Program centres. USA	160 children (2-4 years) **Only include child if >50th percentile**	DPA	**Paediatrics Overweight Prevention through Parent Training Programme** Class sessions to incorporate healthy nutrition and PA messages within existing field tested parent training modules.	Waitlist, no intervention
Vaughn 2021	CRCT (92)	Nursery/child care and home USA	853 children (3-4 years)	DPA	**HMHW Healthy Me, Healthy We** An intervention designed to increase children's diet quality and physical activity.	Usual care
Yoong 2020	CRCT (35)	Nursery/child care Australia	522 children (2-6 years)	Diet (D)	The intervention was designed to address barriers and enablers to dietary guideline implementation	Usual care
Zask 2012	CRCT (31)	Preschools Australia	498 children (29-73 months)	DPA	**Tooty Fruity Vegie** The intervention strategies included skills development and awareness-raising for parents, staff and children, and social support for parents to foster behaviour changes in their children through feedback and reinforcement.	Usual care

Table abbreviations: D, Diet; PA, Physical activity; DPA, Diet and Physical activity

Children aged 5 to 11 years

Table 3: Summary of studies for children aged 5 to 11 years

Table below lists the studies supplied by authors that specifically focused on BMI-z and BMI data and school and other settings (e.g., community and home).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Adab 2018 , United Kingdom	CRCT (School; n=54)	School + Home	2462	Diet and physical activity (DPA)	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	No active intervention (NAI) – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					termly school led family workshops on healthy cooking skills.	
Anand 2007, Canada	CRCT (Household (parent(s) + ≥ 1 child); n=57)	School (ASP) + Home	93	DPA	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.	NAI – Usual care families received Canada's Food Guide to Healthy Eating16 and Canada's Physical Activity Guide to Healthy Active Living.
Annesi 2016, United States	CRCT (After-school care sites; n=9)	School (ASP)	114	DPA	**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-behavioural methods to encourage children to consume healthy foods and beverages.	NAI – Physical activity was administered in a variety of ways that were mostly left up to the discretion of the counsellor.
Annesi 2017, United States	CRCT (After-school care sites; n=9)	School (ASP)	141	DPA	**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-behavioural methods to	NAI – Physical activity was administered in a variety of ways that were mostly left up to the discretion of the counsellor.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					encourage children to consume healthy foods and beverages.	
Baranowski 2003, United States	RCT (Parent/daughter dyad)	Community + Telehealth + Web	35	DPA	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.	NAI – The control camp experienced only the usual camp activities at that site; focused on general health issues.
Baranowski 2011, United States	RCT	Home + Web	153	DPA	Two interactive, computer-based video games (9 sessions each) played in sequence to increase fruit, vegetable and water intake, physical activity and decrease TV viewing.	DPA Parallel web and DVD based knowledge games on fruit, vegetable, water, physical activity and physical inactivity.
Barbeau 2007, United States	RCT	School (ASP)	309	Physical activity (PA)	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.	NAI – Subjects in the control group received no intervention.
Barnes 2015, Australia	CRCT (Mothers + ≥ 1 daughter; n=40)	Community + Home	48	PA	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.	NAI – 6-month wait-list control

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Beech 2003, United States	RCT (Parent/daughter dyad)	Community	60	DPA	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 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	Active control (AC) – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					segment (EASY Tips); and a segment alternating food preparation and nutrition- related games (EASY Fun).	
Bohnert 2013, United States	RCT	School (ASP)	133	DPA	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.	NAI – No specific interventions were conducted with participants in the control condition other than participating in the health festivals.
Brandstetter 2012, Germany	CRCT (School; n=32)	School	1119	DPA	**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 exercise a day (each 5–7 min), 6 family homework lessons (tasks that cannot be accomplished by the	NAI – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					child himself without the help of a parent) and materials for the training and information of the parents.	
Branscum 2013, United States	CRCT (After school program; n=12)	School (ASP)	183	DPA	Comic-book program designed to help children learn and engage in behaviours 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.	DPA – 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.
Breheny 2020, United Kingdom	CRCT (School; n=40)	School	2280	PA	**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.	NAI – Only the usual school health and wellbeing activities were implemented
Brown 2013, United States	RCT	School (ASP) + Community	76	DPA	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	AC – Youth drug and alcohol prevention program

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Caballero 2003, United States	CRCT (School; n=41)	School + Home	1704	DPA	**The Pathways Study** intervention consisted of 4 components; classroom curriculum: culturally appropriate school-based lessons that promote healthful eating behaviours 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	NR – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					healthier lifestyle, with the direct involvement of children.	
Cao 2015, China	CRCT (School; n=14)	School + Home	2446	DPA	**The Family-Individual-School (FIS-based)**comprehensive intervention model combined models of family- and school-based interventions and had three aspects: health knowledge, dietary behaviour, and exercise behaviour. 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.	NR – NR
Carlin 2021 – Phase 1, United Kingdom	CRCT (Parent + 1 to 2 children; n=11)	Home	16	DPA	**The Intelligent Personal Assistant Project (IPAP)** intervention aimed to promote positive health behaviours 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	NAI – "Continue as normal without the provision of the technology."

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					signposted to search for the app Skills under the topics of Health and Fitness, Lifestyle, Sport, Cooking, and Recipes.	
Carlin 2021 – Phase 2, United Kingdom	CRCT (Parent + 1 to 2 children; n=15)	Home	18	DPA	**The Intelligent Personal Assistant Project (IPAP)** intervention aimed to promote positive health behaviours 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.	NAI – "Continue as normal without the provision of the technology."
Chai 2019, Australia	RCT (Parent/child dyad)	Telehealth + Web	46	Diet (D)	1. 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	NAI – 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

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					cooking videos. Facebook group for parents to exchange ideas and information related to the B2BF website. 2. 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-weekly rotations of decreasing frequency.	
Chen 2010, United States	RCT (Mother/child dyad)	Community	67	DPA	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 that 8 week. 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 Centre 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	NAI – After completing the final follow-up assessment, this group received the ABC study intervention.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					explaining the activities that highlight healthy eating and active lifestyles.	
Choo 2020, South Korea	CRCT (Community centre; n=8)	Community + Home + Telehealth	120	DPA	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 behavioural 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 behavioural 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	NAI – The control group received usual care being provided in the community child centre program.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					telephone counselling sessions, and 12 weekly text messages. The centre-level intervention consisted of organizational strategies such as partnership building, curriculum development, centre staff education, and centre policy changes.	
Clemes 2020, United Kingdom	CRCT (School; n=8)	School	176	PA	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.	NAI – 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.
Coleman 2012, United States	CRCT (School; n=8)	School	1273	D	Intervention goals were to eliminate unhealthy foods and beverages on campus and at home, to deliver active nutrition	NR – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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).	
Crespo 2012, United States	CRCT (School; n=13)	School/Home/Home + School	808	DPA	1. 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. 2. 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	NAI – Participants in the control condition were asked to maintain their regular lifestyles and to attend the yearly scheduled measurements

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					messages in grocery stores). 3. Combination of the home/family environment and school/community environment interventions.	
Cunha 2013, Brazil	CRCT (Classroom; n=20)	School	574	D	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,	NAI – The control group received a one-hour section of orientation on general health and advice on healthy eating, at the end of the study.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					cookies, minimarket, and food advertisements.	
Damsgaard 2014, Denmark	CRCT (School; n=9)	School	823	D	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.	NAI – Usual packed lunch from home. The teachers were instructed not to use the material about NND during the control period.
Davis 2021, United States	CRCT (School; n=16)	School	4239	D	**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	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
De Bock 2013, Germany	CRCT (Preschool; n=39)	School + Home + Web	1028	PA	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.	NAI – "A 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."
De Greeff 2016, Netherlands	CRCT (Classroom; n=12)	School	388	PA	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.	NAI – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
De Heer 2011, United States	CRCT (Classroom; n=85)	School (ASP)	646	DPA	A culturally tailored health education and physical activity after-school program with modules on healthy 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.	NAI – Members of the control and spill over groups received fourth-grade health workbooks and incentives at pre-test and follow-up measurements, but they did not attend the after-school sessions.
De Ruyter 2012, Netherlands	RCT	School	641	D	Children were provided with 1 can per day of a noncaloric, artificially sweetened, noncarbonated beverage or a sugar-containing noncarbonated beverage.	AC – Children were provided with 1 a sugar-containing noncarbonated beverage.
Donnelly 2009, United States	CRCT (School; n=24)	School	1527	PA	**Physical Activity Across the Curriculum (PAAC)** promoted 90 minutes/week of moderate to vigorous physically active academic lessons (3.0 to 6.0 METS,~10 min each) delivered intermittently throughout the school day.	NAI – Regular classroom instruction without physically active lessons.
Drummy 2016, Northern Ireland	CRCT (Classroom; n=14)	School	120	PA	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,	NAI – The control groups continued with their normal daily routine throughout the 12-week period.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					followed by moderate–vigorous intensity exercises such as hopping, jumping and running on the spot, scissor kicks.	
Duncan 2019, New Zealand	CRCT (School; n=16)	School + Home	1200	DPA	**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).	NAI – Schools assigned to the control group were offered the intervention (including all resources) following the final assessment period.
Elder 2014, United States	CRCT (Recreation centre; n=30)	Community	541	DPA	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 centre,	NAI – Families and recreation centres assigned to the control condition completed measures on the same schedule as those in the intervention conditions.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 centre intervention emphasized making changes in the quantity and quality of physical activity and healthy food and beverage offerings within the centres and targeted centre policies, programs, and facilities.	
Epstein 2001, United States	RCT (Parent/child dyad)	Home	30	DPA	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	Diet – 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

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					vegetables, and to increase access to physical activity and to reduce access to sedentary behaviours. 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.	
Fairclough 2013, United Kingdom	CRCT (School; n=12)	School + Home	318	DPA	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.	NAI – 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.).
Farmer 2017, New Zealand	CRCT (School; n=16)	School	1663	PA	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	NAI – Control schools were asked to not change their play environment

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					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.	
Ford 2013, United Kingdom	RCT	School	174	PA	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.	NAI – The control group took part in normal school lessons during the walking sessions, which involved seated literacy work.
Foster 2008, United States	CRCT (School; n=10)	School	1349	DPA	**The School Nutrition Policy Initiative (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	NR – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Fulkerson 2010, United States	RCT (Parent/child dyad)	Community + Home	44	D	Sessions were held at rented space in a church and community centre (with kitchen and dining facilities) within proximity to participants' homes in the early evening (6–7:30pm). 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	NAI – Families randomized to the control condition participated in home assessments only and were sent written intervention materials at the end of the study.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					assignment, take home materials, and session evaluations.	
Fulkerson 2015, United States	RCT (Parent/child dyad)	Community + Telehealth	160	D	The intervention included ten monthly group sessions and five brief goal-setting telephone calls. Families received a guidebook with session topics, strategies to promote behaviour 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 behavioural goal(s). Calls included the same behaviour change techniques as in person sessions but followed an interview format, utilized motivational interviewing techniques, and provided opportunities to discuss behaviours/goals that complemented the group session topics.	AC – Control group participants received a monthly family-focused newsletter and did not receive the HOME Plus intervention program.
Gentile 2009, United States	CRCT (School; n=10)	School + Community + Home	1323	DPA	**The Switch program** promoted healthy active lifestyles by encouraging students to 'Switch what you Do, Chew, and View'.	NAI – Control schools did not receive any school materials. Control families were recruited similarly to experimental families

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 behavioural and environmental strategies employed at multiple ecological levels.	but received no materials other than the surveys.
Gortmaker 1999a, United States	CRCT (School; n=10)	School	1560	DPA	**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.	NAI – Control schools received their usual health curricula and PE classes and none of the Planet Health program.
Greve 2015, Denmark	CRCT (School; n=33)	School + Web	Unclear (15493 at baseline)	DPA	The main focus of **the Healthy Schools Network (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	NAI – Control schools were offered the opportunity of participating in the HSN programme from the school year 2011/12 onward.

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					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.	
Griffin 2019, United Kingdom	CRCT (Father + ≥ 1 daughter; n=43)	Community	61	DPA	**The Healthy Dads, Healthy Kids (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	AC – The control group received information about local opportunities for physical activity plus a voucher for the family to attend a leisure centre

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					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 because of qual research including reducing the number of PowerPoint slides, simplifying and anglicising wording and updating the guidance and	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					stats to align to UK public health recommendations.	
Grydeland 2014 , Norway	CRCT (School; n=37)	School + Home	2165	DPA	The multilevel approach included collaboration with school principals and teachers, school-health services and parent committees. Multiple intervention efforts 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.	NAI – NR
Ha 2021, China	CRCT (Parent + ≥ 1 child); n=171)	School	173	PA	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	NAI – Wait list (start intervention after 1 year).
Habib-Mourad 2014, Lebanon	CRCT (School; n=8)	School + Home	374	DPA	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	NAI – Students in the control schools received their usual curriculum during the intervention period.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Habib-Mourad 2020, Lebanon	CRCT (School; n=36)	School + Home	1239	DPA	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	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Haire-Joshu 2010 , United States	CRCT (Sites; n=119)	Community	782	DPA	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.	NAI – Control children received the standard tutoring program which consisted of routine one-hour visits with the child.

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Han 2006, China	CRCT (School; n=10)	School	2800	Diet	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.	NAI – NR
Hannon 2018, United States	CRCT (Mother + ≥ 1 child; n=128)	Community	203	DPA	The intervention was adapted from the lifestyle curriculum used in the **Diabetes Prevention Programme (DPP).** Scripts used in the 16	DPA – This second curriculum had 2 fundamental differences from the mother only version. First, it made mothers aware of what their

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	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.
HEALTHY Study Group 2010, United States	CRCT (School; n=42)	School	11158	DPA	The intervention consisted of four integrated components: nutrition, physical activity, behavioural 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	NAI – 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).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					time students spent in moderate-to-vigorous physical activity. Behavioural 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.	
Hendrie 2011, Australia	CRCT (Families (parent(s) + ≥ 1 child); n=93)	Home	145	D	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.	NAI – Parental education on reducing children's screen time. NB: Screen time was encouraged to be replaced with other sedentary behaviour to avoid an increase in physical activity
Hendy 2011, United States	RCT	School	210	DPA	**The Kid's Choice Program (KCP)** group (called the 'LIONS'') received stars punched into their nametags for each of three ''Good Health Behaviours'' that included eating 1/8 cup FV (''the size of a	NAI – The control group (called the ''TIGERS'') received stars punched into their nametags for each of three ''Good Citizenship Behaviours'' that included talking quietly during meals, keeping their

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					ping pong ball'') first during their meal (FVFIRST), choosing a low-fat and low sugar healthy drink (HDRINK), and having 5000 exercise steps recorded on their pedometers (EXERCISE).	meal area clean, and respecting others by not touching them or their things.
Hooft van Huysduynen 2014, Netherlands	RCT	Home	218	D	The intervention included five face-to-face sessions during which a dietician used motivational interviewing to guide the parents towards a healthy diet. The parents also received three emails with individualised feedback.	NAI – The control group did not receive any of the intervention elements.
Hopper 2005, United States	CRCT (School; n=6)	School + Home	238	DPA	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)."	NAI – Children received no additional instruction in nutrition and physical education beyond that provided in their regular school curriculum.
Howe 2011, United States	RCT	School (ASP)	106	PA	A 10-month after-school PA intervention. The daily intervention	NAI – Participants in the control group received no intervention and

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					(2 h/day) consisted of skills development (25 min), vigorous PA (35 min), and strengthening/stretching (20 min) components. A healthy snack was offered during the 2-h intervention.	were not allowed to stay for the after-school intervention but rather instructed not to change their daily after-school routine.
Hull 2018, United States	CRCT (Parent + ≥ 1 child; n=272)	Community + Telehealth	319	DPA	**Familias Saludables Activas** aimed to increase physical activity, decrease sedentary behaviour and improve healthy eating behaviours through parental modelling 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.	AC – 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.
Huys 2020, Belgium	CRCT (Municipality; n=11)	School (ASP)	444	DPA	**The Feel4Diabetes intervention** involved (1) the family component: six counselling sessions on healthy	DPA – Families of the control group only received the first individual session of the family

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					eating, improving PA and limiting sedentary behaviour 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 behaviour 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.	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.
Ickovics 2019, United States	CRCT (School; n=12)	School	756	D/PA/DPA	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	AC – For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					condition), and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). 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. 2. Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. 3.combination of policy interventions related to nutrition and physical activity.	
James 2004, United Kingdom	CRCT (Classroom; n=29)	School + Web	644	D	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	NR – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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).	
Jansen 2011, Netherlands	CRCT (School; n=26)	School + Community	2770	DPA	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	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Johnston 2013, United States	CRCT (School; n=7)	School	835	DPA	Curriculum materials with integrated health information teaching aids, and health and nutrition educational materials developed for this study were provided to all 7 schools. The materials centred 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.	NAI – Schools randomized to the SH condition attended a 1-day training before the beginning of each school year to review curriculum materials.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Jones 2015, Australia	RCT	School (ASP) + Home	37	PA	The Physical Activity programs comprised 30 min of homework plus 90 min of structured physical activity. Facilitators 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.	DPA – The HL education program (active comparison group) 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.
Kain 2014, Chile	CRCT (School; n=9)	School	1949	DPA	The intervention included classroom nutrition education, increasing physical education (PE)	NR – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					class time, and increasing time children were moderately active during those classes.	
Keller 2009, Germany	RCT	Home	365	DPA	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.	NAI – The subjects of the control group received neither information after an intervention.
Keshani 2016, Iran	CRCT (School; n=8)	School + Home	221	D	“Six nutrition education sessions for students and 4 sessions for mothers were held during one year in four intervention schools, using a similar method.	NAI – “No training was considered for the control group, except the routine school trainings.”

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Khan 2014, United States	RCT	Community	220	PA	The intervention provided 70 minutes (5 days/week) of moderate to vigorous physical activity;	NAI – 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.
Kipping 2008, United Kingdom	CRCT (School; n=19)	School	679	DPA	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.	NAI – The control schools were provided with the teacher training and teaching material after the completion of the study
Kipping 2014, United Kingdom	CRCT (School; n=60)	School + Home	2221	DPA	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; 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.	NAI – Schools randomised to the control group continued standard education provision for the school year, and 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, United States	RCT (Parent/child dyad)	Community	303	DPA	The obesity prevention intervention provided practical experience with nutrition and physical activity, and	AC – The alternative intervention targeted the girls only and was designed to provide meaningful

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					the alternative intervention focused on building social awareness and community responsibility. Girls and caregivers participated in the obesity prevention intervention through a combination of separate and joint sessions.	benefits with the goal of improving self-esteem and social efficacy. There was no focus on changing behaviours at home or activities related to diet, physical activity or body weight.
Kobel 2017, Germany	CRCT (Classroom; n=91)	School + Home	525	DPA	The intervention combines elements from behavioural 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 focus lies on the promotion of healthy and active alternatives, which children are offered to choose to lead a healthier lifestyle. 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	NAI – The teachers in the schools of the control group, representing the alternative in the economic analysis, continued to teach as normal and were obliged to wait one year before they could take part in the vocational training.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					efforts of parents and child to solve the given exercises.	
Kocken 2016, Netherlands	CRCT (School; n=65)	School + Home	1112	DPA	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 behavioural 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.	NAI – Control schools followed their regular school program
Kovalskys 2016, Argentina	CRCT (School; n=8)	School	760	DPA	Intervention aimed at improving healthy eating and PA in school children. “Playgrounds were re-designed to promote 30 minutes of	NAI – No details reported

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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." No details are reported for the diet component of the intervention.	
Kriemler 2010, Switzerland	CRCT (School; n=15)	School	502	PA	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.	NAI – Three physical education lessons each week (compulsory by law);
Kubik 2021, United States	RCT (Parent/child dyad)	School (ASP) + Home	132	DPA	The programme included 14 kid group and 5 parent group sessions held after school at a central school location + 4 home visits (32.5 total contact hours). Included motivational interviewing and behavioural change techniques.	AC – Monthly newsletter with family-oriented healthy lifestyle information.
Lau 2016, China	RCT	School (ASP)	80	PA	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.	NAI – Regular PA and physical education class and received no additional intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Lazaar 2007, France	CRCT (School; n=19)	School (ASP)	425	PA	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 to bring about long-term changes in behavioural patterns.	NAI – Regular sport physical education and PE classes;
Lent 2014, United States	CRCT (School-store (school and its surrounding corner stores within a four-block radius); n=10 schools + 24 corner stores)	School + Community + Web	767	D	**Healthy corner store intervention** was designed to promote healthier snack and beverage purchases in students shopping in corner stores. Intervention has 3 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).	NAI – No active intervention (students were still intercepted and asked what they bought in their adjacent non-intervention corner stores)
Levy 2012, Mexico	CRCT (School; n=60)	School + Home	1020	DPA	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,	NAI – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Li 2010, China	CRCT (School; n=20)	School	4700	PA	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	NAI – No intervention took place in the control schools.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Li 2019, China	CRCT (School; n=40)	School + Home	1641	DPA	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	NAI – "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."

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Lichtenstein 2011, Germany	CRCT (School; n=9)	School + Home	445	DPA	Nutrition module (90 min/month, 6 sessions) and physical activity (90 min/week; 24 sessions) for children, and evening coaching sessions for parents (90 min/month, 6 sessions).	NAI – No intervention
Liu 2019, China	CRCT (School; n=12)	School	1889	DPA	School-level policies encouraged children to avoid unhealthy food and drinks and do 60min/d MVPA + Four 40min lessons on diet and PA + minimum three 45-minute physical education (PE) classes/week + completion of diet and PA diary once a month + suggestions to schools on how to improve the school lunches + overweight students encouraged to attend extracurricular sports club (30 min MVPA 3x/wk; not compulsory).	NAI – Schools in the control group continued usual practice without involvement in any intervention during the 12 months' follow-up

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Llargues 2012, Spain	CRCT (School; n=16)	School + Home	704	DPA	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.	NAI – NR
Lloyd 2018, United Kingdom	CRCT (School; n=32)	School + Home	1324	DPA	**Healthy Lifestyles Programme (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	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Lynch 2016, United States	CRCT (Classroom; n=8)	School	51	DPA	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 always wear the pedometer that they were awake	NAI – NR

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Macias-Cervantes 2009, Mexico	RCT	Community + Home	76	PA	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.	NAI – Children in the control group were asked to maintain the same level of physical activity throughout the 12 weeks of observation
Madsen 2013, United States	CRCT (School; n=7)	School (ASP)	156	PA	**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.	NAI – NR
Magnusson 2012, Iceland	CRCT (School; n=6)	School + Home	321	DPA	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	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					various intervention tactics, which were introduced and discussed during bimonthly meetings led by the research team.	
Marcus 2009, Sweden	CRCT (School; n=10)	School	3135	DPA	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.	NAI – The control group received no intervention and continued as usual.
Martinez-Vizcaino 2014, Spain	CRCT (School; n=20)	School (ASP)	1592	PA	The program consisted of non-competitive 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	NAI – Control schools kept their usual patterns of PA

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					and one 150-minute session on Saturday morning each week.	
Martinez-Vizcaino 2020, Spain	CRCT – crossover (School; n=21)	School (ASP)	2407	PA	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 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.	NAI – Standard physical education lessons

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Meng 2013 (Beijing), China	CRCT (School; n=9)	School/School + Home	2150	D/PA	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. 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.	NAI – No intervention was taken place in the control schools

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Morgan 2011, Australia	CRCT (Father + ≥ 1 child; n=53)	Community	71	DPA	The 3-month **Healthy Dads. Healthy Kids (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 behaviour in their children.	NAI – The wait-list control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions.
Morgan 2014, Australia	CRCT (Fathers + ≥ 1 child; n=93)	Community	132	DPA	The 3-month **Healthy Dads. Healthy Kids (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 behaviour in their children.	NAI – The wait-list control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions.
Morgan 2019, Australia	CRCT (Family unit (father + ≥ 1 daughter) ; n=115)	Community (University) + Home	153	PA	"**The Dads and Daughters Exercising and Empowered (DADEE) program**" was designed to energise fathers to become	NAI – Wait-list control group received the intervention after the 36 weeks assessment.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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."	
Muller 2016, Germany	CRCT (Classroom; n=22)	School	366	PA	Intervention classes were assigned to 1 unit of physical exercise (45 minutes) with at least 15 minutes of endurance training per school day. In addition, lessons on healthy lifestyle were included in the regular schedule once monthly for all pupils.	NAI – The control classes continued to receive 2 units of exercise per week.
Muller 2019, South Africa	CRCT (School; n=8)	School	1009	PA (one school received nutritional intervention)	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	NAI – The control group continued to follow their usual school curriculum.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 intervention (a series of classroom-based to increase the awareness of the importance of healthy nutrition).	
Muzaffar 2019, United States	CRCT (After school program (days of ASP randomized to each arm); n=7)	School (APS)	109	DPA	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	DPA – Intervention is the same as the peer-led but their educators are adults: “Adult educators were recruited from among participating schools’ staff members…. Adult educators delivered the program to 7 to 8 adolescents per educator. “

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
NCT00224887 2005, United States	RCT	Home	307	D	In-home family-based behavioural counselling using in-person and video interventions delivered by community health advisors.	NAI – Standard nutrition education curriculum; standard nutrition education curriculum consisting of video and lesson plans based on USDA Food Guide pyramid.
NCT02067728 2014, United States	CRCT (Primary care clinics ; n=12)	Primary care clinic	430	DPA	Family nutrition physical activity tool implement during well-child visits within the practice comprising of two components: 1) assessment to screens for obesogenic behaviours. 2) Brief Action Planning conversation designed to assist the family develop a health behaviour change goal based on obesogenic risks on the assessment tool.	NAI – Usual care to patients during well-child visits
Nemet 2011a, Israel	CRCT (School; n=30)	School	795	DPA	Teaching 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	NAI – Regular kindergarten schedule.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					short lectures/talks, games, and story reading.	
Nemet 2011b, Israel	CRCT (School; n=11)	School	342	DPA	Teaching 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.	NAI – Regular kindergarten schedule.
Newton 2014, United States	RCT (Parent/child dyad)	Community + Home + Web	27	PA	Children in both study groups were instructed to wear a study-provided pedometer every day during 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 behavioural 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. Behavioural strategies based on the Social Cognitive Theory	AC – Parents 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 behavioural concepts presented in the articles, and motivate parents to foster behavioural change in their child.	
Nollen 2014, United States	RCT	Community + Web	51	DPA	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.	AC – 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.
Nyberg 2015, Sweden	CRCT (Classroom; n=14)	School + Home	243	DPA	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	NAI – Control classes were offered the whole programme directly after the 6-months follow-up measurements

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Nyberg 2016, Sweden	CRCT (Classroom; n=31)	School + Home	378	DPA	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.	NAI – Control classes were offered the entire programme after the follow-up measurements were completed.
O'Connor 2020, United States	CRCT (Father + ≤ 3 children; n=37)	Community + Home	64	DPA	"**Papa´s Saludables Nin˜os Saludables** was culturally adapted from the Healthy Dads Healthy	NAI – The families in the waitlist control group received the full

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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."	program after the post-assessment of the full sample.
Paineau 2008, France	CRCT (School; n=54)	School + Telehealth	1013	D	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. 1. 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). 2. 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).	AC - 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Pena 2021, Chile	CRCT (School; n=20)	School + Web	2022	DPA	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 behavioural 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	NAI – 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).
Pindus 2015, United States	RCT	Community	44	PA	70 minutes (5 days/week) of moderate to vigorous physical activity.	NAI – Regular afterschool activities.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Prina 2014, Mexico	RCT	School + Home	2746	DPA	The purpose of this treatment was to make the health risks of being underweight, overweight, or obese more salient to parents. The parents of healthy weight children received information on the health risks of being overweight/obese. The three treatment groups and control group received an invitation to attend an information session entitled “Practical Tips for Improving Your Child’s Eating Habits and Physical Activity.” Note that this session does not directly address weight. For the treatment groups, this invitation was sent home along with the report card. The three treatment groups received a personalized health report card that detailed the child’s height, weight, and weight classification (i.e., underweight, healthy weight, overweight, or obese). What distinguishes the three treatment groups is the level of information they received. 1. The BASIC treatment group received the report card. 2. The RISK treatment group had an additional script describing the health risks of their child’s weight	NAI – For the control group, invitation to the information session was sent by itself (i.e. report cards).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					classification 3. The COMPARE treatment group obtained the same report card as the BASIC treatment but also received information about the number of children in the child's class in each of the weight categories: underweight, healthy weight, overweight, and obese.	
Puder 2011, Switzerland	CRCT (Classroom; n=40)	School	655	DPA	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.	NAI – Regular school curriculum.
Ramirez-Rivera 2021, Mexico	RCT	School + Home	41	DPA	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	AC - They 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.

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					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.	
Rerksuppaphol 2017, Thailand	RCT	School + Telehealth + Web	218	DPA	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.	NAI – Children in the control group were asked to measure weight and height by their teachers monthly and record the information in the report form.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Rhodes 2019, Canada	RCT (Parents + 1 child)	Home	102	PA	The intervention condition will receive the Canada's physical activity guidelines and be provided with family physical activity planning material. This material will include skill training content (workbook how to plan for family physical activity) and practical material to create a plan.	NAI – The standard (comparison group) package will consist 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.
Riiser 2020, Norway	CRCT (After School Programs; n=14)	School (ASP)	456	PA	**Active Play in After School Programmes (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	NAI – Control ASP were invited to receive the intervention after the study was completed.

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					instead of directing them in a controlling manner.	
Robinson 2003, United States	RCT	Community	61	PA	**GEMS Jewels dance classes** were offered 5 days per week at 3 community centres 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.	DPA – 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.
Robinson 2010, United States	RCT	Community	261	PA	**The GEMS Jewels After School Dance Intervention and Sisters Taking Action to Reduce Television (START**), a home-based screen time reduction intervention designed to incorporate African or African-American history and culture	DPA – State-of-the-art, culturally tailored, authoritative, information-based health education on nutrition, physical activity, and reducing cardiovascular and cancer risk. It included 24 monthly newsletters for the girls and their parents/guardians.
Rosario 2012, Portugal	CRCT (School; n=7)	School	464	D	Teachers in the intervention group had 12 sessions on: nutrition and healthy eating; the importance of drinking water; strategies to encourage fruits and vegetables consumption and to decrease high energy-density foods intake; strategies to increase physical activity and healthy cooking activities. After each session,	NAI – NR

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					teachers were encouraged to develop activities in class that focused on the learned topics.	
Rosenkranz 2010, United States	CRCT (Girl scout troops; n=7)	Community + home	76	DPA	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.	NR – Control troops complete usual troop meeting activities. Control troops receive equal observation time, equal pre-test and post-test assessment, and equal study scrutiny
Rush 2012, New Zealand	CRCT (School; n=164)	School	6456	DPA	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,	NAI – Control schools were given no additional resources or information; however, no restrictions were placed on initiatives they may pursue for themselves.

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					which included a 45 min practical nutrition class. In addition to school children, the project offered assistance to teachers, parents and the local community.	
Sacchetti 2013, Italy	CRCT (Classroom; n=26)	School	521	PA	Physical activity program that was enhanced in terms of duration, intensity, and frequency.	NAI – Standard program of physical education
Safdie 2013, Mexico	CRCT (School; n=27)	School	886	DPA	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. 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. 1. 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	NAI – No changes were made to existing nutrition or physical activity practices in control schools.

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					resources. 2. The plus program implemented all the components incorporated in the basic program and included additional financial investment and human resources.	
Sahota 2001, United Kingdom	CRCT (School; n=10)	School	636	DPA	The programme consisted of teacher training, modifications of school meals, and the devel-opment and implementation of school action plans designed to promote healthy eating and physical activity over one academic year.	NAI – The comparison schools continued with their usual health curriculum, without the intervention.
Sahota 2019, United Kingdom	CRCT (School; n=8)	School + Web	358	DPA	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.	NAI – 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.

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Salmon 2008, Australia	CRCT (Classroom; n=17)	School	306	PA	Each of the intervention conditions consisted of 19 lessons (40–50 min each) delivered by one qualified physical education teacher over one school year. 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 (FM) intervention to monitor and confirm that the nominated programme was turned off, and encouraged their child maintain the TV switch-off. 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	NAI – Usual physical education and sports classes (usual curriculum)

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					activity facilities at each school. 3. Children in the BM/FMS condition received both the BM and FMS lessons, therefore receiving double the dose of the other intervention groups.	
Santos 2014, Canada	CRCT (School; n=20)	School	687	DPA	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.”	NAI – Waiting list control group received a regular curriculum
Seguin-Fawler 2021, United States	RCT (Dyads (caregiver + 1 child))	Home	305	D	Reduced-price community supported agriculture shares, nine skill-based and seasonally-tailored healthy eating classes, and the provision of basic kitchen tools.	NAI – Delayed intervention starting at year 2

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Sekhavat 2014, Canada	RCT	Health care service (dentist)	168	DPA	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.	NAI – To ensure that both groups benefited equally from the study, the control group received counselling at the end of the study.
Sgambato 2019, Brazil	CRCT (School; n=18)	School + Home	2743	DPA	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	NAI – Participants in the control arm received only the routine activities for healthy behaviour of the school.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Sherwood 2019, United States	RCT (Parent/child dyad)	Health care service + Home + Telehealth	421	DPA	Both arms include two components: (1) a brief paediatric 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 behavioural target areas based on paediatric 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.	AC – Contact control intervention focused on home safety and injury prevention, fire safety, bicycle safety, and sun protection.

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Sichieri 2008, Brazil	CRCT (School; n=47)	School	1134	D	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.	AC – The control group received only two one-hour general sessions on health issues and printed general advices regarding healthy diets.
Siegrist 2013, Germany	CRCT (School; n=39)	School	826	DPA	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 healthier food availability and choices (more vegetables and fruits and less energy-dense food)	NAI – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					and reduce media consumption. Parents and teachers attended two and three educational health-related lessons, respectively, and also received 10 newsletters on health issues.	
Siegrist 2018, Germany	CRCT (School; n=15)	School + Home	792	DPA	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 behaviour (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).	NAI – Control schools were asked to continue their usual activities.

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Simon 2008, France	CRCT (School; n=8)	School	954	PA	The program included an educational component focusing on physical activity and sedentary behaviours. 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;	NAI – The controls followed their usual school curriculum without any intervention
Spiegel 2006, United States	CRCT (Classroom; n=70)	School	1191	DPA	**The Wellness, Academics and You (WAY) program** engages students in multidisciplinary activities in language arts, mathematics, science, and health content, building their academic skills while developing their health attitudes, behavioural intent, and, ultimately, behaviour. 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	NAI – Comparison classes participated in the data collection only and were not exposed to the WAY program.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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	
Stettler 2015, United States	CRCT (Clinical practice; n=15)	Health care service	173	D/DPA	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. 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. 2. Parents and children in the multiple behaviour program participated in a series of consultations and activities focused on multiple healthy	AC – 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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Stolley 1997, United States	RCT (Mother/daughter dyad)	School (ASP)	65	DPA	"The treatment 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	AC – 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"

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					fat and caloric content, culturally relevant music and dance were used for a number of exercise and diet-related activities."	
Story 2003, United States	RCT (Parent/daughter dyad)	School (ASP) + Home	54	DPA	**KEEPS: 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.	AC – The GEMS Club served as an ''active placebo,'' non-nutrition/physical activity condition, and focused on promoting positive self-esteem and cultural enrichment.
Story 2012, United States	CRCT (School; n=14)	School + Home	454	DPA	Physical Activity at School + Healthy Eating at School + Family Environment Multicomponent: Physical Activity at School + Healthy Eating at School + 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	NAI – Control group did not receive any intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 behavioural goals, encourage them in their efforts and to help them evaluate their progress.	
Tanskey 2017, United States	CRCT (School; n=16)	School + Community	892	PA	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	NAI – Control group schools were offered an intervention of their choice after completion of the evaluation in Fall 2017.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					implemented before, during (physical education/recess), or after school. 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.	
Telford 2012, Australia	CRCT (School; n=29)	School	620	PA	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.	NAI – 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.
Tessier 2008, France	CRCT (Classroom; n=52)	School	1150	PA	Three compulsory hours of physical education following over a week delivered over 3 or 4 sessions	PA – Three compulsory hours of physical education following over a week delivered over 1 or 2 sessions

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Thivel 2011, France	CRCT (School; n=19)	School	457	PA	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.	NAI – The control group did not have any intervention and followed their habitual 2 h of physical education per week.
Topham 2021, United States	CRCT (School; n=29)	School (ASP)/School + School (ASP)	538	DPA	**1. The Family Lifestyle (FL)** component focused on developing healthy food and exercise habits to promote a healthy weight in participating children. **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). **3. The Peer Group (PG)** intervention promoted teaching children to accept each other by disallowing rejection at school. 4. All three above	NAI – No classroom or family intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Treviño 2004, United States	CRCT (School; n=27)	School + ASP + Home	1993	DPA	The objective of the **Bienestar Health Program** is to provide children with 50 sessions of health programming distributed throughout 7 months. These behaviours 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 fibre intake, and more physical activity; to have less dietary saturated fat, more dietary fibre, and more physical activity available; and to be role models for the children. Children were asked to set goals aimed at accomplishing the targeted behaviours and to keep records of their accomplishments. Children were also asked to encourage their peers and adult caretakers to practice the 3 health behaviours."	NAI – Health examination alone
Van de Berg, United States	CRCT (School; n=28)	School	1326	D/PA/DPA	**1. Walk Across Texas! (WAT!)** is a school-based PA program, which includes multiple program components designed to establish the habit of regular PA among	NAI – Delayed Control

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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. 2. The 6-month **Learn! Go! Eat! Grow! (LGEG) intervention** (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred 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. 3. **WAT! – Walk Across Texas**	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					program + LGEG! – Learn!Grow! Eat!Go!	
Viggiano 2018, Italy	CRCT (School; n=10)	School	1313	DPA	One play session (15–30 min) with the board game Kaledo, every week for 20 weeks (further details in Viggiano 2015); "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	NAI – The children of the control group did not play with Kaledo.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 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 behaviour in real life (e.g., a fast-food lunch). Therefore, Kaledo could affect dietary behaviour by a knowledge-based nutrition education and/or a behaviourally focused nutrition education."	
Vizcaino 2008, Spain	CRCT (School; n=20)	School (ASP)	1409	PA	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	NAI – The standard physical education curriculum (3 h per week of physical activity at low-to-moderate intensity).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					class and then returned to the school premises to participate in the program.	
Wang 2012, China	CRCT (School; n=6)	School	1003	DPA	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.	NAI – NR
Wang 2018, China	CRCT (School; n=48)	School + Community + Home	10091	DPA	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.	NAI – Control students received their routine health education programs regulated by educational authority.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Warren 2003, United Kingdom	RCT	School	218	D/PA/DPA	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',	AC – Be Smart: Children learnt about food in a non-nutrition sense. On alternate weeks, children learnt about the human body, using an interactive CD-

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	Rom. Children had an activity book, which had a related homework, but it did not have weekly messages.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Wendel 2016, United States	CRCT (Classroom; n=24)	School	480	PA	The treatment classrooms were outfitted completely with Stand2learn LLC (College Station, TX) stand-biased desks and stools (models S2LK04 and S2LS04, respectively).	NAI – The control classrooms were left unchanged, outfitted identically to the rest of the classrooms in the school, with traditional seated desks
White 2019, United States	RCT (Parent/child dyad)	Community + Home + Telehealth + Web	228	DPA	The treatment 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.	NAI – Control participants completed only assessments.
Williamson 2012, United States	CRCT (School; n=17)	School + Web	2060	DPA	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 described in the SPARK study (Sallis 1993) and to reduce sedentary behaviour. Bi-monthly	AC – Schools assigned to this treatment arm will not receive a weight gain prevention program but will participate in the complete data collection process throughout the three-year study. This control group will be given access to a website that provides information on stress management, and study skills. This treatment arm will receive the educational enhancement program (LA GEAR UP), which will control for

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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. 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 behaviour 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.	nonspecific effects (that targets academic achievement but does not target weight gain prevention).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Xu 2015, China	CRCT (School; n=8)	School + Home	1182	DPA	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.	NAI – Routine health education
Xu 2017, China	CRCT (School; n=30)	School + Home	7717	DPA	The comprehensive intervention was a combination of nutrition and PA interventions.	NAI – No intervention was taken place in the control schools
Yin 2012, United States	CRCT (School; n=18)	School (ASP)	1187	PA	**FitKidThe FitKid PA program** was designed to teach sport skills and improve aerobic and musculoskeletal 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	NAI – Regular free “health screenings,” which otherwise may cost more than $300, and diet/PA information to all participants.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					skills), and transportation to home by school bus.	
Zota 2016, Greece	CRCT (School; n=146)	School + Home	21261	D	**DIATROFI program** (daily free healthy meals) + 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 activities for each target group (students of different ages, parents and school staff).	NAI – DIATROFI program (daily free healthy meals)
Barnes 2021, Australia	CRCT (School; n=12)	School + Home	1586	D/PA/DPA	**SWAP IT nutrition intervention**: School nutrition guidelines: Schools received support to develop a school nutrition guideline outlining preferred foods to be packed in lunchboxes and guidance on how to limit the packing of discretionary food items. The guideline encouraged packing 'recommended' foods in the lunchbox every day in place of discretionary foods. Lunchbox flipchart lessons: Schools and teachers were	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

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					provided with a ten-page flipchart for each classroom at the launch of the intervention. The flipchart features a different lunchbox sample for each week of the intervention and provides ideas for teachers to facilitate discussion on healthy lunchboxes in the classroom. The use of lunchbox flipchart lessons were designed to address child preference as a barrier to packing 'recommended' foods. Parent communication pushed via a school mobile communication app ('m-health' component): The intervention utilised an existing school mobile communication app (Skoolbag) to communicate lunchbox messages to parents/carers which address the barriers to packing a healthy lunchbox./The static content and push notifications encouraged simple lunchbox swaps from common 'discretionary' foods to 'recommended' foods consistent with the dietary guidelines. Resources: Information package containing tools and resources, including a lunchbox ideas booklet	programmes, which included educational materials (e.g. factsheets and learning resources).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Di Maglie 2022, Italy	RCT	School	160	PA	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 centre.	Children in the control group participated in usual practice.
Diaz-Castro 2021, spain	RCT	School	103	PA	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	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

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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).	possession drills, pressures, field positions, lines, set pieces, real game situation “match” (15 min); 3. Cool down (5 min): stretching.
Fulkerson 2022, United states	RCT	Other	114	DPA	Participants randomized to the intervention condition received the **NU-HOME (Healthy Offerings via the Mealtime Environment) 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	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.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Ketelhut 2022, Germany	RCT	School	58	PA	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	The control group participated in their normal PE classes twice a week.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Liu 2022, China	CRCT (School; n=24)	School	1392	DPA	**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 behavioural 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 behavioural changes.	The 12 control schools continued with their usual health education lessons and physical education sessions. They did not focus on obesity.
Marsigliante 2022, Italy	RCT	School	398	D	Food education and a healthy lifestyle (e.g., food choices, food	The control schools followed their regular curriculum.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 behaviours, with supporting materials, such as a pocket-sized diary, to monitor own behaviour. The second part (six lessons) aimed at facilitation of choice to improve one of the behaviours, 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	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					intervention and to support their role in educating the children.	
Martinez-Vizcaino 2022, Spain	CRCT (School; n=10)	School	923	PA	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.	Control children continued with their standard physical education curriculum throughout the intervention period (two regular 50-min sessions per week).
Nicholl 2021, Australia	RCT	Home	49	D	Children were requested an ongoing intake of ≥1 serving of reduced-fat dairy per day (where a serving comprised a 250-mL glass	Usual full-fat dairy diet

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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.	
Salmon 2022, Australia	CRCT (School; n=20)	School	1606	PA	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	The control group was a usual curriculum control condition. At study completion, control schools were provided with all the intervention curriculum and supporting materials.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 (e.g., go for a walk with parents and count letterboxes in their street). Classroom sets of physical activity (e.g., balls, skipping rope) and novel circus equipment (e.g., juggling balls, ribbons) were provided each year of the intervention. 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 (e.g., 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	

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					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 (e.g., 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 (i.e., their nine key learning messages each year targeted both physical activity and sedentary behaviour).	

Table abbreviations: D, Diet; PA, Physical activity; DPA, Diet+ Physical activity

Children aged 12 to 18 years

Table 4: Summary of studies for children aged 12 to 18 years

The table below lists the studies supplied by authors that specifically focused on BMI-z and BMI data and school and other settings (e.g., community and home).

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Afam-Anene 2021, Nigeria	RCT	School	346	Diet (D)	Nutrition education	NAI – No intervention
Ahmed 2021, Bangladesh	CRCT (School; n= 8)	School	320	Diet and physical activity (DPA)	Multicomponent intervention – circuit and health education sessions.	NAI – No intervention
Amaro 2006, Italy	CRCT (Classroom; n= 16)	School	291	D	Board game Kaledo to increase nutrition knowledge.	NAI – No intervention
Andrade 2014, Ecuador	CRCT (School; n= 20)	School	1440	DPA	Multicomponent intervention – interactive educational toolkit, workshops with parents; preparing a healthy breakfast and talks from famous young athletes, a walking trail and promotional materials.	NAI – No intervention
Arlinghaus 2021, USA	RCT	School	491	Physical activity (PA)	Intervention focused on incrementally increasing physical activity and decreasing sedentary activity.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Barbosa Filho 2017, Brazil	CRCT (School; n= 6)	School	1272	PA	Multicomponent intervention – physical activity sessions, health education, pamphlets for students and parents.	NAI – No intervention
Bayne-Smith 2004, USA	CRCT (Classroom; n= NR)	School + Home	442	DPA	Personal wellness course that integrated vigorous exercise, health and nutrition education, and behaviour modification	NAI – No intervention
Belton 2019, Ireland	CRCT (School; n= 20)	School	534	PA	Whole-school teacher component (training and physical activity promotion workshops for teachers), parent component (information evening and a parents physical activity information leaflet distributed through the school newsletter).	NAI – No intervention
Bernstein 2019, USA	RCT	School (ASP)	51	DPA	Motivational interviewing plus programme component to promote healthy eating, physical activity, and the use of coping skill.	DPA – Programme component to promote healthy eating, physical activity, and the use of coping skill.
Black 2010, USA	RCT	Home + Community	235	DPA	Rap music video promoting healthy eating and physical activity, motivational interviewing, and mentorship by a college student.	NAI – No intervention
Bogart 2016, USA	CRCT (School; n= 9)	School	4022	D	School-wide food environmental changes with a seventh-grade peer leader club that incorporates social marketing.	NAI – No intervention
Bonsergent 2013, France	CRCT (School; n= 24)	School + Health Service + Community	5354	DPA	Multicomponent intervention – nutrition and physical activity lectures; environmental intervention to increase the availability of fruits, vegetables, bread and dairy	DPA – Factorial design: each group was exposed to either none or one or more components;

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					products, water and physical activity; screening intervention to measure weight, height and waist circumference.	
Brito Beck da Silva 2019, Brazil	CRCT (School; n= 12)	School + Home + Web	895	DPA	Online program to encourage and guide weight control and healthy eating habits.	NAI – No intervention
Chen 2011, USA	RCT	Community + Web	54	DPA	Web-based program of tailored activities to enhance adolescents' self-efficacy and facilitated their understanding and use of problem-solving skills related to nutrition, physical activity, and coping.	D - Web-based non tailored general health information related to nutrition, dental care, safety, skin care, and risk-taking behaviours, not tailored.
Cohen 2021, Colombia	RCT	School (ASP)	129	PA	Supervised resistance activity	PA – Supervised aerobic activity
Dewar 2013 , Australia	CRCT (School; n= 12)	School	357	DPA	Multicomponent intervention – enhanced school sport sessions, interactive seminars, nutrition workshops, lunch-time physical activity, physical activity and nutrition handbooks, parent newsletters, pedometers, and text messaging.	NAI – No intervention
Dunker 2018, Brazil	CRCT (School; n= 10)	School (ASP)	270	DPA	Multicomponent intervention – physical education, sessions with dietitians and psychologists, individual counselling using motivational interviewing techniques, lunch on the days of the activities; weekly group lunch meetings in the maintenance phase.	NAI – No intervention
Ebbeling 2006, USA	RCT	Home + Telehealth	103	D	Weekly home deliveries of non-caloric beverage and telephone calls to assess	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					satisfaction with beverage choices and deliveries, discuss beverage consumption, and provide motivational counselling.	
El Ansari 2010, Egypt	RCT	School (ASP)	160	PA	One hour of moderate exercise in the afterschool time.	NAI – No intervention
Ezendam 2012, The Netherlands	CRCT (School; n= 23)	School + Web	883	DPA	Computer-tailored intervention with educational modules with information on how to improve dietary behaviours, reduce sedentary behaviour and increase physical activity.	NAI – No intervention
Farias 2015, Brazil	CRCT (Classroom; n= 10)	School	567	PA	Programmed physical activity with heart rate monitoring, aerobic activity, sports games and stretching.	NAI – No intervention
French 2011, USA	CRCT (Household (parents + ≥ 1 child); n= 90)	Home + Community + Telehealth	75	DPA	Face-to-face group sessions, telephone calls, monthly newsletters, and home-based activities.	NAI – No intervention
Gustafson 2019, USA	CRCT (School; n= 8)	Telehealth	530	D	Text-messaging intervention including a weekly challenge related to consuming fruits, vegetables, or healthy/low-calorie beverages.	NAI – No intervention
Haerens 2006, Belgium	CRCT (School; n= 15)	School	2840	DPA	Environmental modifications and interventions on personal and social levels related to food choices and physical activity behaviour. Newsletters and a CD-ROM with the adult computer tailored intervention for	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					fat intake and physical activity for the parents to complete at home.	
Haire-Joshu 2015, USA	CRCT (Communities; n= NR)	Home + School + Web	1325	DPA	Multicomponent intervention including home visits, school-based classroom-group meetings, and internet activities to enhance health behaviour.	NAI – No intervention
Harrington 2018, UK	CRCT (School; n= 20)	School	1753	PA	Framework for schools to review their physical education, sport and physical activity culture and practices to ensure that they are relevant and attractive to their 11- to 14-year-old female pupils.	NAI – No intervention
Hollis 2016, Australia	CRCT (School; n= 10)	School + Community + Home	1233	PA	Multicomponent intervention – targeted the school curriculum, school environment, broader community and parental support.	NAI – No intervention
Hovell 2018, USA and Mexico	CRCT (Orthodontist practices; n= 33)	Community	693	DPA	Prescriptions for improving diet and exercise behaviours	Active control (AC) – Prescriptions on reducing tobacco use initiation and second-hand smoke exposure
Isensee 2018, Germany	CRCT (School; n= 29)	School + Home	1489	PA	Different behaviour changes strategies such as self-monitoring, goal setting, and social support with pedometer use.	NAI – No intervention
Jago 2006, USA	CRCT (Troop; n= 42)	Community + Web	473	PA	Physical activity badge included skill building activities at troop meetings and internet-based role modelling, goal setting, goal review and problem-solving.	D – The control group received a “mirror image” fruit and vegetable intervention.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Kennedy 2018, Australia	CRCT (School; n= 16)	School + Web	607	PA	Multicomponent intervention – interactive student seminar, a structured physical activity program, lunchtime fitness sessions and a Web-based smartphone app.	NAI – No intervention
Kuroko 2020, New Zealand	RCT	School (ASP) + Home + Web	164	D	Cooking program during school holidays and social media-led period when participants received weekly meal kits.	NAI – No intervention
Lana 2014, Spain and Mexico	RCT	School + Web	2001	D	Access to a website that included several sections to learn how to prevent and treat main cancer risk behaviours including expert dietetic advice; weekly text messages to encourage compliance with healthy behaviours.	D - Limited access to the intervention and they do not receive the messages
Lappe 2017, USA	RCT	Community	274	D	The dairy group was asked to consume low-fat (skim, 1%, or 2%) milk or low-fat yogurt servings.	NAI – No intervention
Leme 2018, Brazil	CRCT (School; n= 10)	School + Home	253	DPA	Multicomponent intervention – nutrition and physical activity text-messages to support healthy eating and regular physical activity, enhanced physical education sessions, nutrition and physical activity handbooks, interactive seminars, nutrition workshops, parental newsletters, diet and physical activity diaries for self-monitoring.	NAI – No intervention
Lubans 2021, Australia	CRCT (School; n= 20)	School	670	PA	Teachers-delivered high-intensity activity breaks; newsletters for parent.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Luszczynska 2016b, Poland	RCT	School	702	D	Intervention to increase fruit and vegetables intake and replacing energy dense foods with fruit and vegetables. Planning condition participants were asked to read the materials and fill in the forms provided; self-efficacy participants were invited to read self-efficacy definitions.	D - Educational materials about healthy nutrition focused on fruit and vegetables intake.
Mauriello 2010, USA	CRCT (School; n= NA)	School + Web	1800	DPA	Computer tailored obesity prevention intervention that addresses recommended guidelines for physical activity, fruit and vegetable consumption and limited TV viewing.	NAI – No intervention
Melnyk 2013, USA	CRCT (School; n= 11)	School	807	PA	Educational and cognitive–behavioural skills-building program guided by cognitive theory, with physical activity as a component of each session.	AC – Educational intervention on safety and common health topics/issues for teens, such as road safety, dental care, infectious diseases, immunizations, and skin care.
Mihas 2010, Greece	RCT	School	218	D	Teacher-implemented intervention with seminars organized for parents aimed at improving children's diet and nutrition knowledge.	NAI – No intervention
Nanney 2016, USA	CRCT (School; n= 16)	School	1253	D	Intervention that aimed to increase participation in school breakfast programs.	NAI – No intervention
NCT02067728 2014, USA	CRCT (Primary care clinics; n= 12)	Primary care clinic	430	DPA	Screening for obesogenic behaviours and conversation designed to assist the family develop a health behaviour change goal.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Neumark-Sztainer 2003, USA	CRCT (School; n= 6)	School	201	DPA	Physical activity, nutrition, and social support sessions.	DPA – Minimal intervention that included written materials on healthy eating and physical activity.
Neumark-Sztainer 2010, USA	CRCT (School; n= 12)	School (ASP)	356	DPA	Individual coaching on socio-environmental, personal and behavioural factors to bring about changes in physical activity, eating, and weight control behaviours.	NAI – No intervention
O'Connell 2005, USA	CRCT (School; n= 6)	School	489	D	Cafeteria, classroom, and family/school staff nutrition education and cafeteria food improvements.	NAI – No intervention
Ooi 2021, Australia	CRCT (School; n= 6)	School	2265	D	Multicomponent intervention designed to reduce students' consumption of sugar-sweetened beverages.	NAI – No intervention
Papadaki 2010, The Netherlands, Denmark, United Kingdom, Greece, Germany, Spain, Bulgaria, and Czech Republic	RCT	Community	800	D	Dietary intervention providing food with hight or low protein and/or high or low glycaemic index.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Pate 2005, USA	CRCT (School; n= 24)	School	2744	PA	Activities that girls and young women typically enjoy in addition to competitive sports and other traditional physical education activities, health education lessons on skills necessary for adopting and maintaining a physically active lifestyle.	NAI – No intervention
Patrick 2006, USA	RCT	Home + Health care service + Telehealth + Web	819	DPA	Computer-supported intervention to promote adoption and maintenance of improved eating and physical activity; printed manual to take home and stage-matched telephone calls and mail contact; parent intervention to encourage behaviour change attempts through praise, active support, and positive role-modelling.	AC – Adaptation of the SunSmart sun protection behaviour program
Peralta 2009, Australia	RCT	School	33	DPA	Two 20-minute lunchtime physical activity sessions in addition to the curriculum sessions.	NAI – No intervention
Pfeiffer 2019, USA	CRCT (School; n= 24)	School	1519	PA	Intervention designed to encourage insufficiently active middle school girls to increase time spent in moderate to vigorous physical activity.	NAI – No intervention
Prins 2012, The Netherlands	CRCT (Classroom; n= 54)	School + Home + Web	1213	PA	Lessons on moderate to vigorous physical activity and how much activity adolescents should engage; motivation to make a change in one of the physical activity sub-behaviours.	DPA – Non-tailored website containing general information on physical activity and healthy eating.

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Razani 2018, USA	RCT	Primary Care Clinic	78	PA	Counselling by a paediatrician about nature, map of local parks, journal, and pedometer, organised group nature outings.	PA – Counselling by a paediatrician about nature, map of local parks, journal, and pedometer.
Reesor 2019, USA	RCT	School	191	DPA	Instructors lead physical activity, and weight management education with healthy nutritionally dense snack.	DPA/PA – Book encouraging increased physical activity and improved diet, a standard physical education class led by a physical education, or a standard physical education class led by an instructor trained in weight management techniques.
Rodearmel 2006, USA	RCT	Home	71	DPA	Families were asked to increase walking, to consume 2 servings cereal/d, and were provided with fun, creative, family-oriented, educational logs to record steps per day and cereal servings consumed per day.	NAI – No intervention
Sabino 2021, Portugal	CRCT (NR; n= NR)	School	1458	DPA	Designed to develop changes in school physical activity habits by training teachers, delivering physical activity and health education, and creating more school physical activity opportunities at physical education and recess.	NR – NR
Schreier 2013, Canada	RCT	School (ASP)	106	DPA	Volunteering at an after-school programs that included homework club, sports programs, science, cooking, cards and games, and arts and crafts.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Shin 2015, USA	RCT	Community	242	D	Nutrition promotion and education using posters and flyers in stores and interactive sessions such as taste test and cooking demonstrations.	NAI – No intervention
Shomaker 2019, USA	RCT	Home	54	D	Mindfulness-based stress reduction with experiential activities and guided discussions to teach standard mindfulness skills.	D – Six educational session including a nutrition/body image session that provided basic information on healthy eating and unhealthy eating.
Simons 2015, The Netherlands	RCT	Home	270	PA	PlayStation Move upgrade package to play the active video games on a PlayStation 3 console in their homes.	NAI – No intervention
Singh 2009, The Netherlands	CRCT (School; n= 18)	School	1108	DPA	Multicomponent intervention – individual component (educational program covering biology and physical education), environmental component encouraging schools to offer additional physical education classes and advice for schools on changes in and around school cafeterias.	NAI – No intervention
Slawson 2015, USA	CRCT (School; n= 10)	School	1509	DPA	Sessions focused on improving nutrition awareness, physical activity, leadership and communication.	NAI – No intervention
Smith 2014, Australia	CRCT (Schoo; n= 14)	School	361	DPA	Multicomponent intervention to prevent unhealthy weight gain by increasing physical activity, reducing screen-time, and	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
					lowering sugar sweetened beverages consumption.	
Takacs 2020, Hungary	CRCT (Classroom; n= 8)	School (ASP) + Web	229	D	Multicomponent intervention – weekly classroom-based education, after-school cooking classes (open to the entire family) and online education materials distributed via e-mails and social media.	NAI – No intervention
TenHoor 2018, The Netherlands	CRCT (School; n= 9)	School	695	PA	Strength exercise intervention and a motivational intervention to promote after school physical activity.	NAI – No intervention
Velez 2010, USA	RCT	School	31	PA	Structured resistance training program.	NAI – No intervention
Viggiano 2015, Italy	CRCT (School; n= 20)	School	3110	D	A game session that represents a journey through daily meals of the Mediterranean diet.	NAI – No intervention
Weeks 2012, Australia	RCT	School	99	PA	Supervised jumping activity at the start of each physical education class.	NAI – No intervention
Whittemore 2013, USA	CRCT (Classroom; n= 35)	School + Home	384	DPA	Educational lessons on healthy eating and coping skills training, behavioural support for self-monitoring and goal setting.	DPA – Educational lessons on healthy eating and physical activity, behavioural support for self-monitoring and goal setting.
Wieland 2018, USA	CRCT (Family (parents + ≥ 1 child); n= 44)	Home + Telehealth	81	DPA	Modules on healthful eating and physical activity delivered to participating family by health promoters.	NAI – No intervention
Wilksch 2015, Australia	CRCT (Classroom; n= 54)	School	1441	DPA	Lessons on physical activity, sleep, thinking styles, managing emotions and social support.	NAI – No intervention

Study ID, Country	Design (unit of randomization; n of clusters)	Setting of intervention	N children randomised	Intervention type	Intervention sort description	Comparator type and short description
Zhou 2019, China	CRCT (School; n= 12)	School	758	DPA/PA	Modification of school policy – enhanced physical education curriculum and a mandatory after-school physical activity program.	NAI – No intervention
Zota 2016, Greece	CRCT (School; n= 146)	School + Home	21261	D	Multicomponent intervention – free boxed fresh meal every school day and a healthy nutrition educational program (educational material and activities for each target group).	D - Daily free healthy meals

Table abbreviations: D, Diet; PA, Physical activity; DPA, Diet+ Physical activity

See appendix D for full evidence tables.

1.1.6 Summary of the effectiveness evidence

1.1.6.1 Children aged 2 to 4 years

1.1.6.1.1 zBMI

Table 5: Dietary interventions vs control (childcare settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 9 to <15 months (medium term)				
1[a]	318	MD -0.17 (-0.45, 0.11)	Low/Moderate	Could not differentiate between interventions

[a] Yoong 2020

Table 6: Physical activity interventions vs control (childcare settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
3[a]	652	MD -0.05 (-0.18, 0.08)	Moderate	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
2[b]	606	MD -0.03 (-0.21, 0.15)	Moderate	Could not differentiate between interventions
zBMI – longest timepoint in study				
4[c]	758	MD -0.08 (-0.20, 0.05)	Moderate	Could not differentiate between interventions

[a] Dennison 2004, Goldfield 2016, Reilly 2006
[b] Barber 2016, Reilly 2006

[c] Barber 2016, Dennison 2004, Goldfield 2016, Reilly 2006

Table 6: Dietary and physical activity interventions vs control (childcare settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
7[a]	4182	MD -0.02 (-0.05 to 0.02)	Moderate	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
6[b]	3148	MD -0.12 (-0.20 to -0.05)	Moderate	Favours DPA
zBMI – follow-up >15 months (long term)				
6[c]	3294	MD -0.11 (-0.21 to -0.01)	Low	Favours DPA
zBMI – longest timepoint in study				
11[d]	4858	MD -0.10 (-0.17 to -0.04)	Low/Moderate	Favours DPA

[a] Alkon 2014, Davis 2016, Fitzgibbon 2005, Fitzgibbon 2006, Fitzgibbon 2011/Kong 2016, Malden 2019, Vaughn 2021
[b] Davis 2016, Fitzgibbon 2005, Fitzgibbon 2006, Iaia 2017, Slusser 2012, Zask 2012
[c] Davis 2016, Fitzgibbon 2005, Fitzgibbon 2006, Fitzgibbon 2011/Kong 2016, Iaia 2017, Hodgkinson 2019
[d] Alkon 2014, Davis 2016, Fitzgibbon 2005, Fitzgibbon 2006, Fitzgibbon 2011/Kong 2016, Iaia 2017, Malden 2019, Slusser 2012, Vaughn 2021, Zask 2012, Hodgkinson 2019)

1.6.1.1.2 Serious adverse events

No serious adverse events were reported in the 16 studies included in the meta-analysis.

See appendix E for forest plots and appendix F for full GRADE tables.

1.1.6.2 Children aged 5 to 11 years

1.1.6.2.1 zBMI

Table 8: Dietary interventions vs control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
8[a]	3,695	MD -0.06 (-0.13 to 0.01)	Moderate	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
9[b]	7,048	MD -0.04 (-0.1 to 0.02)	Moderate	Could not differentiate between interventions
zBMI – follow-up >15 months (long term)				
7[c]	5,285	MD -0.05 (-0.1 to 0.01)	Low	Could not differentiate between interventions

[a] Chai 2019, Damsgaard 2014, de Ruyter 2012, Fulkerson 2010, Hendrie 2011, Nicholl 2021, Paineau 2008, Viggiano 2018
[b] Barnes 2021, Coleman 2012, Davis 2021, de Ruyter 2012, Fulkerson 2010, James 2004, Lent 2014, Meng 2013, Stettler 2015
[c] Coleman 2012, de Ruyter 2012, Fulkerson 2015, Han 2006, James 2004, Lent 2014, Viggiano 2018

Table 9: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
6[a]	3,580	MD -0.02 (-0.07 to 0.02)	Low	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
13[b]	20,600	MD -0.05 (-0.09 to -0.02)	Moderate	Favours physical activity interventions

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – follow-up >15 months (long term)				
6[c]	6,940	MD -0.02 (-0.09 to 0.04)	Low	Could not differentiate between interventions

[a] Barnes 2015, Breheny 2020, Diaz-Castro 2021, Lazaar 2007, Martinez-Vizcaino 2020, Newton 2014
[b] Barnes 2021, Brehent 2020, Farmer 2017, Khan 2014, Li 2010, Martinez-Vizcaino 2022, Meng 2013, Morgan 2019, Muller 2016, Muller 2019, Tanskey 2017, Wang 2018, Yin 2012
[c] Farmer 2017, Kovalskys 2016, Li 2010, Salmon 2022, Simon 2008, Yin 2012

Table 10: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
26[a]	12,784	MD -0.03 (-0.06 to 0)	Low	Favours diet and physical activity interventions
zBMI – 9 to <15 months follow-up (medium term)				
24[b]	20,998	MD -0.05 (-0.07 to -0.02)	Moderate	Favours diet and physical activity interventions
zBMI – follow-up >15 months (long term)				
22[c]	23,594	MD -0.02 (-0.06 to 0.01)	Low	Could not differentiate between interventions

[a] Baranowski 2011, Bohnert 2013, Brown 2013, Choo 2020, Fairclough 2013, Griffin 2019, Haire-Joshu 2010, Hull 2018, Kipping 2014, Kocken 2016, Levy 2012, Liu 2019, Liu 2022, Morgan 2011, Morgan 2014, NCT02067728 2014, Nyberg 2015, Nyberg 2016, O'Connor 2020, Pena 2021, Ramirez-Rivera 2021, Rerksuppaphol 2017, Rosario 2012, Rosenkranz 2010, Spiegel 2006, White 2019
[b] Barnes 2021, Cao 2015, Crespo 2012, Elder 2014, Fulkerson 2022, Kain 2014, Keller 2009, Kubik 2021, Li 2019, Lichenstein 2011, Liu 2019, Liu 2022, Nyberg 2015, Nyberg 2016, Sahota 2001, Santos 2014, Sekhavat 2014, Sherwood 2019, Siegrist 2013, Stettler 2015, Wang 2012, White 2019, Xu 2015, Xu 2017
[c] Adab 2018, Cao 2015, Crespo 2012, Elder 2014, Foster 2008, Grydeland 2014, Habib-Mourad 2020, HEALTHY Study Group 2010, Hull 2018, Kipping 2014, Kocken 2016, Kubik 2021, Lichtenstein 2011, Lloyd 2018, Marcus 2009, Rush 2012, Sahota 2019, Sherwood 2019, Story 2012, Topham 2021, White 2019, Williamson 2012

1.1.6.2.2 BMI

Table 11: Dietary interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
5[a]	2,107	MD 0.0 (-0.1 to 0.1)	Very low	Could not differentiate between interventions
BMI – 9 to <15 months follow-up (medium term)				
9[b]	6,815	MD -0.01 (-0.15 to 0.12)	Low	Could not differentiate between interventions
BMI – follow-up >15 months				
2[c]	945	MD -0.17 (-0.48 to 0.13)	Low	Could not differentiate between interventions

[a] Chai 2019, Hendrie 2011, Nicholl 2021, Paineau 2008, Sichieri 2008
[b] Barnes 2021, Cunha 2013, Davis 2021, James 2004, Keshani 2016, Lent 2014, Meng 2013, NCT00224887 2005, Stettler 2015
[c] James 2004, Lent 2014

Table 12: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
14[a]	4,069	MD -0.02 (-0.17 to 0.13)	Low	Could not differentiate between interventions
BMI – 9 to <15 months follow-up (medium term)				
16[b]	21,286	MD -0.11 (-0.18 to -0.05)	Moderate	Favours physical activity interventions
BMI – follow-up >15 months (long term)				

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
8[c]	8,302	MD -0.07 (-0.24 to 0.1)	Low	Could not differentiate between interventions

[a] Clemes 2020, De Bock 2013, de Greeff 2016, Diaz-Castro 2021, Drummy 2016, Ford 2013, Ha 2021, Ketelhut 2022, Lau 2016, Lazaar 2007, Martinez-Vizcaino 2020, Newton 2014, Rhodes 2019, Thivel 2011
[b] Barbeau 2007, Barnes 2021, De Bock 2013, Farmer 2017, Ha 2021, Howe 2011, Khan 2014, Kriemler 2010, Li 2010, Martinez-Vizcaino 2014, Martinez-Vizcaino 2022, Meng 2013, Simon 2008, Tanskey 2017, Vizcaino 2008, Wang 2018
[c] Donnelly 2009, Farmer 2017, Kriemler 2010, Li 2020, Sacchetti 2013, Simon 2008, Telford 2012, Wendel 2016

Table 13: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
27[a]	16,066	MD -0.11 (-0.21 to -0.1)	Low	Favours diet and physical activity interventions
BMI – 9 to <15 months follow-up (medium term)				
21[b]	17,547	MD -0.11 (-0.21 to 0)	Moderate	Favours diet and physical activity interventions
BMI – follow-up >15 months (long term)				
16[c]	22,098	MD -0.03 (-0.11 to 0.16)	Low	Could not differentiate between interventions

[a] Annesi 2016, Annesi 2017, Baranowski 2003, Beech 2003, Brown 2013, Chen 2010, De Heer 2011, Duncan 2019, Fairclough 2013, Gentile 2009, Habib-Mourad 2014, Hopper 2005, Hull 2018, Jansen 2011, Kipping 2008, Liu 2019, Liu 2022, Morgan 2014, Nollen 2014, Pena 2021, Rerksuppaphol 2017, Rosario 2012, Rosenkranz 2010, Safdie 2013, Sgambato 2019, Stolley 1997, Story 2003
[b] Annesi 2016, Annesi 2017, Barnes 2021, Elder 2014, Gentile 2009, Kain 2014, Klesges 2010, Kobel 2017, Kubik 2021, Liu 2019, Liu 2022, Nemet 2011a, Nemet 2011b, Puder 2011, Safdie 2013, Sekhavat 2014, Siegrist 2013, Stettler 2015, Stolley 1997, Xu 2015, Xu 2017
[c] Brandstetter 2012, Caballero 2003, Elder 2014, Foster 2008, Greve 2015, Grydeland 2014, Hull 2018, Klesges 2010, Kubik 2021, Llargues 2012, Lloyd 2018, Magnusson 2012, Nemet 2011b, Safdie 2013, Siegrist 2018, Story 2012

1.1.6.2.3 Adverse events

Table 14: Dietary interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				
5[a]	1,913	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-completer participants as a reason to stop drinking the beverages and by 7 children who completed the study.	Low	N/A

[a] de Ruyter 2012, Fulkerson 2015, Ickovics 2019, NCT00224887 2005, Nicholl 2021

Table 15: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				
11[a]	21,278	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).	Moderate	N/A

[a] 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

Table 16: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
19[a]	27,882	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 Centre to be related to study participation, but the Centre 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.	Moderate	N/A

[a] 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

See appendix E for forest plots and appendix F for full GRADE tables.

1.1.6.3 Children aged 12 to 18 years

1.1.6.3.1 zBMI

Table 17: Dietary interventions vs control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
5[a]	3,154	MD -0.06 (-0.12 to 0.01)	Low	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
1[b]	112	MD 0.02 (-0.17 to 0.21)	Very low	Could not differentiate between interventions
zBMI – follow-up >15 months (long term)				
2[c]	1,089	MD -0.14 (-0.38 to 0.1)	Very low	Could not differentiate between interventions

[a] Amaro 2006, Ooi 2021, Papadaki 2010, Shomaker 2019, Viggiano 2015
[b] Kuroko 2020
[c] Shomaker 2019, Viggiano 2015

Table 18: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
7[a]	4,718	MD 0.02 (-0.01 to 0.05)	High	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
6[b]	5,335	MD 0.00 (-0.04 to 0.05)	Moderate	Could not differentiate between interventions
zBMI – follow-up >15 months (long term)				
1[c]	985	MD -0.05 (-0.12 to 0.02)	Moderate	Could not differentiate between interventions

[a] Arlinghaus 2021, Harrington 2018, Kennedy 2018, Lubans 2021, Pfeiffer 2019, Prins 2012, Simons 2015
[b] Harrington 2018, Hollis 2016, Kennedy 2018, Lubans 2021, Pate 2005, Simons 2015
[c] Hollis 2016

Table 19: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
zBMI – 12 weeks to <9 months follow-up (short term)				
3[a]	515	MD -0.09 (-0.2 to 0.02)	Very low	Could not differentiate between interventions
zBMI – 9 to <15 months follow-up (medium term)				
6[b]	3,511	MD -0.05 (-0.1 to 0.01)	Low	Could not differentiate between interventions
zBMI – follow-up >15 months (long term)				
7[c]	8,430	MD -0.02 (-0.05 to 0.01)	Low	Could not differentiate between interventions

[a] Leme 2018, NCT02067728 2014, Reesor 2019
[b] Black 2010, Dewar 2013, French 2011, Haerens 2006, Leme 2018, Reesor 2019
[c] Andrade 2014, Black 2010, Bonsergent 2013, Dewar 2013, Haerens 2006, Hovell 2018, Kuhlemeier 2022

1.1.6.3.2 BMI

Table 20: Dietary interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
3[a]	605	MD -0.18 (-0.41 to 0.06)	Very low	Could not differentiate between interventions
BMI – 9 to <15 months follow-up (medium term)				
3[b]	900	MD -0.65 (-1.18 to -0.11)	Very low	Favours dietary interventions
BMI – follow-up >15 months				

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
1[c]	44	MD -0.3 (-1.67 to 1.07)	Low	Could not differentiate between interventions

[a] Ebbeling 2006, Papadaki 2010, Shomaker 2019
[b] Luszczynska 2016b, Mihas 2010, Takacs 2020
[c] Shomaker 2019

Table 21: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
6[a]	1,780	MD -0.64 (-1.86 to 0.58)	Moderate	Could not differentiate between interventions
BMI – 9 to <15 months follow-up (medium term)				
3[b]	2,143	MD -0.32 (-0.58 to -0.11)	Low	Favours physical activity interventions
BMI – follow-up >15 months (long term)				
1[c]	985	MD -0.28 (-0.51 to -0.05)	Very low	Favours physical activity interventions

[a] El Ansari 2010, Kennedy 2018, Melnyk 2013, Smith 2014, Velez 2010, Weeks 2012
[b] Hollis 2016, Kennedy 2018, Melnyk 2013
[c] Hollis 2016

Table 22: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 12 weeks to <9 months follow-up (short term)				
11[a]	3,429	MD 0.03 (-0.07 to 0.13)	High	Could not differentiate between interventions

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
BMI – 9 to <15 months follow-up (medium term)				
8[b]	5,612	MD 0.01 (-0.09 to 0.11)	Moderate	Could not differentiate between interventions
BMI – follow-up >15 months (long term)				
6[c]	8,736	MD 0.06 (-0.04 to 0.16)	Moderate	Could not differentiate between interventions

[a] Bayne-Smith 2004, Chen 2011, Dunker 2018, Leme 2018, Neumark-Sztainer 2003, Neumark-Sztainer 2010, Peralta 2009, Schreier 2013, Singh 2009, Wieland 2018, Wilksch 2015
[b] Brito Beck da Silva 2019, Dewar 2013, Haerens 2006, Leme 2018, Neumark-Sztainer 2010, Singh 2009, Wieland 2018, Wilksch 2015
[c] Andrade 2014, Bonsergent 2013, Dewar 2013, Ezendam 2012, Haerens 2006, Singh 2009

1.1.6.3.3 Adverse events

Table 23: Dietary interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				
2[a]	377	No evidence of effect of intervention on reported serious adverse events. One study reported that no harm or unintended effects were observed in either group that could be directly attributed to the intervention. One study reported that no injuries or adverse effects were observed during the activity sessions or assessments. One study reported that one enrolled patient (in control group) death occurred during the study period; however, the authors stated that the death was in no way related to participation in this research study. The patient's death occurred following data collection at the first month time point, but prior to data collection at the sixth months time point.	Low	N/A

[a] Ebbeling 2006, Lappe 2017

Table 24: Physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
7[a]	5,428	In one study 20% of the participants in the intervention group reported an injury (e.g., bruises or strained muscles/tendons) as result of the intervention; one study reported that some participants did not complete the study due to injuries or illness (no further details). Five studies reported no effect of intervention on reported serious adverse events.	Low	N/A

[a] Belton 2019, Harrington 2018, Hollis 2016, Kennedy 2018, Lubans 2021, Simons 2015, Smith 2014

Table 25: Diet and physical activity interventions versus control (all settings)

No. of studies	No. of participants	Effect (95% CI)	Quality	Interpretation
Serious adverse events				
4[a]	2,394	In one study 8.7% of the participants reported clinical levels of concern about shape and weight. Three studies reported no effect of intervention on reported serious adverse events.	Very low	N/A

[a] Dunker 2018, Leme 2018, NCT02067728 2014, Wilksch 2015

See appendix E for forest plots and appendix F for full GRADE tables.

1.1.7 Economic evidence

A single search was performed to identify published economic evaluations of relevance to this review question in this guideline update (see Appendix B). The search retrieved 2,631 results for title and abstract screening. After removing 2,616 studies, 15 studies were scanned for full text; 12 of these studies were excluded based on full text.

1.1.7.1 Included studies

Table 9 provides summary details of the included studies. See Appendix I for a full evidence table and assessment of applicability and limitations.

1.1.7.2 Excluded studies

Thirteen economic studies were excluded at full-text screening. See Appendix K for excluded studies and reasons for exclusion.

1.1.8 Summary of included economic evidence

Table 9: Summary of economic evidence

Applicability & limitations	Other comments	Intervention	Absolute		Incremental			Uncertainty
			Cost (£)	QALYs	Cost (£)	QALYs	ICER	
Canaway et al. (2019):								
Partially applicable (Appendix I; table 3); **Potential serious limitations** (Appendix I; table 4)	**Approach to analysis:** A within-trial cost-utility analysis based on a cluster randomised controlled trial of the WAVES intervention. **Perspective:** UK Public Sector (school's perspective) **Time horizon:** This analysis considers costs and effects from baseline to 18 months after the end of the intervention (30 months from baseline).	**Control:** Usual activities	£0	Not Reported (only incremental results reported)	-	-	-	**Deterministic – 3 types:** Three sensitivity analyses were undertaken.
		Multi-faceted school-based obesity prevention intervention, with four components: a school based physical activity component, a dietary activity component, a 6-week programme delivered by a sporting institution to encourage healthy eating and physical activity; and family signposting to activities outside of school.	£155.53 (95% CI: £139.97, £171.09) per child	Not Reported (only incremental results reported)	£155.53 (95% CI: £139.97, £171.09) per child	0.006 (95% CI: -0.024, 0.036), per child	£26,815 per QALY There was a 52% chance the intervention was cost-effective using a WTP threshold of £30,000.	The first sensitivity analysis used an alternative approach to impute and analyse data (seemingly unrelated regressions – a regression model consisting of several regression equations with their own dependent variables). This had little impact on costs (£153) but the incremental QALYs decreased to 0.0033 and increased the ICER to £46,363 per QALY.

	Costs: This analysis only considers delivery costs. **Effectiveness:** Effects were measured in QALYs using the CHU-9D quality of life questionnaire. **Price year and discount rate:** All prices were adjusted to 2014 and costs/QALYs that accrued after the first year of the trial were discounted at 3.5% per year.							The second sensitivity analysis included the cost of setting up the intervention (whereas only the costs of developing the intervention was used in the base case). This increased mean cost per child to £199 and ICER to £34,000 per QALY. The third sensitivity analysis adjusted costs upwards to first match the average class size (ICER £28,265) and then for only the consented children (ICER £46,083). **Probabilistic:** The net benefit framework was used to construct a cost-effectiveness acceptability curve. The probability of cost-effectiveness was 53% at the threshold of £30,000. At higher thresholds, up to £100,000 per QALY, the probability of cost-

								effectiveness did not exceed 62%.
Breheny et al. (2020)								
Partially applicable (Appendix I; table 3); **Potential serious limitations** (Appendix I; table 4)	**Approach to analysis:** A within-trial cost-utility analysis based on a cluster randomised controlled trial of the Daily Mile intervention. **Perspective:** UK public sector **Time horizon:** This analysis considers costs and effects from baseline to 12 months. **Costs:** The costs of the intervention were assumed to be only the value of the teacher's time from supervision, any other costs were judged to be negligible. The control schools were	**Whole sample**						**Probabilistic:** For the whole sample 1,000 jointly bootstrapped cost-QALY pairs were distributed across four quadrants and most of the pairs are in the north-east quadrant indicating that the intervention produces QALY gains at an additional cost, however 14% of the cost-effectiveness plots fell in the north-east quadrant indicating a QALY loss. For boys, the majority (84%) of bootstrapped cost-QALY pairs are in the north-west quadrant, this means that the Daily Mile intervention is both cost-incurring and leads to a loss in QALYs, when compared to usual activities. For girls, the majority of cost-effect pairs are in the north-east quadrant which
		Intervention: The 'Daily Mile' is a school-based intervention that involves children doing an additional 15 min of physical activity every school day, over and above national curriculum physical education (PE) and timetabled break times.	£45.44	0.836 (0.134)	£48.33 (£48.21: 4£8.45)	0.006 (-0.005: 0.018)	£7,455.21	
		Control: The control arm received no active intervention. Schools continued with usual health and wellbeing activities and were requested not to implement new health or physical activity initiatives for the duration of the study.	0	0.839 (0.13)				
		Girls						
		Intervention	45.34 (5.79)	0.840 (0.13)	47.85 (47.71: 48.01)	0.192 (0.002: 0.036)	2,492.38 (1,244.31:3,785.94)	
		Control	0	0.826 (0.13)				
		Boys						

	assumed to have zero cost and therefore the focus was on the cost from implementing The Daily Mile, in addition to 'usual activities'. Annual intervention cost per child was estimated based on the average pupil/teacher ratio of 27:1. **Effectiveness:** QALYs were estimated from the CHU-9D data, using the UK tariff set. The between arm difference in costs and QALYs at 12 months was calculated to produce an ICER. **Price year and discount rate:** All costs are reported in 2017 GBP prices. The intervention duration was 12 months therefore discounting was not conducted.	Intervention	45.453 (5.56)	0.833 (0.14)	47.08 (46.92: 47.23)	-0.007 (-0.021: 0.008)	-6,932.97	means the Daily Mile leads to a gain in QALYs and is cost-incurring. The CEAC reflects the decision uncertainty surrounding the choice of implementing the Daily Mile over usual activities and shows a 76% chance of cost-effectiveness for the whole sample, and a 97% and 12% chance of cost-effectiveness for girls and boys at a WTP of £20,000 per QALY
		Control	0	0.850 (0.12)				

CI: confidence interval; ICER: incremental cost-effectiveness ratio; QALY: quality adjusted life year

1.1.9 Economic model

No economic modelling was conducted for this review question.

1.1.10 Unit costs

Not applicable.

1.1.12 The committee's discussion and interpretation of the evidence

1.1.12.1. The outcomes that matter most

During the development of this review, it was identified that the existing Cochrane review (Brown 2019) on interventions for preventing obesity in children was being updated. The new protocols were discussed with the committee, and based on this discussion, change in BMI z-score was identified as an important outcome. It was also noted that school and pre-school settings were important for this review due to the recommendations specifically focusing on these settings. Therefore, evidence was prepared which focused on change in BMI z-score and BMI (where available) in school and pre-school settings. Adverse events were also considered an important outcome.

1.1.12.2 The quality of the evidence

The protocols of the Cochrane reviews were reviewed and were identified to be applicable to the NICE review. While these reviews covered some settings that were outside the scope of the recommendations and included data from non- Organisation for Economic Co-Operation and Development (OECD) countries, these factors were explored through the characteristics of studies included in the reviews, and meta-analyses prepared by University of Durham and University of Bristol focused on the key settings of interest. It should also be noted that these reviews were not conducted using NICE methodology. While this was not seen as impacting the quality of the evidence prepared, differences in methodologies were noted. For further information on the differences in methodology, see section 1.1.3 Methods and process, the methods chapter, and appendix M for details of the approach to GRADE. The differences in the approach used to GRADE the quality of the evidence between this review and the other reviews for the guideline did not have an impact on the previous recommendations.

Children aged 2 to 4 years

In the Cochrane review covering children aged 2 to 4 years, 71 studies were identified which covered both BMI and zBMI data. Among the 71 studies included, 44% (31/71) were individual RCTs and 56% (40/71) were cluster RCTs. Additionally, 49% of the studies (35/71) were conducted in the USA. Only 5 studies were identified which were conducted in the UK. Amongst the studies included, 39% (28/71) targeted disadvantaged (low income) participants and/or those living in disadvantaged communities.

Out of the 71 included studies, 40 studies were conducted in pre-school settings, 22 were conducted at home, 5 were conducted in primary care and 4 were conducted in community settings. Out of the 40 studies focusing on pre-school settings, 22 reported data on zBMI, 9 reported data on BMI only, 7 reported data on BMI percentile and 2 reported data as weight for height or by weight category. Only studies that focused on zBMI were presented to the committee. Out of the 22 studies, 16 studies presented data in a format that allowed meta-analysis to be conducted. The number of participants within the studies ranged from 42 participants to 1816 participants.

Children aged 5 to 11 years

In the Cochrane review covering children aged 5 to 11 years, 172 studies were identified which covered both BMI and zBMI data. Forty-six studies were individual RCTs and 126 were cluster RCTs.

Majority of the studies presented in the review were conducted in the USA. 16 studies were also identified that were conducted in the UK. Amongst the studies included, 36% (58/163) targeted disadvantaged (low income) participants and/or those living in disadvantaged communities.

Out of the 172 included studies, 112 studies were conducted in school settings, 12 were conducted at home and 33 were conducted in other settings such as community settings. The authors prepared evidence for BMI and zBMI and presented the evidence that included all settings, with separate analyses on school settings.

Children aged 12 to 18 years

In the Cochrane review covering children and young people aged 12 to 18 years, 74 studies were identified which covered both BMI and zBMI data. Twenty-five of the included studies were individual RCTs and 48 were cluster RCTs. Thirty-three studies were conducted in the USA. Two studies were conducted in the UK.

Overall quality of the evidence

Overall, the evidence largely ranged from low to moderate quality. Evidence was mainly downgraded for inconsistency, imprecision and due to risk of bias. While the majority of the evidence for each age group was conducted in the USA, it was noted that it was important to assess how other health systems are managing the prevention of obesity in children and young people. The committee noted that in the UK, childhood obesity is on the rise, and therefore, it was important to assess the effectiveness of different interventions in preventing childhood obesity. Additionally, for the 5-11 and 12-18 age groups, evidence was presented for all settings with separate subgroup analysis by school settings. The committee viewed data for all settings as indirectly applicable, however noted that it was useful to examine the effectiveness of obesity prevention interventions across different settings, so they did not downgrade for this.

1.1.12.3 Benefits and harms

In children aged 2-4 years, 16 studies were identified which were conducted in childcare settings and explored change in BMI z-score. This evidence showed that interventions that included diet and physical activity components resulted in a reduction in BMI z-score at medium (9 months from baseline to <15 months) and long term (15 months or more from baseline) follow up. The evidence also demonstrated that interventions that included a dietary component or physical activity component alone did not demonstrate a reduction in BMI z-score when compared to control.

246 studies were identified which explored the effectiveness of obesity prevention intervention in school age children (5 to 18 years). The majority of the evidence was conducted in school settings. In children aged 5-11 years, evidence in school settings showed that activity interventions and dietary and physical activity interventions did show a reduction in BMI and BMI z-score in the short- (12 weeks from baseline to < 9 months), medium- and long-term, when compared to control. One study also demonstrated that dietary and physical activity interventions resulted in a reduction in BMI z-score when compared to dietary interventions alone and activity interventions alone.

In children aged 12 to 18 years, evidence showed that dietary interventions alone and activity interventions alone resulted in a reduction in BMI in medium and long term when compared

to control. One study also demonstrated that dietary interventions alone resulted in a reduction in BMI z-score in the short and long term, when compared to control.

The committee noted that while there was some evidence of reduction in BMI and BMI z-score in the different age groups, the overall change was very small. The committee acknowledged that the population within some of these trials would include children of 'healthy' weight, where you would not want to see a change in BMI or BMI z-score, however the overall of impact of the intervention was small.

While most of the evidence did not show these interventions to result in a significant change in BMI or BMI z-score, the committee acknowledged the importance of obesity prevention. Obesity prevalence in children remains high. The National Child Measurement Programme (NCMP) report from 2022/23 highlighted that the prevalence of children in England living with obesity in reception (age 4-5 years) has been stable since 2006/07 but it saw a 4.6% increase from 9.9% in 2019/20 to 14.4% in 2020/21. Data showed that there was a decrease to 10.1% in 2021/22 and a further decrease to 9.2% in 2022/23. Furthermore, the prevalence of obesity among reception children in England had been relatively stable, ranging from 9.1% to 9.9% between 2006/07 to 2019/20. In 2020/21 there was a large increase in obesity prevalence (14.4%) during the pandemic. Prevalence then decreased but remained above pre-pandemic levels at 10.1% in 2021/22.

The report also highlighted that in children in year 6 (aged 10-11 years), the prevalence of children in England living with obesity was increasing slowly from 19.0% in 2010/11 to 21.1% in 2019/20. This further increased to 25.5% in 2020/21. Data showed that there was a decrease to 23.4% in 2021/22 and a further decrease to 22.7% in 2022/23, but this was still above the pre-pandemic levels. The prevalence of children in year 6 living with obesity was increasing slowly over time from 18.7% in 2009/10 up to 21.0% in 2019/20. In 2020/21 prevalence increased to 25.5%, and in 2021/22 decreased to 23.4% but remained above pre-pandemic levels.

The prevalence of children living with obesity was over twice as high for children living in the most deprived area than for children living in the least deprived areas. Additionally, the prevalence of children living with obesity was highest in disadvantaged urban communities for children in reception, and highest in disadvantaged urban communities and multicultural city life areas for children in year 6.

With obesity on the increase in children and young people, the committee noted that it was important to focus on obesity prevention in both early years and school settings as these settings can help shape lifelong attitudes and behaviours and can help children and young people develop healthier habits and behaviours.

The 2006 guidance on obesity prevention (CG43) included recommendations on school and early years settings, which could include children's services, childcare and early years settings, children's trusts, children's centres, Healthy Start and Sure Start. The guideline recommended that preventing excess weight gain and improving children's diets and activity levels should be prioritised for all nurseries and childcare facilities. Similarly, the guideline recommended that for all school settings, improving diet and activity levels for children and young people should be a priority and that a whole-school approach should be used to develop life-long healthy eating and physical activity practices. Based on their expertise, the committee highlighted that a whole-school or a whole-systems approach was important for obesity prevention. Based on this understanding, the committee retained the existing recommendation but expanded this to highlight that improving the nutrition and activity levels of children and young people should be a priority for all schools, nurseries and childcare facilities and that a whole-school approach should be used in all of these settings.

Furthermore, the guideline also recommended that all actions aimed at preventing excess weight gain, improving diet, and increasing activity levels in early years settings should involve parents and carers. Similar recommendations were also included for school settings

but were expanded further to detail that parents can be included in school-based interventions though, for example, special events, newsletters, and information about lunch menus and after-school activities. A number of the studies included in the Cochrane reviews included parents and carers. Furthermore, as parents and carers play a significant role in shaping a child's habits and behaviours, the committee noted that it was important that parents and carers are involved in obesity prevention interventions in all settings. Based on this understanding, the committee retained existing recommendations, and expanded these to cover both school and early years settings.

In terms of the components of these interventions, especially physical activity, existing guidance recommended that nurseries and childcare facilities should minimise sedentary activities during play time and provide regular opportunities for enjoyable active play and structured physical activity sessions. While evidence for 2-4 year olds demonstrated that physical activity interventions alone did not show a reduction in BMI z-score, physical activity interventions in conjunction with dietary interventions did show change in BMI z-score. Based on the evidence and their expertise, the committee retained the existing recommendation. However, they noted that existing recommendations did not cover children with special educational needs and disabilities (SEND). While evidence was not identified in this population, the committee noted that activities should be adapted for children with SEND.

For school settings, the guidance recommended that staff delivering physical education, sport and physical activity should promote activities that children and young people find enjoyable and can take part in outside school, through into adulthood. Children's confidence in, and understanding of, why they need to continue physical activity throughout life (physical literacy) should be developed as early as possible.

The evidence demonstrated that interventions that included physical activity did show a reduction in BMI and BMI z-scores in the short, medium and long-term, when compared to control. Based on the evidence and their expertise, the committee retained existing recommendations but amended these further to state that staff delivering physical education, sport and other physical activity in schools should promote a range of activities that children and young people enjoy and can take part in outside of school and into adulthood. Additionally, while evidence was not identified in children and young people with SEND, the committee did note that it was important for activities to be adapted for children and young people with SEND.

In terms of dietary components of healthy living/ obesity prevention interventions, previous NICE guidance recommended that in early years and school settings, staff should ensure that children eat regular, healthy meals in a pleasant, sociable environment free from other distractions (such as television). Children should be supervised at mealtimes and if possible, staff should eat with children. The committee agreed with the recommendation and therefore retained this recommendation but amended it further to state that children and young people should also eat regular, healthy meals (including packed lunches) or snacks in an inclusive environment. The committee also agreed that school settings should implement the Department for Education's school food standards practical guide.

1.1.12.4 Cost effectiveness and resource use

No economic modelling was conducted for this research question due to the lack of clinical effectiveness of obesity prevention programmes among children and young people.

Two UK-based studies were identified in the economic review. The results from these studies appeared to be quite mixed. Canaway et al looked at the WAVES intervention in children aged 5 to 11, reporting neither clinical nor cost-effectiveness. Beheny et al looked at the Daily mile intervention in children aged 5 to 11, with the intervention shown to be cost-effective in the whole population, but not cost-effective in the subgroup of boys. The study had serious limitations, largely stemming from a high percentage (47%) of missing data.

Given the limited evidence on the effectiveness and cost-effectiveness of obesity prevention interventions for children and young people, no major change was made to the existing recommendations. In addition, the majority of the recommendations were related to children and young people's behavioural issues and were made based on committee consensus. Therefore, the recommendations are in line with the current practice and are unlikely to lead to a significant cost impact.

There is some evidence on the improvement in quality of life, although limited evidence was found on the prevention of obesity cases. It suggests that there's a wider range of outcomes related to these interventions, such as mental health outcomes, eating disorders and concentration.

1.1.12.5 Other factors the committee took into account

Current practice and supporting guidance

The committee noted that in practice, commercial interventions are available that can be utilised by local authorities and implemented within schools and early years settings. However, some interventions can be costly with limited effectiveness. The committee noted that some local authorities have utilised principles of obesity prevention outlined in guidance, such as NICE guidelines, to develop and implement their own interventions. These interventions may not necessarily focus just on obesity prevention, but principles of obesity prevention may be applied to aid children, young people and their families and carers into developing healthier habits and behaviours. The committee therefore suggested that nurseries and other childcare facilities should implement the Department for Educations' Early years foundation stage statutory framework, the Department for Education's school foods standards practical guide, and follow other guidance on healthier food provision., They also agreed that staff delivering physical education, sport and other physical activity in schools should follow the UK Chief Medical Officer's physical activity guidelines.

Additionally, the interventions identified in evidence varied in terms of how they were developed, their components and how they were delivered. Therefore, recommendations promoting the use of one approach to obesity prevention could not be drafted. Furthermore, the original question drafted focused on the concept of healthy living programmes. The committee noted that with a shift in how obesity prevention programmes are being used in practice, the terms healthy living interventions or obesity prevention interventions would be more appropriate. Based on this discussion, the term obesity prevention interventions or healthy living interventions are utilised in this review.

Factors to be considered when planning interventions

The 2006 guidance recommended that staff planning interventions within schools should consider the views of children and young people, any differences in preferences between boys and girls, and potential barriers to these interventions. While committee agreed with the sentiments outlined in this recommendation, they noted that there are several factors that need to be considered when planning school interventions.

The secondary objectives of the Cochrane reviews were to collect information to explore if, how and why the effectiveness of interventions on BMI or BMI z-score varied on factors related to health inequity. This included factors such as place of residence, race/ethnicity/ culture/language, occupation, gender/sex, religion, education, socioeconomic status and social capital.

The Cochrane reviews included a number of studies with children and young people from different family backgrounds, however subgroup analyses could not be conducted due to the availability of the evidence. Within their reviews, the authors urged researchers to collect baseline information on factors related to health inequity and highlighted the importance of analysing the effect of these interventions by these factors.

While the committee did not have direct evidence on the effectiveness of these interventions by sex, culture or beliefs they noted that these were important factors to be considered. Based on this belief, the committee recommended that staff planning school-based interventions should take into account the views of children and young people and any difference in preferences because of sex, culture or belief. They also noted that sensory needs of children can also vary and therefore is an important factor that needs to be considered when planning interventions. The committee also stated that in early-years settings, catering should also be adapted to accommodate to different cultural preferences and beliefs while maintaining nutritional standards.

Evidence bases for interventions

Since the previous Cochrane review (Brown 2019), the evidence base on effectiveness of healthy living or obesity prevention interventions has grown considerably. However, while the evidence base has increased, the conclusions that can be drawn out from these studies have not altered and a limited number of studies have demonstrated the effectiveness of these interventions. The committee noted that in practice, local authorities or staff planning interventions may end up using interventions that have not demonstrated clinical and cost-effectiveness. Based on this understanding, the committee noted that it was important for staff to take into account the evidence for different interventions when planning school-based interventions.

Additionally, as a huge body of evidence was identified which explored the effectiveness of these interventions, the committee decided not to draft any further research recommendations. However, they noted as the aim of healthy living interventions is to prevent overweight and obesity, future studies should focus on outcomes such as prevalence of overweight and obesity rather than measures such as change in BMI or BMI z-score. They noted that these measures are useful in evaluating overweight and obesity management interventions which include population of children and people who are already living with overweight or obesity. However, as healthy living interventions can include children and young people of healthy weight, it would be more useful to see any changes in prevalence of overweight and obesity.

Additional areas of concern

While evidence was not sought or identified on the length of time children and young people should be given to finish their meals, the committee noted that there is concern that children and young people are not given adequate to finish their meals. Case studies on length of the school weeks developed by the Department for Education highlighted that different approaches are being used across the country. For example, some schools include shorter lunchtimes (for example a 30 minute lunch break) to help improve pupils' levels of concentration, behaviours and attitudes during afternoon lessons. Other schools have opted to make break times a key part of the school day and provide a 20 minute morning break which is timetabled as talking or snack time and a one-hour lunch period which includes 30 minutes of eating time and 30 minutes given to structured play time. The committee were concerned that due to shorter lunchtimes, young people may opt for unhealthier food options, such as fast food, that can be consumed quickly, or may eat their meals quickly without sufficient time to register feelings of fullness which may contribute to overeating.. Based on this concern, the committee recommended that early years and school settings should ensure that children and young people are given adequate time to finish their meals.

1.1.13 Recommendations supported by this evidence review

This evidence review supports recommendations 1.6.1 to 1.6.8. The committee did not make any research recommendations for this review.

1.1.14 References – included reviews

1.1.14.1 Effectiveness

Phillips SM, Spiga F, Moore THM, Dawson S, Stockton H, Rizk R, Cheng HY, Hodder RK, Gao Y, Hillier-Brown F, Rai K, Yu CB, O'Brien KM, Summerbell CD. Interventions to prevent obesity in children aged 2 to 4 years old. Cochrane Database of Systematic Reviews 2025. Issue 6. Art. No.: CD015326. DOI: 10.1002/14651858.CD015326.pub2

Spiga F, Davies A, Tomlinson E, Moore THM, Dawson S, Breheny K, Savović J, Gao Y, Phillips SM, Hillier-Brown F, Hodder RK, Wolfenden L, Higgins JPT, Summerbell CD. Interventions to prevent obesity in children aged 5 to 11 years old. Cochrane Database of Systematic Reviews 2024, Issue 5. Art. No.: CD015328. DOI: 10.1002/14651858.CD015328.pub2.

Spiga F, Tomlinson E, Davies A, Moore THM, Dawson S, Breheny K, Savović J, Hodder RK, Wolfenden L, Higgins JPT, Summerbell CD. Interventions to prevent obesity in children aged 12 to 18 years old. Cochrane Database of Systematic Reviews 2024, Issue 5. Art. No.: CD015330. DOI: 10.1002/14651858.CD015330.pub2.

1.1.14.2 Economic

Canaway, A., Frew, E., Lancashire, E., Pallan, M., Hemming, K., Adab, P. and WAVES Trial Investigators, 2019. Economic evaluation of a childhood obesity prevention programme for children: Results from the WAVES cluster randomised controlled trial conducted in schools. PloS one, 14(7), p.e0219500.

Breheny, K., Passmore, S., Adab, P., Martin, J., Hemming, K., Lancashire, E.R. and Frew, E., 2020. Effectiveness and cost-effectiveness of The Daily Mile on childhood weight outcomes and wellbeing: a cluster randomised controlled trial. International Journal of Obesity, 44(4), pp.812-822.

1.1.14.3 Other

None

Appendices

Appendix A – Review protocols

Review protocol for healthy living programmes in children and young people

See Cochrane review protocols for:

- Interventions to prevent obesity in children aged 2 to 4 years old (Moore 2022)
- Interventions to prevent obesity in children aged 5 to 11 years old (Moore 2022)
- Interventions to prevent obesity in children aged 12 to 18 years old (Moore 2022)

Appendix B – Literature search strategies

Clinical searches

Clinical searches were conducted by University of Bristol and University of Durham using the same search strategy. The searches were conducted on 7th October 2022 for the 2-4 years review, and 26th September 2021 for the 5-11 years and 12-18 years reviews. For full search strategies please see the relevant sections of the Cochrane reviews.

Health economics

Background and development

Search design and peer review

A NICE information specialist conducted the literature searches for the evidence review. The searches were run on 19th May 2022. This search report is compliant with the requirements of PRISMA-S.

The MEDLINE strategy below was quality assured (QA) by a trained NICE information specialist. All translated search strategies were peer reviewed to ensure their accuracy. Both procedures were adapted from the 2016 PRESS Checklist.

The principal search strategy was developed in MEDLINE (Ovid interface) and adapted, as appropriate, for use in the other sources listed in the protocol, taking into account their size, search functionality and subject coverage.

Review management

The search results were managed in EPPI-Reviewer v5. Duplicates were removed in EPPI-R5 using a two-step process. First, automated deduplication is performed using a high-value algorithm. Second, manual deduplication is used to assess 'low-probability' matches. All decisions made for the review can be accessed via the deduplication history.

Prior work

The strategy was taken from the Cochrane systematic review: Interventions for preventing obesity in children. Additional terms, supplied by Cochrane, were also included in the strategy so that the NICE searches for economic information matched the searches for clinical information (gathered by Cochrane).

Limits and restrictions

English language limits were applied in adherence to standard NICE practice and the review protocol.

Limits to exclude letters, editorials, news, conferences were applied in adherence to standard NICE practice and the review protocol.

The search was limited from 2015 to 2022 as defined in the review protocol.

The limit to remove animal studies in the searches was the standard NICE practice, which has been adapted from: Dickersin, K., Scherer, R., & Lefebvre, C. (1994). Systematic Reviews: Identifying relevant studies for systematic reviews. *BMJ*, 309(6964), 1286.

Search filters

Cost effectiveness searches

The NICE cost utility (specific) filter was applied to the Medline and Embase searches to identify cost utility studies.

- Cost Utility filter is available via the ISSG search filters resource

The following search filters were applied to the search strategies in MEDLINE and Embase to identify cost-effectiveness studies:

- Glanville J et al. (2009) Development and Testing of Search Filters to Identify Economic Evaluations in MEDLINE and EMBASE. Alberta: Canadian Agency for Drugs and Technologies in Health (CADTH)

Several modifications have been made to these filters over the years that are standard NICE practice.

Key decisions

The search strategy was taken from the Cochrane systematic review: Interventions for preventing obesity in children with additional terms added. The date limit was amended from the Cochrane review to 2015-2022. The search fields were also amended from .af to .ti,ab to reduce the number of irrelevant results.

The term playthings was truncated to playthings* in this strategy.

Cost-effectiveness searches

Main search – Databases

Database	Date searched	Database Platform	Database segment or version	No. of results downloaded
EconLit	19/05/2022	OVID	1886 to May 12, 2022	178
Embase	19/05/2022	Ovid	1996 to 2022 May 18	2202
MEDLINE	19/05/2022	Ovid	1946 to May 18, 2022	1477

Search strategy history

Database name: Econlit

1 obes*.ti,ab. (1990)
2 (weight gain or weight loss).ti,ab. (312)
3 (overweight or over weight or overeat* or over eat*).ti,ab. (883)
4 weight change*.ti,ab. (40)
5 ((bmi or body mass index) adj2 (gain or loss or change)).ti,ab. (15)
6 (BMIz or (BMI* adj2 (z-scor* or zscor*))).ti,ab. (25)
7 ((bmi or "body mass index") adj3 (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. (277)
8 ((bmi or "body mass index") adj3 outcome?).ti,ab. (23)
9 ((adiposity or fat or weight) adj3 (goal? or outcome?)).ti,ab. (158)
10 or/1-9 (2753)
11 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).ti,ab. (358)
12 (group therapy or family therapy or cognitive therapy).ti,ab. (13)
13 ((lifestyle or life style) adj (chang* or intervention*)).ti,ab. (97)
14 counsel?ing.ti,ab. (655)
15 social support.ti,ab. (591)
16 (peer adj2 support).ti,ab. (41)
17 (children adj3 parent* adj3 therapy).ti,ab. (1)
18 or/11-17 (1736)
19 (diets or diet or dieting).ti,ab. (1579)
20 (diet* adj (modif* or therapy or intervention* or strateg*)).ti,ab. (11)
21 (low calorie or calorie control* or healthy eating).ti,ab. (138)
22 (fasting or modified fast*).ti,ab. (44)
23 (fruit or vegetable*).ti,ab. (2592)
24 (high fat* or low fat* or fatty food*).ti,ab. (80)
25 formula diet*.ti,ab. (0)
26 or/19-25 (4209)
27 exercis*.ti,ab. (13264)
28 (aerobics or physical therapy or physical activity or physical inactivity).ti,ab. (548)
29 (fitness adj (class* or regime* or program*)).ti,ab. (4)
30 (aerobics or physical therapy or physical training or physical education).ti,ab. (54)
31 dance therapy.ti,ab. (0)
32 sedentary behavio?r.ti,ab. (5)
33 or/27-32 (13747)
34 (alternative medicine or complementary therap* or complementary medicine).ti,ab. (27)

35 (hypnotism or hypnosis or hypnotherapy).ti,ab. (3)
36 (acupuncture or homeopathy or homoeopathy).ti,ab. (14)
37 (chinese medicine or indian medicine or herbal medicine or ayurvedic).ti,ab. (41)
38 or/34-37 (81)
39 ((diet or dieting or slim*) adj (club* or organi?ation)).ti,ab. (0)
40 (weightwatcher* or weight watcher*).ti,ab. (3)
41 (correspondence adj (course* or program*)).ti,ab. (3)
42 (fat camp* or diet* camp*).ti,ab. (1)
43 or/39-42 (7)
44 (health promotion or health education).ti,ab. (825)
45 (media intervention* or community intervention*).ti,ab. (41)
46 health promoting school*.ti,ab. (3)
47 ((school or community) adj2 program*).ti,ab. (1017)
48 ((school or community) adj2 intervention*).ti,ab. (187)
49 (family intervention* or parent* intervention).ti,ab. (13)
50 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).ti,ab. (1667)
51 or/44-50 (3666)
52 (health polic* or school polic* or food polic* or nutrition polic*).ti,ab. (2766)
53 (primary prevention or secondary prevention).ti,ab. (78)
54 (preventive measure* or preventative measure*).ti,ab. (208)
55 (preventive care or preventative care).ti,ab. (219)
56 (obesity adj2 (prevent* or treat*)).ti,ab. (58)
57 or/53-56 (555)
58 10 and (18 or 26 or 33 or 38 or 43 or 51 or 52 or 57) (695)
59 (marketing or advert* or campaign* or "mass media" or "social media" or blog* or vlog*).ti,ab. (28797)
60 (persuasive or persuasion or persuader*).ti,ab. (1487)
61 ((food? or drink? or product? or nutrition* or diet* or carb* or sugar* or fat? or calori* or warning) adj3 (label* or packag*)).ti,ab. (1050)
62 "traffic light*".ti,ab. (104)
63 or/59-62 (30981)
64 (artificial* adj3 sweeten*).ti,ab. (8)
65 ((sugar* or sweeten* or unsweeten* or diet or "low calorie" or fizzy or carbonated) adj3 (beverag* or drinks or juice? or cordial? or pop or smoothie* or snack*)).ti,ab. (232)
66 (((fizzy or carbonated) adj3 (beverag* or drinks)) or soda?).ti,ab. (181)
67 ("low sugar" or "high sugar" or "high fat" or HFSS).ti,ab. (40)
68 ((sugar or fat or food) adj2 (literacy or education)).ti,ab. (123)
69 ((bedtime or "bed time" or nighttime or "night time" or evening or supper) adj3 (beverag* or drink* or snack*)).ti,ab. (0)
70 or/64-69 (480)
71 (school* adj3 (breakfast? or catering or diet* or dinner? or dining or lunch* or meal? or food? or snack?)).ti,ab. (352)
72 ("breakfast club?" or "catering service?").ti,ab. (29)
73 (mealtim* or "meal tim*" or "meal environment?").ti,ab. (9)
74 ("packed lunches" or "tuck shops" or "snack shops").ti,ab. (3)
75 "vending machine?".ti,ab. (37)
76 or/71-75 (425)
77 ("after school" or out-of-school).ti,ab. (388)
78 ((youth? or communit* or holiday* or vacation* or activit* or fitness or sport* or recreation* or leisure) adj3 (center? or centre? or camp? or club?)).ti,ab. (634)
79 (((movement or activit* or fitness) adj2 (app or based or chang* or monitor* or measur* or track*)) or recreation* or sport* or play).ti,ab. (36017)
80 (posture or postural or ((sit* or seat*) and stand*) or "standing desk*").ti,ab. (3641)
81 sleep*.ti. or ((sleep adj3 (duration or efficienc* or hygiene or problem* or quality)) or actigraph*).ti,ab. (230)

82 (nap or naps or napping).ti,ab. (38)
83 or/77-82 (40534)
84 ((parent* or family or families or guardian?) adj2 (advice or advisory or (behavi* adj 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. (3777)
85 ((parent* or family or families or guardian?) adj (based or centred or centered or focus* or tailored or target*)).ti,ab. (280)
86 or/84-85 (4006)
87 (religi* or church or spiritual or faith?).ti,ab. (9157)
88 ((cultur* or multicultur* or race or racial*) adj2 (adapted or appropriate or based or center* or centre* or competent or focus* or tailored or translat* or target*)).ti,ab. (982)
89 or/87-88 (10083)
90 "public health".ti,ab. (4557)
91 ((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") adj (intervention? or program* or project? or strateg* or study or support* or system? or therap* or train* or trial)).ti,ab. (2350)
92 or/90-91 (6884)
93 digital*.ti,kw. or (digital adj3 (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. (4257)
94 (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. (10486)
95 (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) adj3 (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. (104832)
96 (gaming or gamification or "wearable device?" or wearables or videogame or "video game" or videoconferenc* or "video conferenc*").ti,ab. (813)
97 (synchronous or asynchronous or (electronic adj2 deliver*) or eLearning or e-learning or "blended learning").ti,ab. (809)
98 (screentime or "screen time").ti,ab. (14)
99 ("self care" and (computers or internet or software)).ti,ab. (0)
100 or/93-99 (111768)
101 ("early education*" or "head start" or headstart).ti,ab. (362)
102 (playing or plaything*).ti,ab. (3691)
103 or/101-102 (4052)
104 10 and (63 or 70 or 76 or 83 or 86 or 89 or 92 or 100 or 103) (694)
105 58 or 104 (1092)
106 (child* or adolescen* or infant* or pediatr* or paediatr* or boys or girls or youth or youths or teenage* or young people or young person or young adult* or schoolchildren or school children).ti,ab. (43173)
107 (preschool* or pre-school* or kids or toddler* or "early years").ti,ab. (2145)

108 (kindergarten* or prekindergarten* or pre-kindergarten or nursery or nurseries or playschool* or "play school*" or "play cent*" or creche*).ti,ab. (568)
109 (childcare* or (child* adj (care* or daycare* or "day care*"))).ti,ab. (2489)
110 or/106-109 (44568)
111 105 and 110 (396)
112 111 and (2015* or 2016* or 2017* or 2018* or 2019* or 202*).up. (178)

Database name: Embase
1 exp obesity/ (563612)
2 weight gain/ (92633)
3 weight reduction/ (165335)
4 obes$.ti,ab. (478178)
5 (weight gain or weight loss).ti,ab. (223344)
6 (overweight or over weight or overeat$ or over eat$).ti,ab. (120245)
7 weight change$.ti,ab. (16450)
8 ((bmi or body mass index) adj2 (gain or loss or change)).ti,ab. (9093)
9 (BMIz or (BMI* adj2 (z-scor* or zscor*))).ti,ab. (8037)
10 ((bmi or "body mass index") adj3 (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. (74375)
11 ((bmi or "body mass index") adj3 outcome?).ti,ab. (5540)
12 ((adiposity or fat or weight) adj3 (goal? or outcome?)).ti,ab. (11798)
13 or/1-12 (930833)
14 behavior therapy/ (35183)
15 social support/ (98278)
16 family therapy/ (9641)
17 group therapy/ (13792)
18 ((psychological or behavio?r$) adj (therapy or modif$ or strateg$ or intervention$)).ti,ab. (63696)
19 (group therapy or family therapy or cognitive therapy).ti,ab. (11757)
20 ((lifestyle or life style) adj (chang$ or intervention$)).ti,ab. (26460)
21 counsel?ing.ti,ab. (137883)
22 social support.ti,ab. (53026)
23 (peer adj2 support).ti,ab. (8525)
24 (children adj3 parent$ adj3 therapy).ti,ab. (158)
25 or/14-24 (372914)
26 exp diet therapy/ (354107)
27 (diets or diet or dieting).ti,ab. (438700)
28 (diet$ adj (modif$ or therapy or intervention$ or strateg$)).ti,ab. (24151)
29 (low calorie or calorie control$ or healthy eating).ti,ab. (15882)
30 (fasting or modified fast$).ti,ab. (159494)
31 exp fat intake/ (40134)
32 (fruit or vegetable$).ti,ab. (135237)
33 (high fat$ or low fat$ or fatty food$).ti,ab. (81416)
34 formula diet$.ti,ab. (452)
35 or/26-34 (899824)
36 exp exercise/ (343850)
37 exp kinesiotherapy/ (81304)
38 exercis$.ti,ab. (372258)
39 (aerobics or physical therapy or physical activity or physical inactivity).ti,ab. (200485)
40 (fitness adj (class$ or regime$ or program$)).ti,ab. (957)
41 (aerobics or physical therapy or physical training or physical education).ti,ab. (40039)
42 dance therapy.ti,ab. (189)
43 sedentary behavio?r.ti,ab. (8316)

44 or/36-43 (648756)
45 exp alternative medicine/ (64706)
46 (alternative medicine or complementary therap$ or complementary medicine).ti,ab. (21838)
47 (hypnotism or hypnosis or hypnotherapy).ti,ab. (6445)
48 (acupuncture or homeopathy or homoeopathy).ti,ab. (33494)
49 (chinese medicine or indian medicine or herbal medicine or ayurvedic).ti,ab. (61736)
50 or/45-49 (156571)
51 ((diet or dieting or slim$) adj (club$ or organi?ation)).ti,ab. (30)
52 (weightwatcher$ or weight watcher$).ti,ab. (222)
53 (correspondence adj (course$ or program$)).ti,ab. (37)
54 (fat camp$ or diet$ camp$).ti,ab. (25)
55 or/51-54 (314)
56 exp health education/ (301428)
57 (health promotion or health education).ti,ab. (64848)
58 (media intervention$ or community intervention$).ti,ab. (2913)
59 health promoting school$.ti,ab. (391)
60 ((school or community) adj2 program$).ti,ab. (16607)
61 ((school or community) adj2 intervention$).ti,ab. (13536)
62 (family intervention$ or parent$ intervention).ti,ab. (2900)
63 (parent$ adj2 (behavio?r or involve$ or control$ or attitude$ or educat$)).ti,ab. (30614)
64 or/56-63 (374905)
65 health care policy/ (184951)
66 (health polic$ or school polic$ or food polic$ or nutrition polic$).ti,ab. (35637)
67 65 or 66 (201311)
68 exp obesity/pc (16629)
69 primary prevention/ (40325)
70 (primary prevention or secondary prevention).ti,ab. (53174)
71 (preventive measure$ or preventative measure$).ti,ab. (35247)
72 (preventive care or preventative care).ti,ab. (6868)
73 (obesity adj2 (prevent$ or treat$)).ti,ab. (29860)
74 or/68-73 (156618)
75 13 and (25 or 35 or 44 or 50 or 55 or 64 or 67 or 74) (336280)
76 marketing/ or persuasive communication/ or mass medium/ (47378)
77 (marketing or advert* or campaign* or "mass media" or "social media" or blog* or vlog*).ti,ab. (138552)
78 (persuasive or persuasion or persuader*).ti,ab. (4873)
79 food packaging/ (11431)
80 ((food? or drink? or product? or nutrition* or diet* or carb* or sugar* or fat? or calori* or warning) adj3 (label* or packag*)).ti,ab. (23825)
81 "traffic light*".ti,ab. (1638)
82 or/76-81 (200296)
83 artificially sweetened beverage/ or beverage/ or sweetening agent/ (23139)
84 (artificial* adj3 sweeten*).ti,ab. (1656)
85 ((sugar* or sweeten* or unsweeten* or diet or "low calorie" or fizzy or carbonated) adj3 (beverag* or drinks or juice? or cordial? or pop or smoothie* or snack*)).ti,ab. (10984)
86 (((fizzy or carbonated) adj3 (beverag* or drinks)) or soda?).ti,ab. (6630)
87 ("low sugar" or "high sugar" or "high fat" or HFSS).ti,ab. (71653)
88 ((sugar or fat or food) adj2 (literacy or education)).ti,ab. (1386)
89 ((bedtime or "bed time" or nighttime or "night time" or evening or supper) adj3 (beverag* or drink* or snack*)).ti,ab. (562)
90 or/83-89 (107745)
91 catering service/ or dietary service/ (16913)
92 (school* adj3 (breakfast? or catering or diet* or dinner? or dining or lunch* or meal? or food? or snack?)).ti,ab. (5500)

93 ("breakfast club?" or "catering service?").ti,ab. (198)
94 (mealtim* or "meal tim*" or "meal environment?").ti,ab. (5007)
95 ("packed lunches" or "tuck shops" or "snack shops").ti,ab. (111)
96 "vending machine?".ti,ab. (707)
97 or/91-96 (26706)
98 ("after school" or out-of-school).ti,ab. (3636)
99 building/ or leisure/ or physical education/ or sport facility/ (53150)
100 ((youth? or communit* or holiday* or vacation* or activit* or fitness or sport* or recreation* or leisure) adj3 (center? or centre? or camp? or club?)).ti,ab. (28188)
101 "movement (physiology)"/ or activity tracker/ (30375)
102 (((movement or activit* or fitness) adj2 (app or based or chang* or monitor* or measur* or track*)) or recreation* or sport* or play).ti,ab. (1120110)
103 (posture or postural or ((sit* or seat*) and stand*) or "standing desk*").ti,ab. (258415)
104 sleep/ (91820)
105 sleep*.ti. or ((sleep adj3 (duration or efficienc* or hygiene or problem* or quality)) or actigraph*).ti,ab. (165643)
106 (nap or naps or napping).ti,ab. (9065)
107 or/98-106 (1656186)
108 ((parent* or family or families or guardian?) adj2 (advice or advisory or (behavi* adj 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. (107902)
109 ((parent* or family or families or guardian?) adj (based or centred or centered or focus* or tailored or target*)).ti,ab. (20118)
110 or/108-109 (120653)
111 religion/ or cultural anthropology/ (98828)
112 (religi* or church or spiritual or faith?).ti,ab. (68319)
113 ((cultur* or multicultur* or race or racial*) adj2 (adapted or appropriate or based or center* or centre* or competent or focus* or tailored or translat* or target*)).ti,ab. (37406)
114 or/111-113 (168585)
115 public health/ (187477)
116 "public health".ti,ab. (311933)
117 ((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") adj (intervention? or program* or project? or strateg* or study or support* or system? or therap* or train* or trial)).ti,ab. (92075)
118 or/115-117 (497518)
119 computer network/ or telecommunication/ or mobile application/ or mobile phone/ or computer assisted therapy/ (74739)
120 digital*.ti,kw. or (digital adj3 (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. (74152)
121 (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. (248648)
122 (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) adj3 (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. (1012971)
123 (gaming or gamification or "wearable device?" or wearables or videogame or "video game" or videoconferenc* or "video conferenc*").ti,ab. (20410)
124 (synchronous or asynchronous or (electronic adj2 deliver*) or eLearning or e-learning or "blended learning").ti,ab. (59989)
125 (screentime or "screen time").ti,ab. (4013)
126 ("self care" and (computers or internet or software)).ti,ab. (1012)
127 or/119-126 (1319005)
128 early childhood intervention/ (2996)
129 ("early education*" or "head start" or headstart).ti,ab. (2283)
130 recreation/ (16818)
131 (playing or plaything*).ti,ab. (53934)
132 or/128-131 (74317)
133 13 and (82 or 90 or 97 or 107 or 110 or 114 or 118 or 127 or 132) (186820)
134 75 or 133 (413212)
135 exp child/ or exp infant/ or adolescent/ (2831769)
136 (child* or adolescen* or infant* or pediatr* or paediatr* or boys or girls or youth or youths or teenage* or young people or young person or young adult* or schoolchildren or school children).ti,ab. (2394581)
137 nursery school/ or child day care/ (737)
138 (preschool* or pre-school* or kids or toddler* or "early years").ti,ab. (64798)
139 (kindergarten* or prekindergarten* or pre-kindergarten or nursery or nurseries or playschool* or "play school*" or "play cent*" or creche*).ti,ab. (18822)
140 (childcare* or (child* adj (care* or daycare* or "day care*"))).ti,ab. (13131)
141 or/135-140 (3537692)
142 134 and 141 (91422)
143 (2015* or 2016* or 2017* or 2018* or 2019* or 202*).dc. (12903863)
144 142 and 143 (48258)
145 nonhuman/ not human/ (3754906)
146 144 not 145 (46546)
147 146 not (conference abstract or conference paper or conference proceeding or "conference review" or letter or editorial).pt. (32914)
148 limit 147 to english language (31654)
149 "Quality of Life"/ (539694)
150 Quality Adjusted Life Year/ (31342)
151 Quality of Life Index/ (3005)
152 Short Form 36/ (34735)
153 Health Status/ (130976)
154 quality of life.tw. (510459)
155 quality adjusted life.tw. (23219)
156 (qaly$ or qald$ or qale$ or qtime$).tw. (23565)
157 disability adjusted life.tw. (5223)
158 daly$.tw. (4976)
159 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).tw. (46163)
160 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).tw. (2272)
161 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).tw. (10992)
162 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).tw. (57)
163 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).tw. (424)

164 (euroqol or euro qol or eq5d or eq 5d).tw. (25931)
165 (qol or hql or hqol or hrqol).tw. (115633)
166 (hye or hyes).tw. (126)
167 health$ year$ equivalent$.tw. (27)
168 utilit$.tw. (317233)
169 (hui or hui1 or hui2 or hui3).tw. (2654)
170 disutili$.tw. (1066)
171 rosser.tw. (108)
172 quality of wellbeing.tw. (60)
173 quality of well-being.tw. (482)
174 qwb.tw. (237)
175 willingness to pay.tw. (10910)
176 standard gamble$.tw. (1106)
177 time trade off.tw. (1842)
178 time tradeoff.tw. (294)
179 tto.tw. (1921)
180 or/149-179 (1107418)
181 cost utility analysis/ (11081)
182 (cost* and ((qualit* adj2 adjust* adj2 life*) or qaly*)).tw. (26424)
183 ((incremental* adj2 cost*) or ICER).tw. (27067)
184 (cost adj2 utilit*).tw. (9593)
185 (cost* and ((net adj benefit*) or (net adj monetary adj benefit*) or (net adj health adj benefit*))).tw. (2676)
186 ((cost adj2 (effect* or utilit*)) and (quality adj of adj life)).tw. (32065)
187 (cost and (effect* or utilit*)).ti. (48350)
188 or/181-187 (77849)
189 180 or 188 (1138072)
190 148 and 189 (2202)

Database name: Medline All
1 exp Obesity/ (244328)
2 Weight Gain/ (34041)
3 exp Weight Loss/ (47218)
4 obes*.ti,ab. (344146)
5 (weight gain or weight loss).ti,ab. (162142)
6 (overweight or over weight or overeat* or over eat*).ti,ab. (83281)
7 weight change*.ti,ab. (12710)
8 ((bmi or body mass index) adj2 (gain or loss or change)).ti,ab. (5420)
9 (BMIz or (BMI* adj2 (z-scor* or zscor*))).ti,ab. (4647)
10 ((bmi or "body mass index") adj3 (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. (44156)
11 ((bmi or "body mass index") adj3 outcome?).ti,ab. (3341)
12 ((adiposity or fat or weight) adj3 (goal? or outcome?)).ti,ab. (8396)
13 or/1-12 (570813)
14 exp Behavior Therapy/ (85216)
15 social support/ (76714)
16 exp Psychotherapy, Group/ (27556)
17 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).ti,ab. (50952)
18 (group therapy or family therapy or cognitive therapy).ti,ab. (10842)
19 ((lifestyle or life style) adj (chang* or intervention*)).ti,ab. (18412)
20 counsel?ing.ti,ab. (106308)
21 social support.ti,ab. (46175)

22 (peer adj2 support).ti,ab. (6332)
23 (children adj3 parent* adj3 therapy).ti,ab. (139)
24 or/14-23 (353288)
25 exp Obesity/dh (8316)
26 exp Diet Therapy/ (60232)
27 Fasting/ (37734)
28 (diets or diet or dieting).ti,ab. (403992)
29 (diet* adj (modif* or therapy or intervention* or strateg*)).ti,ab. (19564)
30 (low calorie or calorie control* or healthy eating).ti,ab. (12552)
31 (fasting or modified fast*).ti,ab. (120773)
32 exp Dietary Fats/ (95735)
33 (fruit or vegetable*).ti,ab. (125451)
34 (high fat* or low fat* or fatty food*).ti,ab. (59736)
35 formula diet*.ti,ab. (703)
36 or/25-35 (719703)
37 exp Exercise/ (231407)
38 exp Exercise Therapy/ (59593)
39 exercis*.ti,ab. (329136)
40 (aerobics or physical therapy or physical activity or physical inactivity).ti,ab. (154143)
41 (fitness adj (class* or regime* or program*)).ti,ab. (995)
42 (aerobics or physical therapy or physical training or physical education).ti,ab. (32384)
43 dance therapy.ti,ab. (114)
44 sedentary behavio?r.ti,ab. (7000)
45 or/37-44 (555661)
46 exp Complementary Therapies/ (238274)
47 (alternative medicine or complementary therap* or complementary medicine).ti,ab. (16281)
48 (hypnotism or hypnosis or hypnotherapy).ti,ab. (8701)
49 (acupuncture or homeopathy or homoeopathy).ti,ab. (27635)
50 (chinese medicine or indian medicine or herbal medicine or ayurvedic).ti,ab. (45978)
51 or/46-50 (280136)
52 ((diet or dieting or slim*) adj (club* or organi?ation)).ti,ab. (28)
53 (weightwatcher* or weight watcher*).ti,ab. (154)
54 (correspondence adj (course* or program*)).ti,ab. (93)
55 (fat camp* or diet* camp*).ti,ab. (28)
56 or/52-55 (303)
57 exp Health Promotion/ (83172)
58 exp Health Education/ (258126)
59 (health promotion or health education).ti,ab. (66250)
60 (media intervention* or community intervention*).ti,ab. (2491)
61 health promoting school*.ti,ab. (341)
62 ((school or community) adj2 program*).ti,ab. (15773)
63 ((school or community) adj2 intervention*).ti,ab. (11537)
64 (family intervention* or parent* intervention).ti,ab. (2438)
65 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).ti,ab. (27198)
66 or/57-65 (338470)
67 exp Health Policy/ (113066)
68 (health polic* or school polic* or food polic* or nutrition polic*).ti,ab. (33554)
69 67 or 68 (135283)
70 exp Obesity/pc (21200)
71 exp Primary Prevention/ (171271)
72 (primary prevention or secondary prevention).ti,ab. (37166)
73 (preventive measure* or preventative measure*).ti,ab. (30527)
74 (preventive care or preventative care).ti,ab. (6238)
75 (obesity adj2 (prevent* or treat*)).ti,ab. (23024)

76 or/70-75 (275622)
77 13 and (24 or 36 or 45 or 51 or 56 or 66 or 69 or 76) (214084)
78 Marketing/ or Persuasive Communication/ or Communications Media/ (12132)
79 (marketing or advert* or campaign* or "mass media" or "social media" or blog* or vlog*).ti,ab. (118396)
80 (persuasive or persuasion or persuader*).ti,ab. (5121)
81 Food Packaging/ or Food Labeling/ (9985)
82 ((food? or drink? or product? or nutrition* or diet* or carb* or sugar* or fat? or calori* or warning) adj3 (label* or packag*)).ti,ab. (24359)
83 "traffic light*".ti,ab. (1106)
84 or/78-83 (159653)
85 Artificially Sweetened Beverages/ or Beverages/ or Sweetening Agents/ (22824)
86 (artificial* adj3 sweeten*).ti,ab. (1563)
87 ((sugar* or sweeten* or unsweeten* or diet or "low calorie" or fizzy or carbonated) adj3 (beverag* or drinks or juice? or cordial? or pop or smoothie* or snack*)).ti,ab. (8787)
88 (((fizzy or carbonated) adj3 (beverag* or drinks)) or soda?).ti,ab. (6020)
89 ("low sugar" or "high sugar" or "high fat" or HFSS).ti,ab. (51283)
90 ((sugar or fat or food) adj2 (literacy or education)).ti,ab. (1120)
91 ((bedtime or "bed time" or nighttime or "night time" or evening or supper) adj3 (beverag* or drink* or snack*)).ti,ab. (446)
92 or/85-91 (85587)
93 Food Services/ or Dietary Services/ (7327)
94 (school* adj3 (breakfast? or catering or diet* or dinner? or dining or lunch* or meal? or food? or snack?)).ti,ab. (4647)
95 ("breakfast club?" or "catering service?").ti,ab. (164)
96 (mealtim* or "meal tim*" or "meal environment?").ti,ab. (3798)
97 ("packed lunches" or "tuck shops" or "snack shops").ti,ab. (88)
98 "vending machine?".ti,ab. (666)
99 or/93-98 (14885)
100 ("after school" or out-of-school).ti,ab. (3380)
101 "Non-Medical Public and Private Facilities"/ or Leisure Activities/ or "Physical Education and Training"/ or "Sports and Recreational Facilities"/ (23484)
102 ((youth? or communit* or holiday* or vacation* or activit* or fitness or sport* or recreation* or leisure) adj3 (center? or centre? or camp? or club?)).ti,ab. (24002)
103 Movement/ or Fitness Trackers/ (79841)
104 (((movement or activit* or fitness) adj2 (app or based or chang* or monitor* or measur* or track*)) or recreation* or sport* or play).ti,ab. (989583)
105 (posture or postural or ((sit* or seat*) and stand*) or "standing desk*").ti,ab. (194910)
106 Sleep/ (62704)
107 sleep*.ti. or ((sleep adj3 (duration or efficienc* or hygiene or problem* or quality)) or actigraph*).ti,ab. (128899)
108 (nap or naps or napping).ti,ab. (7168)
109 or/100-108 (1427543)
110 ((parent* or family or families or guardian?) adj2 (advice or advisory or (behavi* adj 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. (95871)
111 ((parent* or family or families or guardian?) adj (based or centred or centered or focus* or tailored or target*)).ti,ab. (17056)
112 or/110-111 (106860)
113 religion/ or culture/ (48220)
114 (religi* or church or spiritual or faith?).ti,ab. (62953)
115 ((cultur* or multicultur* or race or racial*) adj2 (adapted or appropriate or based or center* or centre* or competent or focus* or tailored or translat* or target*)).ti,ab. (31509)
116 or/113-115 (130656)
117 Public Health/ (90853)

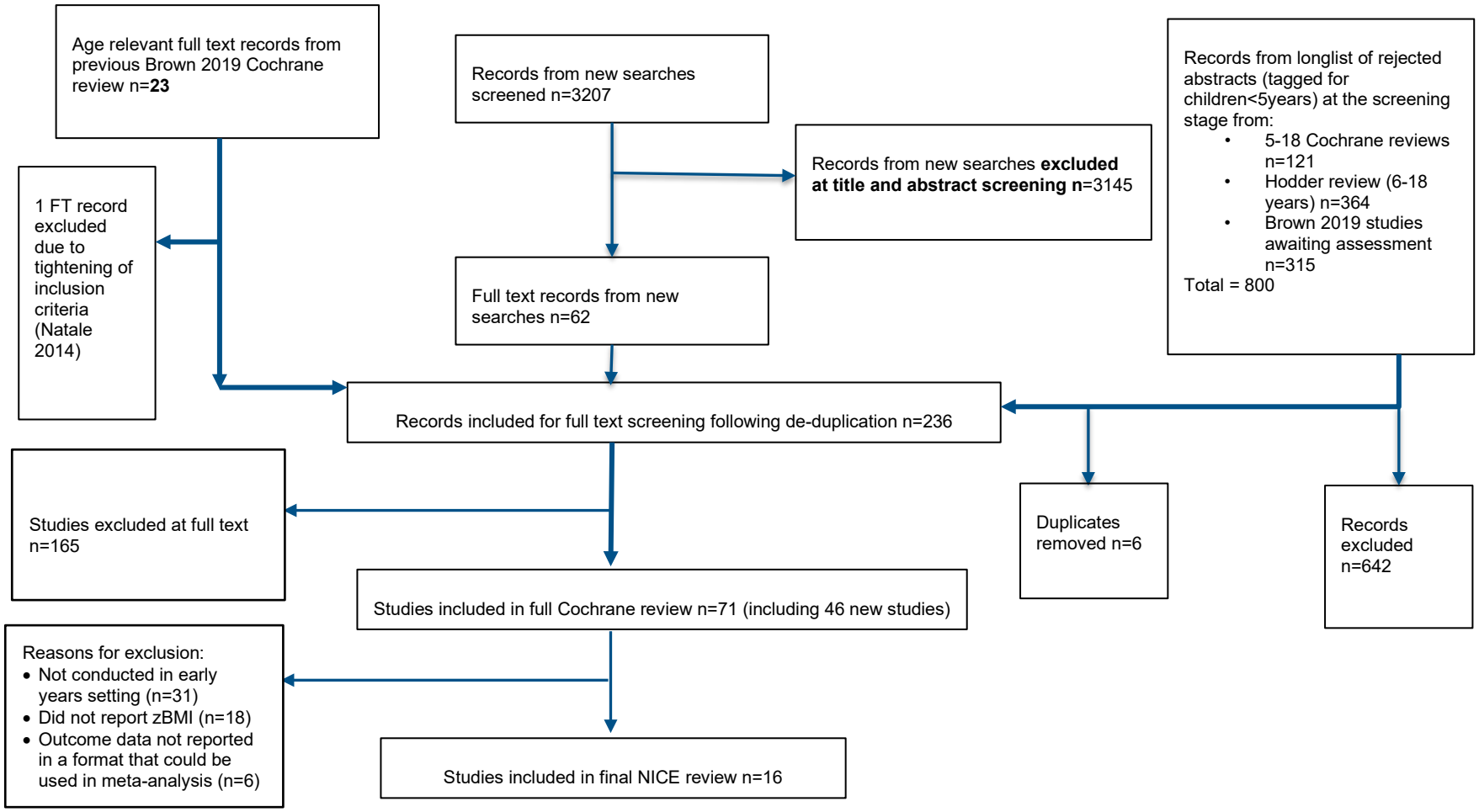
118 "public health".ti,ab. (288004)
119 ((complex or co-ordinated or comprehensive or factorial or interdisciplinary or inter-disciplinary or multiple or "multi component?" or multicomponent? or multidisciplin* or "multi disciplin*" or multidimension* or "multi dimension*" or multifactor* or "multi factor*" 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") adj (intervention? or program* or project? or strateg* or study or support* or system? or therap* or train* or trial)).ti,ab. (76547)
120 or/117-119 (405637)
121 Computer Communication Networks/ or Telecommunications/ or Mobile Applications/ or Cell Phone/ or Therapy, Computer-Assisted/ (43547)
122 digital*.ti,kw. or (digital adj3 (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. (75909)
123 (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. (192577)
124 (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) adj3 (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. (848365)
125 (gaming or gamification or "wearable device?" or wearables or videogame or "video game" or videoconferenc* or "video conferenc*").ti,ab. (16855)
126 (synchronous or asynchronous or (electronic adj2 deliver*) or eLearning or e-learning or "blended learning").ti,ab. (54387)
127 (screentime or "screen time").ti,ab. (3347)
128 ("self care" and (computers or internet or software)).ti,ab. (699)
129 or/121-128 (1099669)
130 Early Intervention, Educational/ (3388)
131 ("early education*" or "head start" or headstart).ti,ab. (2321)
132 "Play and Playthings"/ (9121)
133 (playing or plaything*).ti,ab. (46127)
134 or/130-133 (59566)
135 13 and (84 or 92 or 99 or 109 or 112 or 116 or 120 or 129 or 134) (108277)
136 77 or 135 (254961)
137 exp child/ or exp infant/ or adolescent/ (3848619)
138 (child* or adolescen* or infant* or pediatr* or paediatr* or boys or girls or youth or youths or teenage* or young people or young person or young adult* or schoolchildren or school children).ti,ab. (2320564)
139 Schools, Nursery/ or Child Day Care Centers/ (6618)
140 (preschool* or pre-school* or kids or toddler* or "early years").ti,ab. (60310)
141 (kindergarten* or prekindergarten* or pre-kindergarten or nursery or nurseries or playschool* or "play school*" or "play cent*" or creche*).ti,ab. (21742)
142 (childcare* or (child* adj (care* or daycare* or "day care*"))).ti,ab. (13336)
143 or/137-142 (4471209)
144 136 and 143 (67234)
145 (2015* or 2016* or 2017* or 2018* or 2019* or 202*).ed,dt. (10400228)
146 144 and 145 (32483)

147 (exp animals/ not humans.sh.) or (rat or rats or mouse or mice or rodent*).ti. (5239492)
148 146 not 147 (31811)
149 limit 148 to (letter or historical article or comment or editorial or news or case reports) (863)
150 148 not 149 (30948)
151 limit 150 to english language (29951)
152 "Quality of Life"/ (241722)
153 quality of life.tw. (332541)
154 "Value of Life"/ (5784)
155 Quality-Adjusted Life Years/ (14764)
156 quality adjusted life.tw. (15525)
157 (qaly$ or qald$ or qale$ or qtime$).tw. (12911)
158 disability adjusted life.tw. (4373)
159 daly$.tw. (3915)
160 Health Status Indicators/ (24058)
161 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).tw. (28626)
162 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).tw. (2437)
163 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).tw. (6915)
164 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).tw. (37)
165 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).tw. (433)
166 (euroqol or euro qol or eq5d or eq 5d).tw. (14309)
167 (qol or hql or hqol or hrqol).tw. (64755)
168 (hye or hyes).tw. (75)
169 health$ year$ equivalent$.tw. (40)
170 utilit$.tw. (243712)
171 (hui or hui1 or hui2 or hui3).tw. (1790)
172 disutili$.tw. (554)
173 rosser.tw. (105)
174 quality of wellbeing.tw. (36)
175 quality of well-being.tw. (460)
176 qwb.tw. (211)
177 willingness to pay.tw. (7320)
178 standard gamble$.tw. (891)
179 time trade off.tw. (1291)
180 time tradeoff.tw. (260)
181 tto.tw. (1244)
182 or/152-181 (679413)
183 Cost-Benefit Analysis/ (89648)
184 Quality-Adjusted Life Years/ (14764)
185 Markov Chains/ (15703)
186 Cost-Benefit Analysis/ (89648)
187 (cost* and ((qualit* adj2 adjust* adj2 life*) or qaly*)).tw. (15644)
188 ((incremental* adj2 cost*) or ICER).tw. (16071)
189 (cost adj2 utilit*).tw. (6245)
190 (cost* and ((net adj benefit*) or (net adj monetary adj benefit*) or (net adj health adj benefit*))).tw. (2025)
191 ((cost adj2 (effect* or utilit*)) and (quality adj of adj life)).tw. (21416)
192 (cost and (effect* or utilit*)).ti. (35847)
193 or/186-192 (108877)

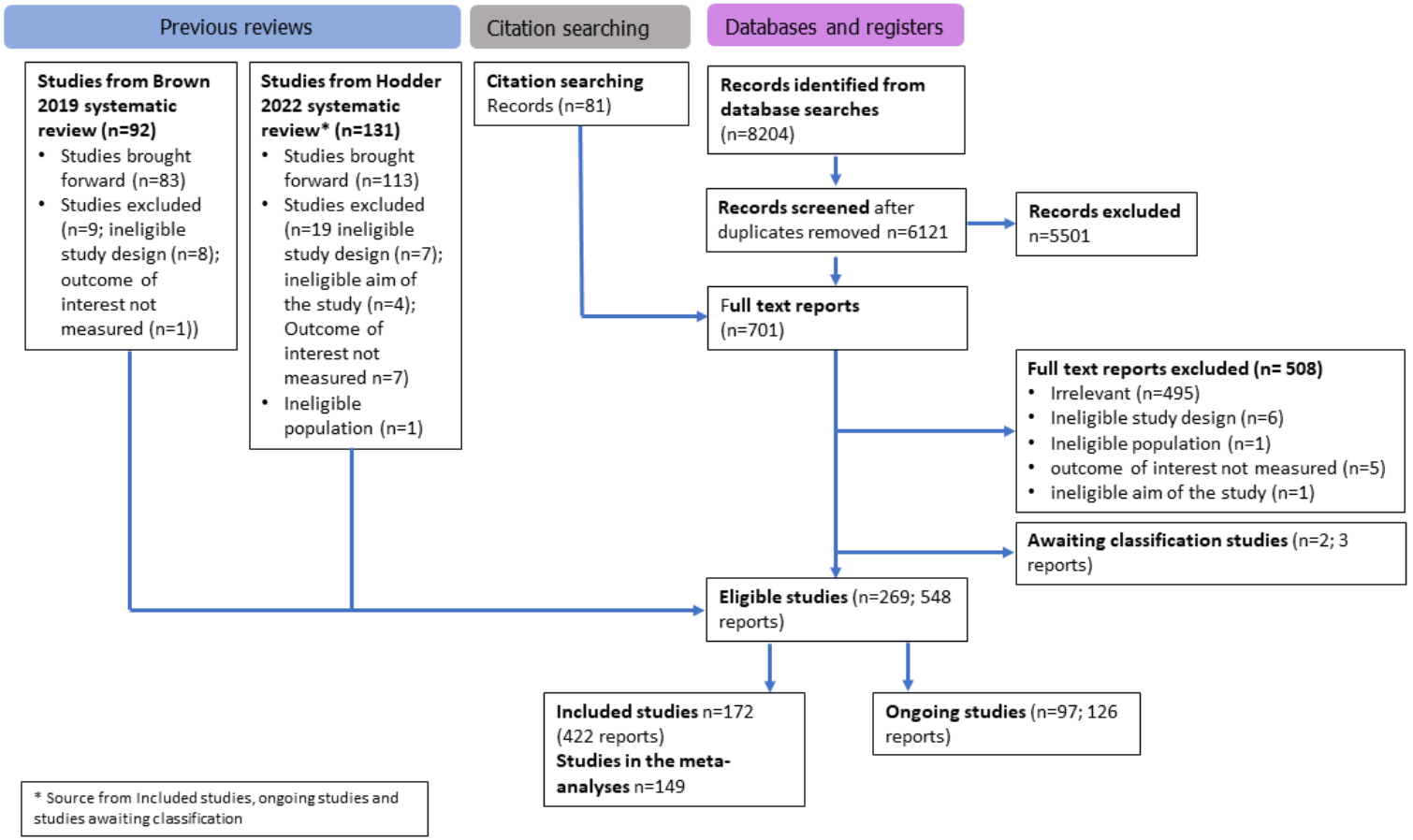
194 182 or 193 (753887)
195 151 and 194 (1477)

Appendix C – Effectiveness evidence study selection

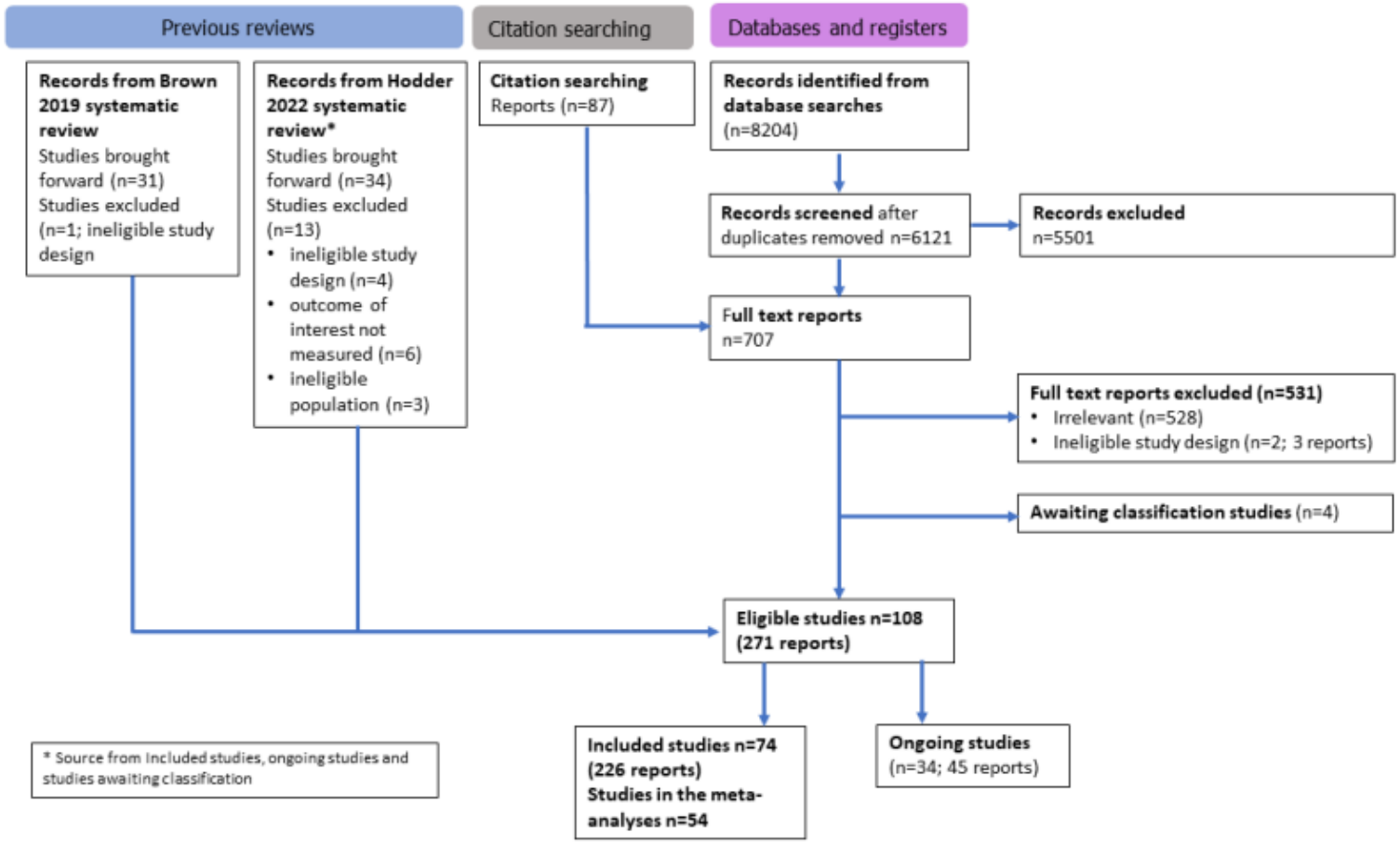
Children aged 2 to 4 years



Children aged 5 to 11 years



Children aged 12 to 18 years



Appendix D – Effectiveness evidence

Children aged 2 to 4 years

Alkon 2014	
Study characteristics	
Methods	**Study name**: Nutrition and Physical Activity Self Assessment for Childcare (NAP SACC) intervention **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Childcare centres **Unit of analysis**: Individual **Intervention period**: 7 months **Follow up time**(s): 7 months
Participants	**Number randomized**: 9 clusters; 260 children **Number control group**: 9 clusters; 292 control **Setting**: Child care centers **Location**: USA **Country income**: High income

	Recruitment: 42 child care centers were recruited, of which 24 centers did not meet the inclusion criteria. Inclusion criteria included English-speaking director, on-site kitchen, racial/ethnic diversity among the children, participation by at least 60% of families, and a population of children in care primarily comprised of low-income children between the ages of three and five years of age. None of the centers enrolled in the study had participated in the NAP SACC program previously. One control center, which withdrew when it was unable to complete the required number of study questionnaires was replaced with a matched center prior to intervention. Research assistants selected children at the pre-intervention period for height and weight measurements from center-specific randomly ordered lists of enrolled children. **% of eligible population enrolled:** 75% (assumed centres that decline or excluded for other reasons were eligible) **Age of children**: 3-5 years **Gender/sex of children**: Intervention: 56% male; control: 52% male
Interventions	**Theory**: NR **Intervention type**: Diet and Activity Intervention **Comparator type**: Waitlist Control; the control centers received the delayed NAP SACC intervention in year two of the study. **Comparison**: Diet and Activity intervention vs Control **Setting of the intervention**: Childcare Centers
Outcomes	**Measured outcome(s**): zBMI **Outcome(s) included in the meta-analysis:** zBMI short term

	Outcome self-reported: No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NCT01921842 **Funder(s) type**: Non-industry **Writing and/or research independent from funder(s)**: NR **Funding details**: "This study was funded by grant #R40 MC 08727 through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Research Program"

Barber 2016	
Study characteristics	
Methods	**Study name**: Preschoolers in the Playground (PiP) **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Pre-school **Unit of analysis**: Individual **Intervention period**: 30 weeks **Follow up time(s)**: 10 and 52 weeks
Participants	**Number randomized**: 5 clusters; 83 children,

	Number control group: 5 clusters; 81 children **Setting**: Pre-school **Location**: Bradford, UK **Country income**: High income **Recruitment**: Letters sent home from school with children attending the trial schools. Additionally, community research assistants recruited families through face-to-face conversations with parents or guardians in the playground at schools, children's centres, and nursery sites. To account for the linguistic diversity among the study population, research assistants recruiting families and subsequently conducting measurements and questionnaires were bilingual and understood these tasks in either English or Urdu **% of eligible population enrolled**: 37% of eligible schools participated, 48.1% of eligible children participated **Age of children**: Mean (SD): 2.8 (0.7) years **Gender/sex of children**: 47.5% male
Interventions	**Theory**: NR **Intervention type**: Activity Intervention **Comparator type**: Control; Treatment as usual **Comparison**: Activity Intervention vs Control **Setting of the intervention**: Pre-school
Outcomes	**Measured outcome(s)**: zBMI

	Outcome(s) included in the meta-analysis: zBMI medium term **Outcome self-reported:** No Reason for exclusion from the meta-analysis: NA
Notes	**Clinical Trial Registry**: ISRCTN54165860 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: "NIHR Public Health Research and NIHR CLAHRC Yorkshire and the Humber"

Davis 2016	
Study characteristics	
Methods	**Study name**: Child Health Initiative for Lifelong Eating and Exercise (CHILE) **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Head Start centre **Unit of analysis**: Individual **Intervention period**: 2 years

	Follow up time(s): 7, 12, 19 months
Participants	**Number randomized**: 8 clusters; 945 children **Number control group**: 8 clusters; 871 children **Setting**: Head start centres **Location**: New Mexico, USA **Country income**: High income **Recruitment**: Head Start centre were recruited by a community engagement specialist on the research team. **% of eligible population enrolled**: 74% of the eligible population were enrolled and participated in the study **Age of children**: 2-5 years **Gender/sex of children**: 52.6% male
Interventions	**Theory**: Socioecological approach **Intervention type**: Diet and Activity Intervention **Comparator type**: Control **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Head start centres
Outcomes	**Measured outcome(s)**: zBMI

	Outcome(s) included in the meta-analysis: zBMI short term, zBMI medium term, zBMI long term. **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder(s)**: yes **Funding details**: National Institute of Diabetes and Digestive and Kidney Diseases (Grant R01 DK72958).

Dennison 2004	
Study characteristics	
Methods	**Study name**: Seven session intervention to reduce TV/video viewing by preschool children (smaller part of the Brocodile the Crocodile health promotion program). **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Early years settings (Pre-schools and day care centers) **Unit of analysis**: Individual **Intervention period**: 7 weeks

	Follow up time(s): Winter 2001 and Spring 2001 (6 months)
Participants	**Number randomized**: 8 clusters; 93 children **Number control group**: 8 clusters; 83 children **Setting**: Preschool **Location**: New York, USA **Country income**: High income **Recruitment**: Preschool and day care centers located within a 45-mile radius of Cooperstown, New York, but excluding Cooperstown, that enrolled children aged 3 through 5 years were invited to participate in the Brocodile the Crocodile health promotion program. 20 centers were identified, and directors at 19 centers agreed to participate in this study. All children aged 2.5 through 5.5 years who attended a participating preschool or day care center were eligible to participate in this study. **% of eligible population enrolled**: NR **Age of children**: 2.6 - 5.5 years **Gender/sex of children**: Intervention: 47% male; Control 53% male
Interventions	**Theory**: NR **Intervention type**: Activity Intervention (though focus is on screen time) **Comparator type**: Control; Other unrelated intervention (Safety and injury prevention program) **Comparison**: Activity Intervention vs Control **Setting of the intervention**: Preschool

Outcomes	**Measured outcome(s)**: BMI and zBMI **Outcome(s) included in the meta-analysis:** zBMI short term, BMI short term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: "This study was supported in part by grant 1-R01-HL65144 from the National Institutes of Health, National Heart, Lung, and Blood Institute, Bethesda, MD"

Fitzgibbon 2005	
Study characteristics	
Methods	**Study name**: Hip Hop to Health Junior **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Head Start Centres **Unit of analysis**: Individual **Intervention period**: 14 weeks

	Follow up time(s): Post-intervention, 12 months, 24 months
Participants	**Number randomized**: 6 clusters; 197 children **Number control group**: 6 clusters; 212 children **Setting**: Head Start Centres **Location**: Chicago, Illinois, USA **Country income**: High income **Recruitment**: In September of 1999, 12 Head Start sites administered through the Archdiocese of Chicago were recruited. The schools were paired based on class size, and one member of each pair was randomly assigned to the weight control intervention or to the general health intervention. All children at the sites were eligible to participate. **% of eligible population enrolled**: NR **Age of children**: Mean: Intervention 49.6 months; Control 50.8 months **Gender/sex of children**: Intervention 50.3% male; Control 49.5% male.
Interventions	**Theory**: Social learning theory, self-determination theory and transtheoretical model **Intervention type**: Diet and Activity Intervention **Comparator type**: Control; other unrelated intervention (General health concepts: 14-week (20 minutes, 1 time weekly). **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention:** Head Start Centers

Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** zBMI short term, zBMI medium term, zBMI long term, BMI short term, BMI medium term, BMI long term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: Supported by a grant from the National Heart, Lung, and Blood Institute

Fitzgibbon 2006	
Study characteristics	
Methods	**Study name**: Hip Hop to Health Junior **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Head Start Centers **Unit of analysis**: Individual **Intervention period**: 14 weeks

	Follow up time(s): Post-intervention, 12 months, 24 months
Participants	**Number randomized**: 6 clusters; 202 children **Number control group**: 6 clusters; 199 children **Setting**: Head Start Centers **Location**: Chicago, Illinois, USA **Country income**: High income **Recruitment**: 12 Head Start sites that were administered through the Archdiocese of Chicago and that served primarily Latino children were recruited to participate. The 12 schools were then randomly assigned to the intervention group or the control group. All children were eligible to participate in the intervention, but data were only collected on children whose parents provided informed consent. **% of eligible population enrolled**: NR **Age of children**: Mean: Intervention 50.8 months; Control 51 months **Gender/sex of children**: Intervention 52.5% male; Control 48.7% female
Interventions	**Theory**: Social cognitive theory and concepts of self-determination theory **Intervention type**: Diet and Activity Intervention **Comparator type**: Control; other unrelated intervention (General health concepts: 14-week (20 minutes, 1 time weekly). **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: **:** Head Start Centers

Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** zBMI short term, zBMI medium term, zBMI long term, BMI short term, BMI medium term, BMI long term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: Supported by a grant from the National Heart, Lung, and Blood Institute

Fitzgibbon 2011/Kong 2016	
Study characteristics	
Methods	**Study name**: Hip Hop to Health Junior **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Head Start Centers **Unit of analysis**: Individual **Intervention period**: 14 weeks

	Follow up time(s): Post intervention and 1 year post intervention
Participants	**Number randomized**: 9 clusters; 376 children **Number control group**: 9 clusters; 353 children **Setting**: Head Start Centers **Location**: Chicago, Illinois, USA **Country income**: High income **Recruitment**: 18 Head Start programs administered in Chicago Public Schools eligible. All children in participating classrooms received one of the interventions; only data collected from children whose parents provided consent were included. Up to two children per family were eligible to participate. **% of eligible population enrolled**: 92% of children enrolled in the participating settings provided consent **Age of children**: 3-5 years **Gender/sex of children**: 47% male
Interventions	**Theory**: SCT and concepts of self-determination theory **Intervention type**: Diet and Activity Intervention **Comparator type**: Control; other unrelated intervention (teacher delivered general health session) **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Head Start Center

Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis**: zBMI short term, zBMI long term, BMI short term, BMI long term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: Supported by a grant from the National Heart, Lung, and Blood Institute **General notes**:

Goldfield 2016	
Study characteristics	
Methods	**Study name**: Preschoolers Activity Trial **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Child care centers **Unit of analysis**: Individual

	Intervention period: 6 months **Follow up time(s)**: 6 months
Participants	**Number randomized**: 3 clusters; 40 children **Number control group**: 3 clusters; 43 children **Setting**: Child care centers **Location**: Ontario, Canada **Country income**: High income **Recruitment**: Recruitment involved contacting child care centres. Child care centers were eligible if they housed more than 10 children aged 3–5 years on a full-time basis. 9 child care centres expressed interest: 1 was ineligible, 2 declined enrollment. 6 were assessed for eligibility **% of eligible population enrolled**: NR **Age of children**: 3-5 years **Gender/sex of children**: Intervention: 45% male; Control 53% male
Interventions	**Theory**: NR **Intervention type**: Activity Intervention **Comparator type**: Control; treatment as usual **Comparison**: Activity Intervention vs Control **Setting of the intervention**: Child care centers

Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** zBMI short term, BMI short term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NCT02293278 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: "The Preschoolers Activity Trial was funded by a grant (NA-7118) from the Heart & Stroke Foundation of Canada and supported by a Ministry of Research and Innovation Early Researcher Award."

Hodgkinson 2019	
Study characteristics	
Methods	**Study name**: Healthy Heroes **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Early Years Settings **Unit of analysis**: Individual **Intervention period**: 6 months

	Follow up time(s): 6, 12, and 24 months
Participants	**Number randomized**: 5 clusters; 47 children **Number control group**: 5 clusters; 34 children **Setting**: Early years setting **Location**: Lancashire, UK **Country income**: High income **Recruitment**: Each of the 10 setting had around 800 children, with approximately 160 2-year olds per setting registered on their databases. Early Years settings sent out recruitment letters to 160 (10%) parents with a 2-year old child on their registers. Only one parent responded. Therefore, with the assistance of the Centre staff, one of the authors spent time at each Centre, recruiting parents with a 2-year old child into the study. **% of eligible population enrolled**: NR **Age of children**: 2 years old **Gender/sex of children**: Intervention 47% male; Control 56%
Interventions	**Theory**: Social Learning Theory **Intervention type**: Diet and Activity Intervention **Comparator type**: Control **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Early Years' Centres

Outcomes	**Measured outcome(s)**: zBMI **Outcome(s) included in the meta-analysis:** zBMI long term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: ISRCTN22620137 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: Author was sponsored by her employer NHS North Lancashire and Lancashire County Council. The sponsor did not have influence over the study design, analyses, interpretation of data or drafting the manuscript.

Iaia 2017	
Study characteristics	
Methods	**Study name**: Educational intervention to promote healthy lifestyles **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Childcare centres **Unit of analysis**: Individual

	Intervention period: 6 months **Follow up time(s)**: 1 and 2 years
Participants	**Number randomized**: 8 clusters; 199 children **Number control group**: 8 clusters; 226 children **Setting**: Childcare centres **Location**: Italy **Country income**: High income **Recruitment**: Children attending the first session of public childcare centres in Cesena, Forlì-Cesena, Italy. Each cluster aimed to include at least 15 3-year-old children to be eligible for the trial. Eligibility criteria for participants were: no chronic medical condition precluding them from study participation; being Italian or Italian-speaking foreign families. **% of eligible population enrolled**: NR **Age of children**: 3 years **Gender/sex of children**: 52% male
Interventions	**Theory**: NR **Intervention type**: Diet and Activity Intervention **Comparator type**: Control; Treatment as usual **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Childcare centre

Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** zBMI medium term, zBMI long term, BMI medium term, BMI long term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Industry **Writing and/or research independent from funder**(s): Yes **Funding details**: OROGEL S.P.A., a company based in via Dismano 2600, I-47522, Cesena, Forlì Cesena, Italy, granted €10 000 in support of the educational intervention. This sponsor had no role in designing and conducting our study; collecting, managing, analysing and interpreting its data; and preparing, reviewing and approving our paper.

Malden 2019	
Study characteristics	
Methods	**Study name**: ToyBox-Scotland **Study design**: Cluster RCT **Number of arms**: 2

	Unit of allocation: Preschool **Unit of analysis**: Individual **Intervention period**: 18 weeks **Follow up time(s)**: 15–17 weeks
Participants	**Number randomized**: 26 **Number control group**: 16 **Setting**: Preschool **Location**: Glasgow, Scotland **Country income**: High income **Recruitment**: A Glasgow City Council representative contacted a convenience sample of all local authority preschools in the Glasgow City area via email to seek expressions of interest to participate (n = 112). 11 preschools expressed an interest to participate in the study, of which 6 were selected based on similarities in demographics, size, and socio-economic status (SES). Head teachers at participating preschools were visited by the study manager and provided with information sheets and consent forms, which they distributed to parents/caregivers of all 3–5-year-old children at their preschools. **% of eligible population enrolled**: 18% **Age of children**: Mean (SD): 4.4 (0.46) years **Gender/sex of children**: 60% male
Interventions	**Theory**: NR

	Intervention type: Diet and Activity Intervention **Comparator type**: Control; treatment as usual **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Preschool and home
Outcomes	**Measured outcome(s)**: zBMI **Outcome(s) included in the meta-analysis**: zBMI short term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: ISRCTN12831555 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: "Research relating to this study was funded by the Cunningham Trust. The funders had no role in study design, data collection, data analysis, interpretation of findings, or preparation of this manuscript."

Reilly 2006
Study characteristics

Methods	**Study name**: Movement and Activity in Glasgow intervention in children (MAGIC) trial **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Nursery **Unit of analysis**: Individual **Intervention period**: 24 weeks **Follow up time(s)**: 6 months, 12 months
Participants	**Number randomized**: 268 **Number control group**: 277 **Setting**: Preschool **Location**: Glasgow, Scotland **Country income**: High income **Recruitment**: In 2002, 124 nurseries invited to participate in the) trial. Eligible nurseries had at least 12 children in their preschool year. 36 of the 104 nurseries willing to participate were randomly selected. All families with children in their preschool year attending the 36 nurseries were invited to participate. **% of eligible population enrolled**: NR **Age of children**: Mean(SD): 4.2(0.2) years **Gender/sex of children**: Intervention: 52% males; Control: 52% males

Interventions	**Theory**: NR **Intervention type**: Activity intervention **Comparator type**: Control; treatment as usual **Comparison**: Activity vs Control **Setting of the intervention**: Nursery and home elements
Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** zBMI short term, zBMI medium term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: ISRCTN36363490 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: British Heart Foundation, Glasgow City Council, and the Caledonian Research Foundation. The pilot study was funded by Sport Aiding Medical Research for Kids (SPARKS)

Slusser 2012
Study characteristics

Methods	**Study name**: Pediatrics Overweight Prevention through Parent Training Programme (PT) **Study design**: RCT **Number of arms**: 2 **Unit of allocation**: Families (parents and children) **Unit of analysis**: Individual **Intervention period**: 15-17 weeks **Follow up time(s)**: 4 months, 12 months
Participants	**Number randomized**: 80 children **Number control group**: 80 children **Setting**: Health care clinic/schools **Location**: Los Angeles, USA **Country income**: High income **Recruitment**: All families were recruited during health care clinic visits at Venice Family Clinic, or in the classrooms at the community sites. **% of eligible population enrolled**: 1 out of 161 **Age of children**: 2-4 years **Gender/sex of children**: Intervention 44.3% male; Control 43.3% male
Interventions	**Theory**: Social learning Theory

	Intervention type: Diet and Activity Intervention **Comparator type**: Control; waitlist **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Family Clinics, pre-schools, Head Start Program centres.
Outcomes	**Measured outcome(s)**: BMI, zBMI, BMI percentile **Outcome(s) included in the meta-analysis:** BMI medium term, zBMI medium term, BMI percentile medium term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: Study funded by generous gifts of: Joseph Drown Foundaiton, Simms/Mann Family Foundation, Venice Family Clinic.

Vaughn 2021	
Study characteristics	
Methods	**Study name**: Healthy Me, Healthy We (HMHW)

	Study design: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Nursery/childcare centre **Unit of analysis**: Individual **Intervention period**: 8 months **Follow up time(s)**: Post-intervention
Participants	**Number randomized**: 48 clusters; 446 children **Number control group**: 44 clusters; 407 children **Setting**: Nursery/Childcare **Location**: North Carolina, USA **Country income**: High income **Recruitment**: Unclear for children and parents. They may not have been asked for consent to take part, or it was an opt out. **% of eligible population enrolled**: NR **Age of children**: 3-4 years old **Gender/sex of children**: 50.8% male
Interventions	**Theory**: Social Ecological Framework, Exchange Theory, and Social Cognitive Theory **Intervention type**: Diet and Activity Intervention

	Comparator type: Control; waitlist **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Nursery/Childcare and small home component
Outcomes	**Measured outcome(s)**: BMI, zBMI **Outcome(s) included in the meta-analysis:** BMI short term, zBMI short term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NCT02330354 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: "This study was funded by the National Heart, Lung and Blood Institute [R01HL120969]. Support was also received from the Center for Disease Control and Prevention [U48DP005017] and National Institute of Diabetes and Digestive and Kidney Diseases [P30DK056350]"

Yoong 2020
Study characteristics

Methods	**Study name**: Web based intervention to improve dietary guideline implementation **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Childcare centres **Unit of analysis**: Individual **Intervention period**: 1 year **Follow up time(s)**: 1 year
Participants	**Number randomized**: n clusters unclear; 288 children **Number control group**: n clusters unclear; 234 children **Setting**: Childcare centres **Location**: New South Wales, Australia **Country income**: High income **Recruitment**: All childcare centers were posted an invitation letter and information statement about the study 2 weeks before a call from a research assistant to assess eligibility and obtain consent. The first 40 childcare centers (oversampling to obtain 35) were asked during the call if they consented to a 1-d site visit. These centers were asked to distribute information and consent forms to parents of children in the room with the highest number of children aged 2–6 years before the scheduled site visit. Consistent with previous approaches by the research team and to maximize consent, research assistants also approached parents at drop off on the day of the visit. Centres took part, but only data was collected from individual children if parents had also consented.

	% of eligible population enrolled: NR **Age of children**: 2 to 6 years old **Gender/sex of children**: 50.4% male
Interventions	**Theory**: Theoretical Domains Framework **Intervention type**: Diet Intervention **Comparator type**: Control; treatment as usual **Comparison**: Diet vs Control Intervention **Setting of the intervention**: Childcare centre
Outcomes	**Measured outcome(s)**: zBMI **Outcome(s) included in the meta-analysis:** zBMI medium term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: ACTRN12616000974404 **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): Yes **Funding details**: "National Health and Medical Research Council (NHMRC) project grant APP1102943 (to LW) and Cancer Council NSW (CCNSW) program grant PG16-05 (to JW). Pilot funding was also provided from the

	Hunter Cancer Research Alliance (to SLY) and the Priority Research Centre for Health Behaviour, University of Newcastle (to SLY). Hunter New England Population Health, Hunter Medical Research Institute, and the University of Newcastle provided infrastructure funding. Healthy Australia Ltd provided in-kind support for programming of the web program ("feedAustralia"). The NHMRC and CCNSW played no role in the conduct of the trial. The content of this publication responsibility of the authors and does not reflect the views of the NHMRC or CCNSW. Healthy Australia Ltd provided input on data analysis and interpretation of the data via review of the manuscript."

Zask 2012	
Study characteristics	
Methods	**Study name**: Tooty Fruity Vegie **Study design**: Cluster RCT **Number of arms**: 2 **Unit of allocation**: Preschools

	Unit of analysis: Individual **Intervention period**: 10 months **Follow up time(s)**: Post intervention
Participants	**Number randomized**: 18 clusters; 335 children **Number control group**: 13 clusters; 163 children **Setting**: Preschools **Location**: New South Wales, Australia **Country income**: High income **Recruitment**: Preschools in the New South Wales North Coast area (n=40) were asked to submit an expression of interest to participate in the program; 30 volunteered and were randomly allocated to intervention or control groups. **% of eligible population enrolled**: 78% **Age of children**: 2.5-6 years **Gender/sex of children**: 51.7% male
Interventions	**Theory**: Health Belief Model and Competence Motivational Theory **Intervention type**: Diet and Activity Intervention **Comparator type**: Control; waitlist control **Comparison**: Diet and Activity Intervention vs Control **Setting of the intervention**: Preschool

Outcomes	**Measured outcome(s)**: zBMI **Outcome(s) included in the meta-analysis:** zBMI medium term **Outcome self-reported:** No **Reason for exclusion from the meta-analysis:** NA
Notes	**Clinical Trial Registry**: NR **Funder(s) type**: Non-industry **Writing and/or research independent from funder**(s): NR **Funding details**: Data collection for this research at a time 3 follow up was supported by NSW Health Australia and Deakin University. LB is supported by an NHMRC early career fellowship. JS is supported by a National Heart Foundation of Australia and sanofiaventis Career Development Award.

Children aged 5 to 11 years

Study ID	**Adab 2018**
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.
Study ID	**Anand 2007**
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
Study ID	**Annesi 2016**
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
Study ID	**Annesi 2017**
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
Study ID	**Baranowski 2003**
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
Study ID	**Baranowski 2011**

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
Study ID	**Barbeau 2007**
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.
Study ID	**Barnes 2015**
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
Study ID	**Barnes 2021**

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
Study ID	**Beech 2003**
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
Study ID	**Bohnert 2013**

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
Study ID	**Brandstetter 2012**
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
Study ID	**Branscum 2013**
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

Study ID	**Breheny 2020**
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.
Study ID	**Brown 2013**
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
Study ID	**Caballero 2003**
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
Study ID	**Cao 2015**
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
Study ID	**Carlin 2021**
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.
Study ID	**Chai 2019**
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.
Study ID	**Chen 2010**

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
Study ID	**Choo 2020**
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
Study ID	**Clemes 2020**
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
Study ID	**Coleman 2012**
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

Study ID	**Crespo 2012**
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
Study ID	**Cunha 2013**
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."
Study ID	**Damsgaard 2014**

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
Study ID	**Davis 2021**
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
Study ID	**De Bock 2013**
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.
Study ID	**de Greeff 2016**
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
Study ID	**De Heer 2011**
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
Study ID	**de Ruyter 2012**
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

Study ID	**Di Maglie 2022**
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.
Study ID	**Diaz-Castro 2021**
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
Study ID	**Donnelly 2009**
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
Study ID	**Drummy 2016**
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
Study ID	**Duncan 2019**
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
Study ID	**Elder 2014**
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
Study ID	**Epstein 2001**
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)
Study ID	**Fairclough 2013**

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
Study ID	**Farmer 2017**
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
Study ID	**Ford 2013**
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
Study ID	**Foster 2008**

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
Study ID	**Fulkerson 2010**
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
Study ID	**Fulkerson 2015**
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).
Study ID	**Fulkerson 2022**
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
Study ID	**Gentile 2009**
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
Study ID	**Gortmaker 1999**

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;
Study ID	**Greve 2015**

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
Study ID	**Griffin 2019**
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
Study ID	**Grydeland 2014**
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
Study ID	**Ha 2021**
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.
Study ID	**Habib-Mourad 2014**
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
Study ID	**Habib-Mourad 2020**
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
Study ID	**Haire-Joshu 2010**

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
Study ID	**Han 2006**
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.
Study ID	**Hannon 2018**
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

Study ID	HEALTHY Study Group 2010
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
Study ID	**Hendrie 2011**
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
Study ID	**Hendy 2011**
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
Study ID	**Hooft van Huysduynen 2014**
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
Study ID	**Hopper 2005**
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
Study ID	**Howe 2011**
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
Study ID	**Hull 2018**

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.
Study ID	**Huys 2020**
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.
Study ID	**Ickovics 2019**
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
Study ID	**James 2004**
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."
Study ID	**Jansen 2011**
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
Study ID	**Johnston 2013**
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.
Study ID	**Jones 2015**
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
Study ID	**Kain 2014**
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
Study ID	**Keller 2009**

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).
Study ID	**Keshani 2016**
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)
Study ID	**Ketelhut 2022**
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
Study ID	**Khan 2014**
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
Study ID	**Kipping 2008**
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

Study ID	Kipping 2014
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.
Study ID	**Klesges 2010**
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

Study ID	**Kobel 2017**
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.

Study ID	**Kocken 2016**
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
Study ID	**Kovalskys 2016**
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
Study ID	**Kriemler 2010**
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
Study ID	**Kubik 2021**
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
Study ID	**Lau 2016**
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
Study ID	**Lazaar 2007**
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
Study ID	**Lent 2014**
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
Study ID	**Levy 2012**
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
Study ID	**Li 2010**

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
Study ID	**Li 2019**
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.
Study ID	**Lichtenstein 2011**
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
Study ID	**Liu 2019**
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

Study ID	Liu 2022
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.
Study ID	**Llargues 2012**

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
Study ID	**Lloyd 2018**
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
Study ID	**Lynch 2016**
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

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Study ID	**Macias-Cervantes 2009**
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
Study ID	**Madsen 2013**
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
Study ID	**Magnusson 2012**
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
Study ID	**Marcus 2009**
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.
Study ID	**Marsigliante 2022**
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.

Study ID	**Martinez-Vizcaino 2014**
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

Study ID	**Martinez-Vizcaino 2020**
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.

Study ID	**Martinez-Vizcaino 2022**
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).

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Study ID	**Meng 2013 (Beijing)**
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.
Study ID	**Morgan 2011**
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
Study ID	**Morgan 2014**
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.
Study ID	**Morgan 2019**
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
Study ID	**Muller 2016**
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.
Study ID	**Muller 2019**
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).
Study ID	**Muzaffar 2019**
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.
Study ID	**NCT00224887 2005**
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

Study ID	**NCT02067728 2014**
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.
Study ID	**Nemet 2011a**
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
Study ID	**Nemet 2011b**
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
Study ID	**Newton 2014**

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.
Study ID	**Nicholl 2021**
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
Study ID	**Nollen 2014**
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.
Study ID	**Nyberg 2015**
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 narrativelly.
Study ID	**Nyberg 2016**
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
Study ID	**O'Connor 2020**
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"
Study ID	**Paineau 2008**

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
Study ID	**Pena 2021**
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.
Study ID	**Pindus 2015**
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
Study ID	**Puder 2011**
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
Study ID	**Ramirez-Rivera 2021**
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
Study ID	**Razani 2018**

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."
Study ID	**Rerksuppaphol 2017**
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
Study ID	**Rhodes 2019**
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
Study ID	**Riiser 2020**
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
Study ID	**Robinson 2003**
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
Study ID	**Robinson 2010**
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
Study ID	**Rosario 2012**
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
Study ID	**Rosenkranz 2010**
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
Study ID	**Rush 2012**
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
Study ID	**Sacchetti 2013**
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
Study ID	**Safdie 2013**
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
Study ID	**Sahota 2001**
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
Study ID	**Sahota 2019**

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
Study ID	**Salmon 2008**
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."
Study ID	**Salmon 2022**
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."
Study ID	**Santos 2014**
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.
Study ID	**Seguin-Fawler 2021**
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.
Study ID	**Sekhavat 2014**
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

Study ID	Sgambato 2019
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
Study ID	**Sherwood 2019**
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
Study ID	**Sichieri 2008**
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

Study ID	Siegrist 2013
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
Study ID	**Siegrist 2018**
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
Study ID	**Simon 2008**
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.
Study ID	**Spiegel 2006**
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
Study ID	**Stettler 2015**

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.

Study ID	Stolley 1997
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
Study ID	**Story 2003**
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
Study ID	**Story 2012**
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
Study ID	**Tanskey 2017**
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
Study ID	**Telford 2012**
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)
Study ID	**Tessier 2008**
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
Study ID	**Thivel 2011**

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
Study ID	**Topham 2021**
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)
Study ID	**Treviño 2004**
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."
Study ID	**Van de Berg**

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
Study ID	**Viggiano 2018**
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
Study ID	**Vizcaino 2008**
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
Study ID	**Wang 2012**
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
Study ID	**Wang 2018**
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
Study ID	**Warren 2003**
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.
Study ID	**Wendel 2016**
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
Study ID	**White 2019**

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
Study ID	**Williamson 2012**
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
Study ID	**Xu 2015**
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
Study ID	**Xu 2017**
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 study.
Study ID	**Yin 2012**
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
Study ID	**Zota 2016**
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.

Children aged 12 to 18 years

Study ID	**Afam-Anene 2021**
Methods	Study name: NR 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
Participants	N randomized (intervention): 189 N randomized (control): 157 Setting: Secondary school(s) Location: Owerri North, Local Government Area of Imo State; Nigeria Country income: Lower middle income Recruitment: NR % of eligible population enrolled: NR Age: Participants are adolescents in secondary schools Gender/Sex: NR

Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): Proportion of children who are obese Outcome(s) included in the meta-analysis: None Outcome self-reported: NR Reason for exclusion from the meta-analysis: Results described narratively
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR General notes: Conference abstract; narrative results only
Study ID	**Ahmed 2021**
Methods	Study name: NR Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 12 weeks Follow-up time(s): 12 weeks (Note: BMI as outcome was planned but not measured)
Participants	N randomized (intervention): 160 N randomized (control): 160

	Setting: Eight schools Location: Dhaka; Bangladesh Country income: Lower middle income Recruitment: "Thirteen schools were purposively invited to participate in the study. Eleven schools accepted the intervention, and eight of them were randomly allocated for the study. All randomly selected schools were then randomised. An information pack, containing information sheet, consent and assent form, was distributed to interested students so that they could discussed with their parents about their participation in the study. Written informed parental consent and student's assent were obtained from all students participated in this study, and the response rate was 100%. A minimum of 40 students were recruited from each school, as per the inclusion criteria. For a school with more than 40 students in Grade 8 and 9, a random allocation was performed to achieve the required sample size." % of eligible population enrolled: Schools: 73% (8/11); children: 100% (320/320); Age: Mean (SD): intervention: 14.42 (1.15); control: 14.18 (0.89) Gender/Sex: 41.25% boys
Interventions	Theory: Health-Promoting School Framework Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): None Outcome(s) included in the meta-analysis: NA Outcome self-reported: No Reason for exclusion from the meta-analysis: Measurement of proportion of children who are obese or overweight was planned but results are not reported (there is no evidence that it was measured)

Notes	Clinical Trial Registry: ACTRN12619000091101 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: There was no external financial support with this project General notes: BMI outcome was planned but not reported
Study ID	**Amaro 2006**
Methods	Study name: Kaledo Study design: Cluster RCT N of arms: 2 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 24 weeks Follow-up time(s): 24 weeks
Participants	N randomized (intervention): 188 N randomized (control): 103 Setting: Three middle school Location: Naples; Italy Country income: High income Recruitment: "All students from three middle school in Naples were invited to participate." % of eligible population enrolled: Children: 95% (291/307); Age: Mean (SD): intervention: 12.3 (0.8); control: 12.5 (0.7) Gender/Sex: 55.2% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention

	Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study has been made possible by contributions from the Italian Association Amici di Raoul Follereau (AIFO), Commune of Naples and from the Second University of Naples." General notes: NR
Study ID	**Andrade 2014**
Methods	Study name: ACTIVITAL (actividad y vitalidad) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 28 months Follow-up time(s): 17 months; 28 months
Participants	N randomized (intervention): 700 N randomized (control): 740 Setting: Twenty schools Location: Cuenca; Ecuador

	Country income: Upper middle income Recruitment: "All students in 8th and 9th grades from 20 schools in urban Cuenca were invited to participate." % of eligible population enrolled: Schools: 71% (20/28); Children: 100%; Age: Mean (SD): intervention: 12.8 (0.8); control: 12.9 (0.8) Gender/Sex: Intervention: 33.6% boys; control: 40.7% boys;
Interventions	Theory: Social Cognitive Theory, Information-Motivation, Behavioral Skills Model, Control Theory, Trans-theoretical Mode, Theory of Planned Behavior Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI long term; zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01004367 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by generous financial support from VLIR-UOS and Nutrition Third World and conducted within the cooperation between the Cuenca University (Ecuador) and the Ghent University (Belgium)." General notes: The eligible schools were paired according to monthly school fee (as proxy for the socioeconomic status of the school).
Study ID	**Arlinghaus 2021**

Methods	Study name: FLOW-PA (Family Lifestyle Overweight Prevention Program-Physical Activity) 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	N randomized (intervention): 251 N randomized (control): 240 Setting: Middle school students from a school district Location: Houston, Texas; United States Country income: High income Recruitment: "Middle school students from a school district in Houston, Texas." % of eligible population enrolled: Children: 100%; Age: Mean (SD): weekday group: 12.10 (0.63), weekend group: 12.06 (0.60) Gender/Sex: Weekday group: 47.15% boys; weekend group: 43.38% boys;
Interventions	Theory: Social Cognitive Theory Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA

Notes	Clinical Trial Registry: NCT04396769 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This research was supported by funds from the US Department of Agriculture, Grant No. ARS 2533759358. 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." General notes: NR
Study ID	**Barbosa Filho 2017**
Methods	Study name: Fortaleça sua Saúde Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 4 months Follow-up time(s): 4 months (Note: BMI as outcome was planned but not measured)
Participants	N randomized (intervention): 639 N randomized (control): 633 Setting: Six full-time schools of the city that were linked to a national program called School Health Program Location: Fortaleza; Brazil Country income: Upper middle income Recruitment: "All six full-time schools of the city that were linked to a national program called School Health Program were included....The six schools had similar characteristics (e.g., size, target audience, curriculum, etc.) and were located in different administrative regions (geographically dispersed). After authorization of the study by the Municipal Education

	Department, all directors of eligible schools were informed about the study and the participation criteria. All directors agreed to participate without being informed which treatment group the schools would be assigned to in the study." % of eligible population enrolled: Schools: 100% (6/6); children: 93% (1182/1272); Age: Age groups 11–13 years: 52.9%; age group 14–18 years: 47.1% Gender/Sex: 51.5% boys
Interventions	Theory: Different theoretical aspects, including the Socio-ecological Theory and Health-Promoting School Framework Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): None Outcome(s) included in the meta-analysis: NA Outcome self-reported: NA Reason for exclusion from the meta-analysis: Measurement of proportion of children who are obese or overweight at follow-up was planned but results are not reported (there is no evidence that it was measured)
Notes	Clinical Trial Registry: NCT02439827 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "There was no financial funding to perform this study. Individual grants for VCBF (N. 10737/2014-6) from the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and ASL (N. 303012/2013-7) from the Conselho Nacional de Ciência e Tecnologia (CNPQ). The funding agencies had no participation in the interpretation, analysis, writing and approval of this manuscript." General notes: BMI outcome was planned but not reported

Study ID	**Bayne-Smith 2004**
Methods	Study name: PATH (Physical Activity and Teenage Health Study design: RCT/Clustered RCT (Started as RCT then became CRCT, see notes) N of arms: 2 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	N randomized (intervention): 310 N randomized (control): 132 Setting: Students from three New York City high schools Location: New York City, New York; United States Country income: High income Recruitment: Students from three New York City high schools. % of eligible population enrolled: NR Age: Mean (SD): intervention: 16.2 (1.3); control: 15.9 (1.2) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term

	Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was funded in part by grants from the Professional Staff Congress-City University of New York (CUNY), Faculty Research Awards Program, the Research Foundation of CUNY; the Department of Health, State of New York; and Operation Fitkids, Inc." General notes: Trial started as an RCT with individuals being randomised, then became a CRCT in year 2 and 3 with classes being randomised after year one. No details given about number of clusters.
Study ID	**Belton 2019**
Methods	Study name: Y-PATH (Youth-Physical Activity Towards Health) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 9 months (one school year) Follow-up time(s): 12 months; 24 months (Note: results at 24 months are not reported)
Participants	N randomized (intervention): 275 N randomized (control): 259 Setting: Twenty mixed-gender schools in the particular Irish geographical region Location: Dublin County; Ireland Country income: High income Recruitment: "Inclusion criteria for post primary schools in this study were that a) schools

	have a qualified PE teacher on staff, b) first year students attending the school were timetabled for a minimum of 70 minutes of PE weekly, c) schools were mixed gender and situated in the greater area of a large Irish city. All mixed-gender schools in the particular Irish geographical region (n = 104) were invited to express interest in participation in the study if they met the above inclusion criteria....Principals of 26 schools returned expressions of interest, screening of these schools highlighted that 22 schools met the inclusion criteria, all 22 schools were recruited to participate in the study. One first year class group from each school was randomly selected by the school principal to participate. Two schools subsequently withdrew from the study prior to commencement due to changes in staffing (PE teacher and principal), reducing numbers to 20 overall." % of eligible population enrolled: School; 91% (20/22); children: 96% (534/555); Age: Mean (SD): intervention boys: 12.8 (0.41); intervention girls: 12.79 (0.40); control boys: 12.81 (0.44); control girls: 12.8 (0.42) Gender/Sex: Intervention: 50% boys; control: 52% boys;
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: NA Outcome self-reported: No Reason for exclusion from the meta-analysis: BMI was measured at follow-up but results are not reported
Notes	Clinical Trial Registry: ISRCTN20495704 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes

	Funding details: The Y-PATH research study was funded by the Dublin Local Sports Partnerships, and the Dublin City University Career Start grant. The funders had no role in study design; collection, analysis, and interpretation of data; writing the report; and the decision to submit the report for publication. General notes: BMI was measured at baseline and at follow-up at 12 and 24 months but data are not reported. The 20 recruited schools were pair-matched prior to baseline testing based on the following criteria: socioeconomic status (disadvantaged, non-disadvantaged, and fee paying).
Study ID	**Bernstein 2019**
Methods	Study name: ECT (Expand, Connect, Thrive) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 7.5 months (6 weeks primary intervention + 6 months of MI sessions) Follow-up time(s): 4.5 months (3 months post-intervention); 7.5 months (6 months post-intervention);
Participants	N randomized (intervention): 27 N randomized (control): 24 Setting: Summer camp at school based health clinic (SBHC) Location: North Miami Beach, Florida; United States Country income: High income Recruitment: "Participants were recruited using flyers posted at feeder schools for the Middle School and at the Middle School. All adolescents voluntarily indicated interest in participation. Only youth entering grades 6-9 and their parents who were enrolled in the summer camp were approached by study staff (i.e., trained social workers and/or a graduate student).

	Parental consent and youth assent were obtained from interested families. Additionally, parents signed a video/audio recording authorization." % of eligible population enrolled: Children: 96% (51/53); Age: Mean (SD): 12.06 (1.16) Gender/Sex: 44% boys
Interventions	Theory: Cognitive Behaviour Therapy, Self Determination Theory Intervention type: Dietary and Activity intervention Comparator type: Dietary and Activity Comparison: Dietary and Activity intervention vs Dietary and Activity intervention Setting of the intervention: School (ASP)
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: Comparison is not eligible (the comparison is between the same type of interventions)
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR General notes: Weight status at baseline: 54% of the sample fell into the overweight category and 18% met the cut off for obesity. Narrative results only.
Study ID	**Black 2010**
Methods	Study name: Challenge! Study design: RCT N of arms: 2

	Unit of allocation: Individual Unit of analysis: Individual Intervention period: 12 weeks Follow-up time(s): 10 months; 24 months
Participants	N randomized (intervention): 121 N randomized (control): 114 Setting: Mid-Atlantic, urban, University Medical Center Location: Baltimore, Maryland; United States Country income: High income Recruitment: Two groups of adolescents were recruited. One group (n=84) participated in a longitudinal investigation of growth and development. "Approximately 17.9% experienced growth faltering by age 2 years; by 6 years, their growth had recovered. The other group (n=151) was recruited from middle schools." % of eligible population enrolled: NR Age: Mean (SD): 13.3 (1) Gender/Sex: 51% boys
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Home + Community
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term; zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT00746083; NCT03103269; Funder(s) type: Non-industry

	Writing and/or research independent from funder(s): NR Funding details: "This research was supported by grant R40MC00241 from the Maternal and Child Health Research Program, US Department of Health and Human Services to Maureen Black, Ph.D., and the University of Maryland General Clinical Research Center grant M01 RR16500, General Clinical Research Centers Program, National Center for Research Resources (NCRR), NIH." General notes: NR
Study ID	**Bogart 2016**
Methods	Study name: SNaX (Students for Nutrition and Exercise) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 5 weeks Follow-up time(s): 2 years
Participants	N randomized (intervention): 1954 N randomized (control): 2068 Setting: Ten schools with >50% NSLP-eligible students (a proxy for low income) Location: Los Angeles Unified School District (LAUSD), California; United States Country income: High income Recruitment: From Bogart 2014: "We identified 31 eligible schools with >50% NSLP-eligible students (a proxy for low income) and <900 seventh-graders (a greater number of smaller schools provides more statistical power than a few larger schools). The number of schools selected (5 intervention, 5 wait-list control) was based on a pre-RCT power analysis for small-to-medium effects. / Seventh-graders were recruited via in-class presentations and informational tables for a peer leader club in which they learned educational messages and

	conducted lunchtime giveaways (e.g., educational bookmarks) and cafeteria-food taste-tests." % of eligible population enrolled: School: 32% (10/31); Children: 91% (3678/4022); Age: Mean (SD): 12.2 (0.68) Gender/Sex: 49.1% boys
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Home
Outcomes	Measured outcome(s): zBMI and BMI percentile Outcome(s) included in the meta-analysis: BMI percentile long term Outcome self-reported: No Reason for exclusion from the meta-analysis: Results described narratively (zBMI long term)
Notes	Clinical Trial Registry: NCT01914471 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: Supported by the National Institute on Minority Health and Health Disparities (R24 MD001648; Dr Schuster, Principal Investigator). Funded by the National Institutes of Health (NIH). General notes: One school served as a control school in 2009 and then again as an intervention school 1 year later in 2010: "based on our school selection criteria (in which we matched pairs of control and intervention schools within the same district area), 1 school served as a control school in 2009 and then again as an intervention school 1 year later in 2010."
Study ID	**Bonsergent 2013**

Methods	Study name: PRALIMAP (PRomotion de l'ALIMentation et de l'Activité Physique) Study design: Clustered RCT (2x2x2 factorial design) N of arms: 8 Unit of allocation: School Unit of analysis: Individual Intervention period: 2 school years (6 months/year) Follow-up time(s): 12 months; 24 months (Note: results at 12 months are not reported)
Participants	N randomized (intervention): Education strategy: 3424; No education strategy: 2947; Environmental strategy: 3150; No environmental strategy: 3221; Screening and care strategy: 3191; No screening and care strategy: 3180 N randomized (control): Setting: Twenty-four public high schools Location: Lorraine region; France Country income: High income Recruitment: "A total of 24 public high schools were included in PRALIMAP, in the administrative region of Lorraine, northeast France (population 2,339,000, according to the 2006 census) in 2006 and 2007. All adolescents entering the selected high schools in Grade 10 in 2006 or 2007 (according to the school) and in Grade 11 in 2007 or 2008 were enrolled." % of eligible population enrolled: Schools: 19% (24/124); Children: 84% (5354/6371); Age: Mean: 15.8 Gender/Sex: 47.1% boys
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: Attention control Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Healthcare Service + Community

Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI long term; zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT00814554 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "The PRALIMAP trial was funded by grants from public and private sectors. Special acknowledgements are addressed to ARH Lorraine, Conseil Régional de Lorraine, DRASS de Lorraine, GRSP de Lorraine, Fondation Coeurs et Artères, Fondation Wyeth, Ministère de l'enseignement supérieur et de la recherche, Inca, IRESP, Régime local d'assurance maladie d'Alsace Lorraine and Urcam de Lorraine. All trial steps, design,data collection, analysis, write-ups, and reports are and will be performed independently of any funding or sponsoring agency." General notes: The design of the trial is a 2x2x2 factorial and data are reported and analysed according to this design: "Each high school was assigned to receive or not receive each of the three strategies according to a 2x2x2 factorial cluster (high school) randomization, stratified on administrative area and type of school."
Study ID	**Brito Beck da Silva 2019**
Methods	Study name: StayingFit Brazil 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	N randomized (intervention): 428 N randomized (control): 467 Setting: Twelve mid-sized public schools of the public comprehensive education system Location: Salvador, Bahia; Brazil Country income: Upper middle income Recruitment: "7th to 9th graders who were enrolled in twelve mid-sized public schools of the public comprehensive education system in Salvador, Bahia, Brazil participated in this research. Eligible students provided a signed informed consent document and agreed to participate in the study." % of eligible population enrolled: Schools: NR; Students: 50% (895/1800) Age: Mean (SD): 14.5 (1.42) Gender/Sex: 51.6% boys
Interventions	Theory: Cognitive Behavioural Therapy Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Home + Web
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: RBR-7qgnbn Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This research was funded by National Council for Scientific and Technological Development (CNPq; n. 446763/2014-4), the Bahia Research Foundation (FAPESB; n.app

	0103/2016) and Coordination of Superior Level Staff Improvement (CAPES: 001)." General notes: NR
Study ID	**Chen 2011**
Methods	Study name: Web ABC (Web-Based Active Balance Childhood) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 8 weeks Follow-up time(s): 8 months
Participants	N randomized (intervention): 27 N randomized (control): 27 Setting: Community programs Location: San Francisco Bay area, California; United States Country income: High income Recruitment: Convenience sampling was used to recruit participants from community programs in the San Francisco Bay area. % of eligible population enrolled: Children: 86% (54/63) Age: Mean (SD): 12.52 (3.15) Gender/Sex: 53.7% boys
Interventions	Theory: Trans-theoretical Model, Stages of Change, Social Cognitive Theory, Intervention type: Dietary and Activity intervention Comparator type: Attention control Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Community + Web

Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This publication was made possible by grant number KL2 RR024130 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, Hellman research grant, and in part by NIH grant DK060617 to M.B.H. General notes: NR
Study ID	**Cohen 2021**
Methods	Study name: SIMAC (Fuerza muscular y capacidad aero´bicarelacio´n SImbio´tica en escolares con bajo peso al nacer y riesgo MetAbo´liCo) Study design: RCT N of arms: 3 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 16 weeks Follow-up time(s): 16 weeks
Participants	N randomized (intervention): Resistance training: 44; Aerobic training: 43 N randomized (control): 41 Setting: One state school Location: Piedecuesta, Santander; Colombia

	Country income: Upper middle income Recruitment: "We recruited by inviting all students aged between 13–17 and their parents to presentations given by the investigators at the school to outline the study. For those students who were interested in participating and their parent or guardian gave their assent, we obtained written informed consent from the parent/guardian." % of eligible population enrolled: Children: 83% (129/155) Age: Mean (SE): resistance intervention: 15 (0.95); aerobic intervention: 14.8 (1.04); control: 14.7 (1.09) Gender/Sex: Resistance intervention: 55% boys; aerobic intervention: 47.5% boys; control: 50% boys;
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School (ASP)
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: Results described narratively
Notes	Clinical Trial Registry: NCT03779737 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "FOSCAL received funding for this project in the form of a grant (2014 Colciencias grant ID: 651765741093 number:657), which was awarded to DDC and PAC and used for equipment and other human resources relating to the present study." General notes: Narrative results only. Outcome estimate is reported for lean body mass and

	sum of skinfold, but not for BMI, despite being included as primary outcome in the trial registration.
Study ID	**Dewar 2013**
Methods	Study name: NEAT Girls (Nutrition and Enjoyable Activity for Teen Girls) 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	N randomized (intervention): 178 N randomized (control): 179 Setting: Twelve government secondary schools Location: Hunter Region and Central Coast areas in New South Wales; Australia Country income: High income Recruitment: "Government secondary schools located in the Hunter Region and Central Coast areas in New South Wales (Australia), with a SEIFA index of = 5 (bottom 50%) were considered eligible for inclusion. Eligible study participants were adolescent girls in Grade 8 (2nd year of secondary school) attending one of the 12 recruited schools." % of eligible population enrolled: Schools: 67% (12/18); Children: NR; Age: Mean (SD): 13.2 (0.5) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention

	Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI medium term; BMI long term; zBMI medium term; zBMI long term; Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12610000330044 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This research project is funded by an Australian Research Council Discovery Project Grant (DP1092646). This sponsor had no involvement in the design or implementation of this study, in analyses of data, or in the drafting of this paper." General notes: Twelve eligible schools were recruited (based on a Socio-Economic Indices for Areas [SEIFA] index ≤ 5. This index is derived from information [e.g., education, employment and financial well-being] used to characterise individuals and households in a specified area). To be eligible for the study, students were considered by their teachers to be disengaged in physical activity and/or not currently participating in organized team or individual sports.
Study ID	**Dunker 2018**
Methods	Study name: BNMP (Brazilian New Moves program) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 18 weeks Follow-up time(s): 18 weeks

Participants	N randomized (intervention): 131 N randomized (control): 139 Setting: Ten public schools Location: Sao Paulo (central and southern areas); Brazil Country income: Upper middle income Recruitment: "Out of a total 46 schools from the Central-Southarea of São Paulo city, we consulted 20 schools. Institutions were selected after principals agreed to have their schools involved. Ten public schools from the were interested in participating in the clinical trial at the beginning of each semester. The primary researcher advertised the project during school hours to all seventh and eighth-grade students. During the recruitment process, only girls were asked to participate." % of eligible population enrolled: Schools: 22% (10/46); Children: 95% (270/285); Age: Mean (SD): 13.39 (0.64) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School (ASP)
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: RBR-6ddpb3 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This work was supported by the São Paulo Research Foundation (FAPESP)

	[grant number 2012/16952-8]; and by the Brazilian National Council for Scientific and Technological Development (CNPQ) [grant number 483871/2013-3]. The authors received statistical and English reviewing assistance from SporeData Inc. The authors declare that there is no conflict of interest regarding the publication of this paper. Our funding sources had no involvement in the study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the article for publication." General notes: Eligible participants were girls practicing less than one daily hour of physical activity at the time of study recruitment.
Study ID	**Ebbeling 2006**
Methods	Study name: BASH - Beverages and Student Health Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 25 weeks Follow-up time(s): 25 weeks
Participants	N randomized (intervention): 53 N randomized (control): 50 Setting: Home Location: United States Country income: High income Recruitment: "Recruitment was conducted in collaboration with a local high school that provided mailing lists. Packets containing an invitation letter and informed consent and assent documents were sent to parents of all students enrolled at the school. Parents were instructed to contact staff members by telephone, if interested, to obtain more information about the study protocol. The study director supervised the evaluation of eligibility criteria

	and enrolment. Adolescents aged 13-18 years who reported consuming at least 1 serving per day of sugar-sweetened beverages (SSB) and lived predominately in 1 household were eligible." % of eligible population enrolled: Children: 77% (103/133); Age: Mean (SD): intervention: 16 (1.1); control: 15.8 (1.1) Gender/Sex: Intervention: 45% boys; control 46% boys;
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: Home + Telehealth
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was supported by grants R01 DK63554 and K01 DK62237 from the National Institute of Diabetes and Digestive Kidney Diseases, the Charles H. Hood Foundation, and grant M01 RR02172 awarded by the National Institutes of Health to support the General Clinical Research Center at Children's Hospital Boston." General notes: Adolescents aged 13-18 years who reported consuming at least 1 serving per day of sugar-sweetened beverages (SSB) and lived predominately in one household were eligible to participate.
Study ID	**El Ansari 2010**

Methods	Study name: NR 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
Participants	N randomized (intervention): 80 N randomized (control): 80 Setting: One secondary school with both indoor and outdoor sport facilities and sport equipment Location: Mansoura City; Egypt Country income: Lower middle income Recruitment: "A little minority of schools in Mansoura city have both indoor and outdoor sport facilities and sport equipment, which were needed for the study. One secondary school in Mansoura city was selected due to the availability of both indoor and outdoor sport facilities and sport kits at the school." % of eligible population enrolled: Children: 44% (200/450) agreed to participate; 100% of eligible students were included (180/180); Age: Mean (SD): intervention: 15.7 (1.8); control: 15.4 (1.6) Gender/Sex: 43.75% boys
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School (ASP)

Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR General notes: NR
Study ID	**Ezendam 2012**
Methods	Study name: FATaintPHAT Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 10 weeks Follow-up time(s): 2 years
Participants	N randomized (intervention): 485 N randomized (control): 398 Setting: Twenty-three schools for secondary education Location: Netherlands Country income: High income Recruitment: "Eighty-eight schools for secondary education in the Rotterdam area were invited to participate. Twenty-three schools were eligible and willing to participate. Second, adolescents from 1 to 5 first-year classes in each school (depending on the number of first-

	year classes in the school, maximum of 5) were invited to participate. Students received information and an informed consent form for themselves and their parents for active consent. The completed consent forms were returned through the schools % of eligible population enrolled: Schools: 33% (23/70); Children: 59% (883/1494); Age: Mean (SD): intervention: 12.7 (0.7); control: 12.6 (0.6) Gender/Sex: Intervention: 58.9% boys; control 49.7% boys;
Interventions	Theory: Theory of Planned Behavior, Precaution Adoption Process Model, Implementation intentions Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ISRCTN15743786; NTR811; Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "Funding/Support: This study was funded by grant 62200020 from ZonMw, the Netherlands Organization for Health Care Research and Development. Role of the Sponsors: The funding organization was not involved in any aspect of the analyses or in the preparation of the manuscript" General notes: NR
Study ID	**Farias 2015**

Methods	Study name: NR 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): 1 school year
Participants	N randomized (intervention): 283 N randomized (control): 284 Setting: High school Location: Colégio Meta, Rio Branco, Acre ; Brazil Country income: Upper middle income Recruitment: "Post-pubertal school children attending the first to the third year of high school of Colégio Meta, Rio Branco, AC, Brazil, aged 15 to 17 years, during the 2011 school year." % of eligible population enrolled: Children: 68% (386/567; number of children excluded because not eligible is not reported) Age: Mean (SD): intervention: 15.9 (0.8); control: 16 (0.8) Gender/Sex: Intervention: 56.9% boys; control: 49.3% boys;
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: None Outcome self-reported: NR Reason for exclusion from the meta-analysis: It is apparent that there is a typo in the results

	and the transformation of the data from proportion of children who are obese or overweight to zBMI looks implausible
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: CNPq (Conselho Nacional de Desenvolvimento Científico eTecnológico)-process n. 475959/2010-8. General notes: NR
Study ID	**French 2011**
Methods	Study name: Take Action Study design: Cluster RCT N of arms: 2 Unit of allocation: Family (parents + ≥ 1 child) Unit of analysis: Individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	N randomized (intervention): NR N randomized (control): NR Setting: Community and home Location: Minneapolis, Minnesota; United States Country income: High income Recruitment: "Households were recruited from the community for a one-year obesity prevention intervention trial. The intervention included both household environment and individual-level behavioral components. Recruitment sources included community libraries, worksites, schools, day-care centers, health clinics, religious institutions, park and recreation centers, grocery stores and food co-ops."

	% of eligible population enrolled: Households: 31% (90/289); Age: Mean (SD): 14.7 (1.7) Gender/Sex: 61.1% boys
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Home + Community + Telehealth
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was supported by grant #1U54CA116849 and #R21CA137240 from the National Institutes of Health/National Cancer Institute." General notes: The unit of randomization is the household (HH), more than one children per HH was eligible to participate and the analysis is adjusted for clustering, therefore the study is coded and assesses as CRCT: quote: "HH configuration was a four-category variable created based on crossing the number of adults and children living in the HH: one adult/one child; one adult/multiple children; two adults/one child; two adults/multiple children."
Study ID	**Gustafson 2019**
Methods	Study name: Go Big and Bring it Home Study design: Cluster RCT

	N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 8 weeks Follow-up time(s): >12 weeks
Participants	N randomized (intervention): 380 N randomized (control): 150 Setting: Eight high schools (four in rural eastern Kentucky and four in rural eastern North Carolina) Location: Eastern Kentucky and Eastern North Carolina; United States Country income: High income Recruitment: "A total of eight high schools (four in rural eastern Kentucky and four in rural eastern North Carolina) agreed to participate in the intervention in the fall of 2017. Schools were asked to participate in the intervention through Cooperative Extension agents in each county in Kentucky and in North Carolina through existing relationships with school staff and administration. Advertising for recruitment was conducted through several channels including e-mail and text message, information sheets about the intervention, information on the school websites and/or Facebook web page, orientation events "Teachers handed out information to students in foods/culinary classes, physical education and health classes, home room, English classes, and in a general agriculture course." % of eligible population enrolled: Schools: NR; Students: 91% (482/530; 48 students from the intervention arm dropped from the study); Age: Mean (SE): intervention: 15 (0.07); control: 15 (0.1) Gender/Sex: Intervention 38% boys; control 30% boys;
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention

	Comparison: Dietary intervention vs Control Setting of the intervention: Telehealth
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT02793024 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was funded by the United States Department of Agriculture (USDA) Agriculture and Food Research Initiative Grant 30000045856." General notes: NR
Study ID	**Haerens 2006**
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 (9 months/year) Follow-up time(s): 8-9 months; 20-21 months
Participants	N randomized (intervention): Intervention + parents involvement: 1226; Intervention only: 1006 N randomized (control): 759 Setting: Fifteen schools with technical and vocational education Location: West Flanders; Belgium

	Country income: High income Recruitment: "A random sample of 15 schools of the 65 schools with technical and vocational education in West-Flanders (Belgium) was selected to participate in this study." All students in 7th and 8th grades were invited. % of eligible population enrolled: Schools: 23% (15/65); Children: 95% (2840/2991) Age: Mean (SD): 13.06 (0.81) Gender/Sex: 63.4% boys
Interventions	Theory: An ecological framework Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI medium term; BMI long term; zBMI medium term; zBMI long term; Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by the Policy Research Centre Sport, Physical Activity, and Health funded by the Flemish Government." General notes: NR
Study ID	**Haire-Joshu 2015**

Methods	Study name: BALANCE (Balance Adolescent Lifestyle Activities and Nutrition Choices for Energy) Study design: Cluster RCT N of arms: 2 Unit of allocation: Communities Unit of analysis: Individual Intervention period: 12 months Follow-up time(s): 12 months; 24 months
Participants	N randomized (intervention): 774 N randomized (control): 551 Setting: Participants of the Parent As Teachers (PAT) Teen Program Location: 30 states; United States Country income: High income Recruitment: Adolescents were eligible to participate if they were enrolled in the Parent As Teachers (PAT) Teen Program. Eligibility and willingness to participate were assessed at the sites by the parent educator. Study staff followed up with interested adolescents to formally recruit and obtain consent. % of eligible population enrolled: Communities: NR; Children: 100% (1325/1325) Age: Mean (SD): intervention: 17.7 (1.3); control: 17.9 (1.3) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory and an ecological framework Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Home + Web
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: None

	Outcome self-reported: No Reason for exclusion from the meta-analysis: Non-usable data. Data reported as Odds Ratio (OR; the outcome is odds of weight success, (i.e., maintaining normal BMI percentile from baseline to follow-up, decreasing from overweight BMI percentile at baseline to normal BMI at follow-up, or decreasing from obese BMI at baseline to overweight or normal BMI at follow-up) comparing those in BALANCE to those in the control group).
Notes	Clinical Trial Registry: NCT01617486 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "The National Cancer Institute of the National Institutes of Health (Grant #USPHS 1 R01 CA121534) funded this project. Additional support was contributed by the National Institutes of Diabetes, Digestive and Kidney Institute of the National Institutes of Health (Grant # 1P30DK092950)." General notes: Data not used. Outcome is BMI success defined as maintaining normal BMI at baseline, decreasing overweight BMI at baseline to normal BMI, or decreasing obese BMI at baseline to overweight or normal BMI.
Study ID	**Harrington 2018**
Methods	Study name: Girls Active Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 12 months Follow-up time(s): 7 months; 14 months
Participants	N randomized (intervention): 867 N randomized (control): 885

	Setting: Twenty state secondary schools Location: The Midlands (Leicester City, Leicestershire and Rutland, Derbyshire, Nottinghamshire and Warwickshire); United Kingdom Country income: High income Recruitment: "All state secondary schools in Leicester, Leicestershire and Rutland (LLR) with female pupils aged 11–14 years (n = 56 schools) were eligible and were invited to take part in the trial along with 26 other state secondary schools in Derbyshire, Nottinghamshire and Warwickshire. These schools were sent an initial letter outlining the Girls Active programme and evaluation and inviting them to a briefing event. Schools provided the research team a list of all eligible girls between the ages of 11 and 14 years and in years 7, 8 and 9. All eligible pupils were provided with an information pack that contained a separate participant and parent/guardian information sheet and opt out consent form as well as an invitation letter." % of eligible population enrolled: Schools: 24% (20/82); Children: 100% (1752/1753); Age: Mean (SD): 12.8 (0.8) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term; zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ISRCTN10688342 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes

	Funding details: "This project was funded by the National Institute for Health Research (NIHR) Public Health Research programme and will be published in full in Public Health Research; Vol. 7, No. 5. See the NIHR Journals Library website for further project information. The YST funded the intervention. This study was undertaken in collaboration with the Leicester Clinical Trials Unit, a UK Clinical Research Collaboration-registered clinical trials unit in receipt of NIHR Clinical Trials Unit support funding. Neither the YST nor the NIHR Clinical Trials Unit had any involvement in the Trial Steering Committee, data analysis, data interpretation, data collection or writing of the report. The University of Leicester authors are supported by the NIHR Leicester–Loughborough Biomedical Research Unit (2012–17), the NIHR Leicester Biomedical Research Centre (2017–22) and the Collaboration for Leadership in Applied Health Research and Care East Midlands. These funders had no involvement in the Trial Steering Committee, the data analysis, data interpretation, data collection or writing of the report." General notes: NR
Study ID	**Hollis 2016**
Methods	Study name: PA4E (Physical Activity 4 Everyone) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 7-8 school terms (19–24 months) Follow-up time(s): 12 months; 24 months
Participants	N randomized (intervention): NR N randomized (control): NR Setting: Ten secondary schools Location: New South Wales; Australia Country income: High income

	Recruitment: "Randomly selected secondary schools within the study region were invited to participate between October and December 2011. A cohort of first-year high-school students (Grade 7, aged 12–13 years) at the consenting secondary schools were invited to participate. Parents were provided with an information package and asked to provide written informed consent for their child. Two weeks following the distribution of the information package, the non-responding parents were telephoned and asked to provide verbal consent. Children also provided assent for participating in the study." % of eligible population enrolled: Schools: 45% (10/22); Children: 84% (1233/1468); Age: Median: 12 Gender/Sex: Intervention: 48% boys; control: 49% boys;
Interventions	Theory: Social Cognitive Theory and Socio-ecological Theory Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Community + Home
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI medium term; BMI long term; zBMI medium term; zBMI long term; Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12612000382875 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study is funded through the NSW Ministry of Health, Heath Promotion Demonstration grant scheme. In kind, support for the study is also provided by the Hunter New England Local Health District. The project also received infrastructure support from the

	Hunter Medical Research Institute (HMRI)." General notes: NR
Study ID	**Hovell 2018**
Methods	Study name: Healthy Smiles Study design: Cluster RCT N of arms: 2 Unit of allocation: Orthodontist practices Unit of analysis: Individual Intervention period: 18-24 months Follow-up time(s): 12 months; 18 months
Participants	N randomized (intervention): 332 N randomized (control): 361 Setting: US and Mexico orthodontists Location: San Diego, Orange, and Riverside Counties in Southern California and along the Northern border region of Baja California; United States (80% of participants) and Mexico (20% of participants) Country income: High income (USA); Upper middle income (Mexico) Recruitment: Orthodontists: US orthodontists were identified from the American Association of Orthodontist membership listing and online searches. Mexican pediatric orthodontists were identified from telephone directory advertisements and referrals from participating orthodontists. About 8% (n=33) of contacted offices enrolled. Patients: Participating offices informed their patients of the study by letter or personal contact. Patients allowing contact by study personnel were then screened for study inclusion. At an initial in-person visit the parent and child signed consent and assent forms. % of eligible population enrolled: Orthodontists: 3% (n=33; number of eligible practices not reported); Children: 70% (693/991);

	Age: Mean (SD): 12.1 (1.9) Gender/Sex: Intervention 43.4% boys; control: 54.6% boys;
Interventions	Theory: Behavioral Ecological Model, Geoffrey Rose model Intervention type: Dietary and Activity intervention Comparator type: Attention control Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Community
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01510483 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This work was supported by the National Institutes of Health, National Cancer Institute, [grant number CA138192]. NIH/NCI was not involved in the design, collection, analysis or interpretation of the data, the writing of this manuscript or in the decision to submit this manuscript for publication." General notes: NR
Study ID	**Isensee 2018**
Methods	Study name: The Lauft Program Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual

	Intervention period: 12 weeks Follow-up time(s): 12 weeks; 14.8 months (Note: results at 12 weeks are not reported)
Participants	N randomized (intervention): 887 N randomized (control): 602 Setting: Twenty-nine secondary schools Location: Schleswig-Holstein; Germany Country income: High income Recruitment: Schools were selected from a complete list of all secondary schools in Schleswig-Holstein in Germany obtained from the Ministry of Education. All secondary schools were invited to participate with their eighth grade classes. All students of participating classes were included in the study. % of eligible population enrolled: Schools: 22% (29/134); Children: NR; Age: Mean (SD): intervention: 13.68 (0.65); control: 13.71 (0.66) Gender/Sex: Intervention: 53.8% boys; Control: 50.1% boys;
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Home
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ISRCTN49482118 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: German Cancer Aid in the Priority Program Primary Prevention of Cancer

	(Nutrition and Physical Activity, reference number: 110012) General notes: Randomization conducted with a ratio intervention vs control of 3:2
Study ID	**Jago 2006**
Methods	Study name: Fit for Life Badge Programme Study design: Cluster RCT N of arms: 2 Unit of allocation: Troop Unit of analysis: Individual Intervention period: 9 weeks Follow-up time(s): 8 months + 1 week
Participants	N randomized (intervention): 240 N randomized (control): 233 Setting: Forty-two Boy Scouts troops Location: Greater Houston area, Texas; United States Country income: High income Recruitment: Participants were 10- to 14-year-old Boy Scouts recruited from 42 troops within the greater Houston area. % of eligible population enrolled: Troops: 100% (42/42); Children: 64% (473/736); Age: Mean (SE): 13 (0.1) Gender/Sex: 100% boys;
Interventions	Theory: Social Cognitive Theory (5-a-Day Achievement Badge Program) Intervention type: Activity intervention Comparator type: Dietary Comparison: Activity intervention vs Dietary intervention Setting of the intervention: Community + Web

Outcomes	Measured outcome(s): BMI and BMI percentile Outcome(s) included in the meta-analysis: BMI short term; BMI percentile short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was funded in part by a grant from the American Cancer Society, ACS TURSG-01. This work is also a publication of the USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine and Texas Children's Hospital, Houston, Texas. This project has been funded in part by federal funds from the USDA/ARS under co-operative agreement 58-6250-6001.' General notes: The study was conducted in two waves: in the spring with 16 troops and in the fall with 26 troops; outcome data are reported separately for each wave.
Study ID	**Kennedy 2018**
Methods	Study name: Resistance Training for Teens 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; 12 months
Participants	N randomized (intervention): 353 N randomized (control): 254 Setting: Sixteen government secondary schools

	Location: Hunter, Central Coast and Sydney regions of New South Wales; Australia Country income: High income Recruitment: Eligible schools were government secondary schools within approximately 50 km of the University of Newcastle and the University of Sydney were identified via the NSW Department of Education website 'School Locator' function. % of eligible population enrolled: Schools: 20% (16/81); Children: NR Age: Mean (SD): 14.1 (0.5) Gender/Sex: 49.9% boys;
Interventions	Theory: Social Cognitive Theory, Social-determination Theory Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term; zBMI short term; zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12615000360516. Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "The authors thank the Australian Research Council and the DoE School Sport Unit (with special thanks to Ross Morrison and Sue Meade) for providing funding"; "The results of the present study do not constitute endorsement by the American College of Sports Medicine." General notes: NR

Study ID	Kuhlemeier 2022
Methods	Study name: ACTION-PAC Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: Two 20 min sessions over two years Follow-up time(s): 12 months; 24 months
Participants	N randomized (intervention): N randomized (control): Setting: Eight public high schools from a state in the Southwestern United States Location: New Mexico; United States Country income: High income Recruitment: "Schools were eligible if they had functioning school-based health centers (SBHC), enrolled ≥ 700 students, had ≥ 40% Latinx students, and were located in high poverty areas. Participants were in the 9th or 10th grade. Consent was obtained from a parent and assent from the participant. % of eligible population enrolled: School: NR; Children: NR Age: Mean: 15.3 (range: 13.4 years to 17.7 years) Gender/Sex: 45.4% boys
Interventions	Theory: King's Theory of Goal Attainment and Transaction Process Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School

Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT02502383 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by the National Institutes of Health, National Heart, Lung, and Blood Institute [R01HL118734] (PI: Kong).The authors have no conflicts or competing interests to disclose." General notes: NR
Study ID	**Kuroko 2020**
Methods	Study name: COOK (Create Our Own Kai) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 7 weeks Follow-up time(s): 12 months
Participants	N randomized (intervention): 109 N randomized (control): 55 Setting: Local educational facilities' teaching kitchens and home Location: Dunedin; New Zealand Country income: High income Recruitment: "Adolescents in their first two years of high school (mostly 12–15 years old),

	residing in Dunedin, New Zealand, were recruited via social media, posters and word of mouth." % of eligible population enrolled: Children: 92% (164/179); Age: Mean (SD): 13.6 (0.8) Gender/Sex: 35.6% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School (ASP) + Home + Web
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12616001664437 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: Lotteries Health New Zealand and the Foodstuffs Community Trust General notes: NR
Study ID	**Lana 2014**
Methods	Study name: PREVENCANADOL program Study design: RCT N of arms: 3 Unit of allocation: Individual Unit of analysis: Individual

	Intervention period: 9 months Follow-up time(s): 9 months
Participants	N randomized (intervention): 1014 N randomized (control): 987 Setting: Secondary education schools Location: Mexico (78% of participants); Spain (22% of participants) Country income: Upper middle income (Mexico); High income (Spain); Recruitment: Secondary education schools in Mexico and Spain. "Programme information was sent by email to all teachers. Links and banners were placed on the main educational portals. Participation was voluntary, but most interested teachers encouraged their students to participate." % of eligible population enrolled: Children: 52% (2001/3855) Age: NR Gender/Sex: 45.2% boys
Interventions	Theory: Attitude, Social influence and self-Efficacy (ASE) Model, Trans-theoretical Model Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: None Outcome self-reported: Yes Reason for exclusion from the meta-analysis: Non-usable data. Definition of obesity and overweight not reported.
Notes	Clinical Trial Registry: ISRCTN27988779 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR

	Funding details: "This research was funded by the Spanish Ministry of Health (Reference: FISS 08PI080544)." General notes: Data not used. Definition of obesity and overweight is not reported
Study ID	**Lappe 2017**
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): 6 months; 12 months (Note: results at 6 months not reported)
Participants	N randomized (intervention): 136 N randomized (control): 138 Setting: Creighton University Osteoporosis Research Center Location: Omaha, Nebraska (note: this is the location of the Medical Center where the study is based); United States Country income: High income Recruitment: "Participants were recruited from the community by using a wide range of methods, such as direct mailing to parents, advertisements in the media, flyers placed in various community locations, and recruitment collaboration with schools, health care providers, and the Girl Scouts. Extensive efforts were made to recruit girls from all racial-ethnic groups in the community. Interested families were encouraged to call the research center at which time a telephone screening was completed to determine eligibility. Those who passed the telephone screening were mailed a 3-d diet diary, which was completed and returned. If eligible by dietary analysis, the girl and her parent were scheduled for a screening study visit."

	% of eligible population enrolled: Children: 100% (274/274) Age: Mean (SD): intervention: 13.5 (0.5); control: 13.5 (0.5) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: Community
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01066806 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: Supported by the National Institute of Nursing grant R01NR010108 General notes: NR
Study ID	**Leme 2018**
Methods	Study name: H3G-Brazil (Healthy Habits, Healthy Girls–Brazil) 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; 12 months

Participants	N randomized (intervention): 142 N randomized (control): 111 Setting: Ten technical public schools that offer nutrition and dietetics training Location: San Paulo; Brazil Country income: Upper middle income Recruitment: "The Human Development Index (HDI) was used to identify eligible high schools. Technical public schools that offer nutrition and dietetics training in the city of São Paulo were selected for the current study. Once schools agreed to participate in the study, research assistants visited the study schools and provided a presentation to the students describing the proposed intervention and assessment procedures. Study participants were then asked to complete a questionnaire regarding PA and eating behaviors to identify girls “at risk” for obesity. Those who were considered “at risk” of obesity based on their PA and dietary behaviors were then eligible to participate in the intervention. The target for recruitment was 25 students per school, but up to 30 students from each school could be accepted. The 30 first students from each school to return their completed consent forms were in cluded in the study." % of eligible population enrolled: Schools: 91% (10/11); Children: 100% (253/253); Age: Mean (SE): 16.05 (0.05) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Home
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term; zBMI short term; zBMI medium term

	Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT02228447 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "Author ACBL received a scholarship from the Brazilian Federal Agency for Evaluation and Support of Graduate Education (Coordenação De Aperfeiçoamento de Pessoal de Nível Superior—CAPES). Author PG holds a postdoctoral scholarship from the São Paulo Research Foundation (Fundação de Amparo à Pesquisa do Estado de São Paulo—FAPESP) process no.: 2013/22,204–7." From Leme 2018: "Funding for AL was provided by FAPESP (2016-21144-9). 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 had been funded in part with federal funds from the USDA ARS under Cooperative Agreement No. 58-3092-5-001." General notes: Eligible girls were girls considered “at risk” of obesity based on their physical activity and dietary behaviors.
Study ID	**Lubans 2021**
Methods	Study name: B2L (Burn 2 Learn) Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 20 weeks Follow-up time(s): 6 months; 12 months
Participants	N randomized (intervention): 337 N randomized (control): 333

	Setting: Twenty government secondary schools with senior school students Location: New South Wales; Australia Country income: High income Recruitment: "New South Wales (NSW) government secondary schools with senior school students (i.e., grades 11 and 12, students aged 16–18) were eligible to participate in the study. Schools were asked to identify two grade 11 teachers from each school and eligible participants were grade 11 students taught by one of the participating teachers. School principals, teachers, parents and students all provided informed written consent prior to enrolment. Schools were recruited via presentations at conferences and meetings (e.g., regional meetings of the NSW Principals' Association) and emails were sent directly to eligible schools (i.e., school principals and grade 11 coordinators). Once schools have expressed an interest in the study, the Project Manager met with the school representative(s) and explained the study requirements." % of eligible population enrolled: Schools: 23% (20/87); Children: 90% (604/670); Age: Mean (SD): 16 (0.4) Gender/Sex: 55.4% boys
Interventions	Theory: Theory of expanded, extended and enhanced opportunities. Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term; zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12618000293268; NTR811; Funder(s) type: Non-industry

	Writing and/or research independent from funder(s): NR Funding details: "The study was funded by the National Health and Medical Research Council (APP1120518) and the New South Wales Department of Education School Sport Unit. DRL is supported by a National Health and Medical Research Council Research Fellowship (APP1154507)." General notes: The RCT was conducted in two cohorts: the first started in 2018 and finished in 2019 (10 schools); the second started in 2019 and finished in 2020 (10 schools). Following recruitment, pairs of schools will be matched based on the following key characteristics: geographic location (i.e., region, rural/urban, coastal/inland).
Study ID	**Luszczynska 2016b**
Methods	Study name: NR Study design: RCT N of arms: 3 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 8-11 weeks Follow-up time(s): 14 months
Participants	N randomized (intervention): Planning intervention: 227; Self-efficacy intervention: 233 N randomized (control): 242 Setting: Ten public middle and high schools in rural (three schools, 36% of participants) and urban areas (seven schools, 64% of participants). Location: Poland Country income: High income Recruitment: Potential respondents were recruited during the classes. All students received information about the study aims and the procedures. % of eligible population enrolled: Schools: NR; Children: 85% (702/830)

	Age: Mean (SD): 16.35 (0.79) Gender/Sex: 42% boys
Interventions	Theory: Social Cognitive Theory, Behaviour Change Theory, Self efficacy, Planning Intervention type: Dietary intervention Comparator type: Attention control Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "The preparation of this paper was supported by the National Science Center [grant number NN106 012240]." General notes: NR
Study ID	**Mauriello 2010**
Methods	Study name: Health in Motion Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 2 months Follow-up time(s): 6 months; 12 months (Note: results are not reported)

Participants	N randomized (intervention): 1128 N randomized (control): 672 Setting: Eight high schools Location: Rhode Island, Massachusetts, New York, Tennessee; United States Country income: High income Recruitment: Students were recruited from eight high schools in Rhode Island, Massachusetts, New York, and Tennessee. School administrators invited students from various classes to participate. Some schools over-recruited students due to the ease of incorporating the research into their schedules, making it easier to retain students in the research in subsequent semesters. This unique process for each school, reflecting a real-world effectiveness trial, contributed to the larger sample size for the treatment group. Parents received a letter describing the research and opt-out forms two weeks prior to the baseline session. Few parents (n=48) withheld permission (2.6%) and 8 students refused to participate (0.4%). Once enrolled, only 10 students refused to complete a follow-up session. % of eligible population enrolled: Children: 97% (1800/1856); Age: Mean: 15.97 Gender/Sex: 49.2% boys
Interventions	Theory: Trans-theoretical Model of Behaviour Change Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight) Outcome(s) included in the meta-analysis: None Outcome self-reported: Yes Reason for exclusion from the meta-analysis: Proportion of children that are overweight was measured at follow-up but results are not reported

Notes	Clinical Trial Registry: NCT01033253 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "Funding for this research was provided by the National Heart, Lung, and Blood Institute (Grant # R43 HL074482)." General notes: Outcome is measured as percent of students that moved to the overweight category after the intervention but data are not reported.
Study ID	**Melnyk 2013**
Methods	Study name: COPE (Creating Opportunities for Personal Empowerment) Healthy Lifestyles TEEN (Thinking, Emotions, Exercise, Nutrition) Program Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 15 weeks Follow-up time(s): 15 weeks; 6 months; 12 months
Participants	N randomized (intervention): 374 N randomized (control): 433 Setting: teens in health education courses in 11 high schools from two school districts Location: Large metropolitan city in the southwest; United States Country income: High income Recruitment: All teens in the selected health education courses in 11 high schools from two school districts in the Southwestern United States were invited to participate in the study. Research team members introduced the study to all students in each participating health class and sent consent/assent packets home with those teens who expressed interest in study participation.

	% of eligible population enrolled: Children: 52% (807/1560; teens returned assent/consent if they chose to participate and met the specified age range). Age: Mean: 14.74 Gender/Sex: 48.4% boys
Interventions	Theory: Cognitive Theory (COPE); Social Learning Theory (Healthy teens); Intervention type: Activity intervention Comparator type: Attention control Comparison: Activity intervention vs Control Setting of the intervention: School + Home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01704768 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was funded by the NIH/ National Institute of Nursing Research 1R01NR012171." General notes: NR
Study ID	**Mihas 2010**
Methods	Study name: VYRONAS (Vyronas Youth Regarding Obesity, Nutrition and Attitudinal Styles) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual

	Intervention period: 12 weeks Follow-up time(s): 12 months
Participants	N randomized (intervention): 108 N randomized (control): 105 Setting: Five high schools Location: Vyronas, Athens; Greece Country income: High income Recruitment: "In the study, 342 adolescents aged 12–13 years who were students (7th grade) of all (n 5) high schools located in Vyronas district, Athens, Greece, were initially eligible. The Vyronas area was selected because it represents the socio-economic status of the citizens of Athens." % of eligible population enrolled: Children: 76% (218/286) Age: Mean (SD): intervention: 13 (0.8); control: 13.3 (0.9) Gender/Sex: Intervention 49% boys; control 49.5% boys;
Interventions	Theory: Social Cognitive Theory, Stages of Change Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "The raw material for health promotion activities covering the thematic areas

	of 'Nutrition–dietary habits' and 'Physical activity and health' was funded by the Ministry of Education and the National Foundation for the Youth" General notes: NR
Study ID	**Nanney 2016**
Methods	Study name: Project breakFAST 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 (Note: results at 24 months are not reported)
Participants	N randomized (intervention): NR N randomized (control): NR Setting: Sixteen rural high schools Location: Minnesota; United States Country income: High income Recruitment: Schools recruitment: "A convenience sample of 16 rural high schools agreed to study participation and were randomized to treatment or delayed treat ment groups in equal allocation. To recruit the study schools an open invitation was posted on the Minnesota School Nutritional Association (MNSA) website and listserv. The MSNA is used by many Minnesota food service directors as a resource to locate funding and support for school food programs. Several informational webinars were conducted for interested school personnel (mainly the principal and food service director). The webinar recordings are available on the study website: z.umn.edu/projectbreakfast." Students recruitment: "The initial identification of "breakfast skippers" (eat breakfast ≤ 3 days in a school week) was important in assessing influence of the intervention on most at risk

	students. All 9th and 10th grade students attending study schools and who were present on the day of screening were invited to complete an initial 7-item screening paper/pencil questionnaire to assess the frequency of eating breakfast during a normal school week (Monday through Friday)." "To meet a minority enrolment goal of 30%, we oversampled for non-White/minority students at each study school. A passive parental consent process was used, with a signed letter from the school principal and the study principal investigator (PI) mailed to the parent(s) or guardian(s) of the invited students describing the study. The mailing also included a consent page, an example of survey items, and instructions on how to withdraw consent for participation of their student. Parents were given 10 days to withdraw consent by contacting the school or project manager by phone, email, or mail with all contact information provided." "After the 10-day waiting period, contact information (address and phone number) was requested from the schools for all initially eligible and consented students. Students were then mailed a letter inviting them to be screened for a second time to determine eligibility to participate in the study. Multiple modalities (e.g., internet, phone, at school) were necessary to maximize recruitment rates)." % of eligible population enrolled: Schools: NR; Children: 50% (1253/2512) Age: Grade 9th and 10th; 10th grade % Median (IQR) 48.2(3); age range: 14-16 years Gender/Sex: % of girls: Median (IQR): 48.2 (4.2)
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control (year 1); Dietary intervention vs Dietary intervention (year 2) Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: None

	Outcome self-reported: No Reason for exclusion from the meta-analysis: Narrative
Notes	Clinical Trial Registry: NCT02004977 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: Funding/financial disclosure: NIH NHLBI R01HL113235; The funding for this study is provided by the National Heart, Lung and Blood Institute of the National Institutes of Health (5R01-HL113235-03, PI: Nanney, MS) General notes: Narrative results only. BMI measured at 12 and 24 months follow-up but narrative data only reported for the 12 months follow-up. Comparison group received a modified intervention in year 2 of the study and therefore the comparison between intervention and control at the second follow-up would not be eligible for inclusion in the meta-analysis.
Study ID	**NCT02067728 2014**
Methods	Study name: FNPA (Family nutrition physical activity tool) Study design: Cluster RCT N of arms: 2 Unit of allocation: Primary care clinics Unit of analysis: Individual Intervention period: 1 visit Follow-up time(s): 6 months
Participants	N randomized (intervention): 210 N randomized (control): 220 Setting: Offices from three healthcare networks Location: Peoria, Illinois; United States Country income: High income

	Recruitment: Practice Recruitment: "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 PI (Amy Christison, MD). The letter will briefly describe the study and offer the opportunity to enrol. 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: Range: 11-17 years Gender/Sex: 46.5% boys (note: calculated from the whole cohort of participants aged 4-18)
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Primary Care Clinic
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT0206772 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR

	Funding details: 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." General notes: The trial was conducted on participants aged 4-17, results at follow-up are reported for all participants and for the age groups 4-10 and 11-17 separately; only data from the age group 11-17 are included in this review. Published data not found; baseline data and results extracted from Trial Registry; limited details on study characteristics and PROGRESS data.
Study ID	**Neumark-Sztainer 2003**
Methods	Study name: New Moves Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 16 weeks Follow-up time(s): 16 weeks; 8 months
Participants	N randomized (intervention): 89 N randomized (control): 112 Setting: Six high-schools Location: Twin Cities area school districts in Minnesota; United States Country income: High income Recruitment: "Immediately following study school assignment, recruitment of intervention and control school participants began. Although schools were randomly assigned to conditions, because of logistical and scheduling issues, girls were recruited after the schools were randomized. Thus, girls in the intervention schools knew that they were enrolling in an

	alternative physical education class, New Moves. Girls in the control schools were recruited to participate in a research study about eating and exercise patterns of teens. For both conditions, recruitment flyers and posters were used to promote the study to high-school students. Care was taken to avoid advertising the program as one for overweight youth because of labelling and stigmatization concerns. Rather, recruitment materials were designed to attract girls who had low levels of physical activity, who wanted to become more active, and were interested in healthy weight management. Interested students were directed to contact the school study liaison to sign up for the study, turn in a signed parental/guardian consent form, and complete a brief screening survey." % of eligible population enrolled: Schools: NR; Children: 86.8% of intervention school, 83.6% of control school; Age: Mean (SD): 15.4 (1.1) Gender/Sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: Attention control Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: Yes Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was supported by Grant AHA NATL/ 9970064N from the American Heart Association (D. Neumark- Sztainer, principal investigator)."

	General notes: The main eligibility criteria for enrolment in the study was self-reported low physical activity (defined as being in precontemplation, contemplation, or preparation stages of change for physical activity), with activity levels at or below 30 min per day/3 days per week.
Study ID	**Neumark-Sztainer 2010**
Methods	Study name: New Moves Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 16 weeks Follow-up time(s): 16 weeks; 9 months
Participants	N randomized (intervention): 182 N randomized (control): 174 Setting: High schools Location: Minneapolis/St. Paul metropolitan area of Minnesota; United States Country income: High income Recruitment: "High schools were recruited into the study on the condition that they would participate as either control or intervention sites and were randomized into these conditions. Girls in intervention and control schools were invited to register for an all-girls physical education class as an alternative to the regular coeducational class. Recruitment materials were designed to appeal to inactive girls interested in healthy weight management. Care was used to avoid stigmatizing the class in any way. A class description was included in the school catalogue used for class registration. Additionally, posters and flyers about the program were displayed at schools." % of eligible population enrolled: Schools: NR; Children: 86% (356/429)

	Age: Mean (SD): 15.8 (1.17) Gender/Sex: 100% girls
Interventions	Theory: Health promotion model, Self-determination Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School (ASP)
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT00250497 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: “New Moves: Obesity prevention among adolescent girls” (Clinical Trials number: NCT00250497) was supported by Grant R01 DK063107 (D. Neumark-Sztainer, principal investigator) from the National Institute of Diabetes and Digestive and Kidney Diseases, NIH. The content does not necessarily represent the official views of the National Institute of Diabetes and Kidney Diseases or the NIH. Research was supported in part by grant M01-RR00400 from the National Center for Research Resources, the NIH." General notes: Girls practicing high levels of physical activity (≥1 hour/day) were excluded
Study ID	**O'Connell 2005**
Methods	Study name: HEROS (Healthy Eating to Reduce Obesity through Schools) Study design: Cluster RCT N of arms: 2

	Unit of allocation: School Unit of analysis: Individual Intervention period: 23 weeks Follow-up time(s): 12 months (Note: results are not reported)
Participants	N randomized (intervention): 220 N randomized (control): 269 Setting: Six middle schools Location: Guildford County, North Carolina; United States Country income: High income Recruitment: "Schools were paired for predominant ethnicity and income level (e.g., high income < 50% and low income > 50% of students receiving free or reduced price lunches). Three pairs of schools were randomly chosen and assigned to intervention or control groups. All seventh grade students were allowed to participate if they returned their informed consent form and met the inclusion criteria." % of eligible population enrolled: Schools: 40% (6/15); Children: NR Age: Mean (SD): 12.7 (0.46) Gender/Sex: 44.9% boys
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: BMI at follow-up was measured but results are not reported. Results are reported as proportion of children that are overweight or obese;

	classification of overweight was based on BMi and classification of obesity was based on BMI and triceps skin fold (TSF): "Participants were classified as overweight if their BMI-for-Age was > 85th percentile and obese if their BMI-for-Age and TSF-for-Age were > 85th percentile.".
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This research was supported by grants from Team Nutrition, the NC Healthy Weight Initiative, and the Moses Cone Wesley Long Health Foundation." General notes: BMI outcome measured but not reported. Outcome reported as prevalence of children that are overweight (based on their zBMI) or obese (based on their zBMI and triceps skin fold test)
Study ID	**Ooi 2021**
Methods	Study name: SwitchURsip Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 20 weeks Follow-up time(s): 5 months
Participants	N randomized (intervention): 1219 N randomized (control): 1046 Setting: Six schools Location: Hunter region of New South Wales; Australia Country income: High income Recruitment: "An invitation to participate in the study was posted to a convenience sample of schools after which a research officer contacted the school principal to invite participation. If

	requested, a face-to-face meeting was arranged if the principal requires more clarification. Fifty-four eligible schools were informed of the study and invited to participate in the study. Recruitment continued until a total of 25 schools were contacted before six schools consented to participate. All students in Years 7 to 9 of participating schools were invited to take part in the data collection component of the study. All parents at participating schools were given a consent form, requesting consent for their child to participate in baseline, mid-point and follow-up data collection. The consent form was distributed to students at school to be taken home for parents' consideration and to discuss participation with their children. One- to two-weeks following the distribution of the letter, parents who had not returned a form indicating their consent or otherwise, were phoned by an authorised staff member to remind parents of the opportunity to participate." % of eligible population enrolled: Schools: 24% (6/25); Children: 48% (1092/2265; Consented data collection/eligible students) Age: Year 7th and 9th Gender/Sex: 47.4% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ACTRN12617001213336 Funder(s) type: Non-industry

	Writing and/or research independent from funder(s): NR Funding details: "This study was funded by the New South Wales Health Translational Research Grant Scheme. The work was supported by infrastructure support from the Hunter Medical Research Institute (HMRI) and Hunter New England Population Health. Dr Rachel Sutherland is supported by a NHMRC Translating Research Into Practice (TRIP) fellowship (APP1150661). Dr Sze Lin Yoong receives salary support via an ARC Discovery Early Career Researcher Award (DE170100382). Dr Nicole Nathan is supported by NHMRC TRIP fellowship (APP1132450), Hunter New England Clinical Research Fellow and Sir Winston Churchill Fellow. Associate Professor Luke Wolfenden receives salary support from an NHMRC Career Development Fellowship (APP1128348) and Heart Foundation Future Leader fellowship (101175). The contents of this manuscript are the responsibility of the authors and do not reflect the views of the NHMRC." General notes: BMI was measured in a nested sample of students, only year 7 students who consented had their height and weight measured.
Study ID	**Papadaki 2010**
Methods	Study name: DiOGenes (diet, obesity, and genes) Study design: RCT N of arms: 5 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 6 months (12 months in Maastricht and Copenhagen cohorts) Follow-up time(s): 6 months
Participants	N randomized (intervention): Low protein (LP)/low glycaemic index (LGI): 162; low protein (LP)/high glycaemic index (HGI): 168; high protein (HP)/low glycaemic index (LGI): 159; high protein (HP)/ high glycaemic index (HGI): 158 N randomized (control): 153

	Setting: Study centres Location: Maastricht (NL), Copenhagen (DK), Cambridge (UK), Heraklion (GR), Potsdam (D) Pamplona (S), Sofia (Bulgaria), Prague (the Czech Republic) ; Netherlands, Denmark, United Kingdom, Greece, Germany, Spain, Bulgaria, and Czech Republic Country income: High income (Netherlands, Czech Republic, Denmark, United Kingdom, Greece, Germany, Spain); Upper middle income (Bulgaria); Recruitment: From Larsen 2010: "Recruitment of families was carried out by using a number of strategies, including a waiting list for weight-loss projects, referrals from local general practices or from other medical departments, flyers and posters in public places and advertising through radio, television, newspapers and internet. Families were interviewed by phone, whenever possible, before being invited to attend a screening examination. Some study centres also arranged information meetings before inviting the families to the screening visit." % of eligible population enrolled: Children: 97% (800/827; number of children excluded because not eligible is not reported) Age: Mean: 12 Gender/Sex: 46% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: Community
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: BMI short term; zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA

Notes	Clinical Trial Registry: NCT00390637 Funder(s) type: Mixed Writing and/or research independent from funder(s): NR Funding details: "The DiOGenes study was partially funded by the European Community (contract FOOD-CT-2005-513946). Financial contributions from local sponsors were provided to the supermarket centers, which also received a number of foods free of charge from food manufacturers. A full list of these sponsors is available at www.diogenes-eu.org/sponsors." General notes: Families eligible for inclusion consisted of at least one overweight but otherwise healthy parent/adult aged less than 65 years, and at least one healthy child. Families in which at least one of the overweight/obese parents achieved the target weight loss (8% of initial body weight) during the low calories diet period were cluster-randomized to one of the five diets.
Study ID	**Pate 2005**
Methods	Study name: LEAP (Lifestyle Education for Activity 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
Participants	N randomized (intervention): 1523 N randomized (control): 1221 Setting: Twenty-four high schools Location: 14 counties in South Carolina; United States Country income: High income Recruitment: "Representative samples of girls who attended intervention and control schools

	were recruited to complete a measurement protocol. All eighth-grade girls who attended 1 of the 31 middle schools that “fed” students to the 24 participating high schools were invited to complete the measures. These girls participated in a school assembly during which the measurement protocol was explained, incentives were described (gifts and promotional items valued at <$10), and all girls were invited to participate." % of eligible population enrolled: Schools: NR; Children: 34%; Age: Mean (SD): intervention: 13.6 (0.6); control: 13.6 (0.6) Gender/Sex: 100% girls
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Community + Home
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This study was funded by a grant from the National Heart, Lung and Blood Institute (R01HL057775)." General notes: Schools were paired by percentage of girls who were African American
Study ID	**Patrick 2006**

Methods	Study name: PACE+ (Patient-centered Assessment and Counselling for Exercise + Nutrition) 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	N randomized (intervention): 424 N randomized (control): 395 Setting: Forty-five primary care providers from 6 private clinic sites Location: San Diego County, California; United States Country income: High income Recruitment: "Adolescents between the ages of 11 and 15 years were recruited through their primary care providers. A total of 45 primary care providers from 6 private clinic sites in San Diego County, California, agreed to participate in the study. A representative group of healthy adolescents seeing primary care providers was sought by contacting parents of adolescents who were already scheduled for a well child visit and by outreach to families with adolescents." % of eligible population enrolled: Children: 59% (819/1381) Age: Mean (SD): 12.7 (1.3) Gender/Sex: 46.5% boys
Interventions	Theory: Behavioural Determinants model; Social Cognitive Theory; Trans-theoretical Model of Behaviour Change Intervention type: Dietary and Activity intervention Comparator type: Attention control Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Home + Healthcare Service + Telehealth + Web

Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: Results described narratively (zBMI long term only)
Notes	Clinical Trial Registry: NCT01657422 Funder(s) type: Mixed Writing and/or research independent from funder(s): NR Funding details: "This project was supported by grants R01CA081495 and R01CA098861-03S1 from the National Institutes of Health National Cancer Institute, Bethesda, Md. Financial Disclosure: Drs Patrick, Calfas, and Sallis are co-owners of, and receive income from, the Center for Health Interventions, LLC (San Diego, Calif), which is developing products related to the research described in this paper. The terms of this arrangement have been reviewed and approved by San Diego State University and the University of California, San Diego, in accordance with their respective conflict-of-interest policies." General notes: Narrative results only. zBMI results reported in the text.
Study ID	**Peralta 2009**
Methods	Study name: FILA (Fitness Improvement Lifestyle Awareness) Program 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	N randomized (intervention): 16 N randomized (control): 17 Setting: A single-sex (boys) secondary school Location: Sydney; Australia Country income: High income Recruitment: "Participants were recruited from the entire 7th Grade (12–13 years) student population of a single-sex (boys) secondary school in Sydney, Australia. Following completion of the school's compulsory fitness testing battery, students' cardiorespiratory fitness results were ranked from highest to lowest (119 to 9 laps). Students with the lowest scores (<49 laps) were invited to participate." % of eligible population enrolled: Children: 58% (35/60) Age: Mean (SD): 12.5 (0.4) Gender/Sex: 100% boys
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: "The authors thank participating students, staff and the broader intervention school community for partly funding the study."

	General notes: The aim of this study was to assess the feasibility, acceptability and potential efficacy of a multifaceted secondary school-based program (The FILA Program Fitness Improvement Lifestyle Awareness) among adolescent boys with sub-optimal cardiorespiratory fitness (at risk of obesity). Some baseline data extracted from Peralta 2010.
Study ID	**Pfeiffer 2019**
Methods	Study name: Girls on the Move Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 17 weeks Follow-up time(s): 18 -21 weeks
Participants	N randomized (intervention): 753 N randomized (control): 766 Setting: Eight schools Location: Michigan; United States Country income: High income Recruitment: Recruitment took place in Septembers of 2012, 2013, and 2014. Prior to participation in the study, parents of girls completed a screening questionnaire to determine eligibility. From the study protocol: "At the beginning of each school year, the project manager schedules mutually convenient times for one or two members of the research team to meet with girls called to an assembly for the sole purpose of discussing the study in each of the eight schools. During the meeting, the researchers share information about the study and invite girls to participate. Girls are informed that their school will be randomly assigned to either receive an after-school physical activity club called Girls Only Activity for Life (G.O.A.L.)

	or continue with usual school offerings. They are told that girls in all schools will have the opportunity to receive incentives for participating in data collection activities, called "download days," in the fall and spring and then again in the following school year. In addition to the brief verbal overview of the study, the researchers play an attractive two-minute recruitment video created by the research team in collaboration with a local production company. The video highlights reasons to participate (e.g., no financial cost and opportunity to make or be with friends) and includes short scenes of girls having fun during various study phases, such as data collection. For example, the video shows girls wearing attractive, colorful headphones as they respond to survey questions using an iPad with voiceover. Following the video presentation, the researchers answer questions and distribute packets containing study materials to interested girls. Each packet includes a consent/assent form and screening tool. Girls are told if they return the completed forms to the researchers present at their school during the next day or two, they will immediately receive a $5.00 cash incentive, regardless of whether they are interested in participating or not." % of eligible population enrolled: Schools: NR; Children: 85% (1543/1823; sample size/ number of participants that agreed to participate in the study and returned signed forms); Age: Mean (SD): intervention: 12.05 (0.99); control: 12.05 (1.02) Gender/Sex: 100% girls
Interventions	Theory: Health Promotion Model and Trans-theoretical Model Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA

Notes	Clinical Trial Registry: NCT01503333 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "Financial support was provided by R01HL109101 from NHLBI at NIH" General notes: NR
Study ID	**Prins 2012**
Methods	Study name: YouR Action Study design: Cluster RCT N of arms: 3 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 4 weeks Follow-up time(s): 7 months
Participants	N randomized (intervention): YouRAction: 366; YouR Action+e: 423 N randomized (control): 424 Setting: Twelve schools Location: Rotterdam and surroundings; Netherlands Country income: High income Recruitment: "As a first step in recruitment, the health coordinators of 69 schools in the area of Rotterdam (the Netherlands) were contacted by phone. If they were interested in participating, a brochure with more detailed information about the intervention content and the research procedure was send to the schools and a member of the research team visited the schools for further information exchange and planning. In each participating school between 1 and 12 classes (depending on the size of the school), in which regular secondary education was given, were selected for participation. All adolescents in the selected classes were invited to take part in the study. Prior to the baseline measurement, adolescents and

	their parents received detailed information about the trial. Based on this information, the adolescent and his/her parent or carer could decide to decline participation in the trial by returning a written objection form." % of eligible population enrolled: Schools: 22%; (12/55); Children: 98% (1213/1240); Age: Mean (SD): 12.7 (0.5); Gender/Sex: 52.4% boys
Interventions	Theory: Self-regulation Theory, Theory of planned behaviour, Social cognitive Theory, Environmental Research framework for weight gain prevention (EnRG), Precaution adaptation process model Intervention type: Activity intervention Comparator type: Attention control Comparison: Activity intervention vs Control Setting of the intervention: School + Home + Web
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NTR1923 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This study was financially supported by a grant from ZonMw, The Netherlands Organization for Health Research and Development (grant ID no 7110.0003). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." General notes: BMI was only measured in 40% of participants: "At baseline and six months post-intervention, body weight, body height and WC were measured by trained research assistants in a random subsample (40% of total sample) of adolescents."

Study ID	**Razani 2018**
Methods	Study name: SHINE (Stay Healthy In Nature Everyday) Study design: RCT N of arms: 2 Unit of allocation: Dyad (child + parent) Unit of analysis: Individual Intervention period: 3 months Follow-up time(s): 3 months (Note: BMI as outcome was planned but was not measured)
Participants	N randomized (intervention): 50 N randomized (control): 78 Setting: A Primary Care Clinic (PCC) that is a Federally Qualified Health Center (FQHC) Location: Oakland, California; United States Country income: High income Recruitment: "In 2012 our pediatric primary care clinic (PCC) partnered with our local park agency to design a park prescription program. Our 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, social workers, case managers, 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: Dyad: 58% (78/134); Age: NR (children eligible age: 4-18 years) Gender/Sex: NR
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: Activity intervention Comparison: Activity intervention vs Activity intervention Setting of the intervention: Primary Care Clinic
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: NA Outcome self-reported: NA Reason for exclusion from the meta-analysis: Measurement of BMI at follow-up 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: "The authors report that they have no conflicts of interest. 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." General notes: BMI outcome was planned but not reported. Based on the study protocol: Body mass index (BMI)—"BMI will be measured in clinic at baseline, one month, and three months by using weight and an average of three measurements of height." The study targeted population that has higher rates of chronic illness than the national pediatric population.

Study ID	**Reesor 2019**
Methods	Study name: FLOW (Family Lifestyle Overweight Prevention Program) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 3-6 months Follow-up time(s): 7.5 months; 12.5 months
Participants	N randomized (intervention): 101 N randomized (control): 90 Setting: A primarily Hispanic (95%) charter school Location: Houston, Texas; United States Country income: High income Recruitment: "The current study is a secondary analysis of data aggregated across 5 randomized controlled trials (RCTs) with similar designs from 2005 to 2010. It was necessary to aggregate the participants across multiple waves of data collection in order to obtain an adequate sample size to evaluate summer weight gain. Sixth- and seventh grade students at a primarily Hispanic (95%) charter school in Houston, Texas were randomly assigned to either receive a weight management program or a control condition." % of eligible population enrolled: NR Age: Mean (SD): intervention: 12.04 (0.58); control: 12.12 (0.72) Gender/Sex: Intervention: 46% boys; control: 47% boys;
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: Attention Control

	Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term; zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT00454610 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by federal funds from the United States Department of Agriculture/Agricultural Research Service 6250-51000." General notes: The study is a secondary analysis of data aggregated across 5 randomized controlled trials for which we only have found main articles for two trials; we are only extracting the participants in normal weight group and therefore we do not have the total number of participants and the number of participants randomized to intervention or control. Follow-up time is assumed to be 7.5 and 12.5 months based on what reported int he text: "Participants were assessed at 3 time points: baseline, spring post-test (March-May), and fall follow-up (August-October)."
Study ID	Rodearmel 2006
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: Family (parents + one eligible child) Unit of analysis: Individual Intervention period: 13 weeks Follow-up time(s): 13 weeks

Participants	N randomized (intervention): 52 N randomized (control): 19 Setting: Home Location: Fort Collins, Colorado; United States Country income: High income Recruitment: "Families were recruited from the Fort Collins, Colorado area by printed flyers and e-mail advertising. Eligible families had at least one 8- to 12-year-old child who was classified as at-risk-for-overweight or overweight (≥85th percentile BMI-for-age) who would participate with at least one parent or guardian. Each child who met this criterion was designated as a target child. / We carried out separate analyses for three groups: parents, target children (≥85th percentile BMI-for-age and 8 to 12 years), and other children (all children ages 8 to 17 years who did not meet the target child criteria in each family)." % of eligible population enrolled: NR Age: Mean: 12.25; intervention girls: 12.8 (SD 0.7); intervention boys 11.8 (SD 0.4); control girls: 11.8(SD 0.8); control boys: 12.0 (SD 0.7) Gender/Sex: 50% boys
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Home
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry

	Writing and/or research independent from funder(s): NR Funding details: "This work was supported by NIH Grants DK042549 and DK048520 and by the W.K. Kellogg Institute." General notes: Children included in the analysis are the "other children" in the non-overweight/at risk for overweight group (i.e., all children ages 8 to 17 years who did not meet the target child criteria in each family (≥85th percentile BMI-for-age and 8 to 12 years).
Study ID	**Sabino 2021**
Methods	Study name: PANPAs (Physical Activity and Nutrition Program for Adolescents) 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	N randomized (intervention): 738 N randomized (control): 720 Setting: Eight schools Location: Madeira Island; Portugal Country income: High income Recruitment: NR % of eligible population enrolled: NR Age: Age range: 10-14 Gender/Sex: NR
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention

	Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: None Outcome self-reported: NR Reason for exclusion from the meta-analysis: Results described narratively (zBMI long term only)
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR General notes: Narrative results only. Conference abstract with limited information about the study design, participants, intervention and PROGRESS characteristics. The follow-up time is not reported but as it is stated that outcome was measured after the intervention and we assumed that the follow-up is at 9 months;
Study ID	**Schreier 2013**
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 10 weeks Follow-up time(s): 3.5 months
Participants	N randomized (intervention): 52 N randomized (control): 54

	Setting: A large urban public high school Location: British Columbia; Canada Country income: High income Recruitment: "One hundred six students were recruited from 5 classes at a large, urban public high school in western Canada during the 2011-2012 school year. To be eligible for this study, participants had to be (1) enrolled in 10th grade at the school, (2) fluent in English, and (3) free of chronic illnesses. Approval was obtained from the local school board, the school principal, and the teachers who were involved. We had permission to recruit students through the Planning 10 classes taught by 2 teachers, totalling 125 students." % of eligible population enrolled: Children: 85% (106/125); Age: Mean (SD): intervention: 14.84 90.42); control: 14.96 (0.78) Gender/Sex: Intervention: 50% boys; control: 53.7% boys;
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School (ASP)
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01698034 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "Support for this study was provided by the William T. Grant Foundation, HopeLab Foundation, and the Social Sciences and Humanities Research Council of Canada." General notes: NR

Study ID	**Shin 2015**
Methods	Study name: BHEZ (The Baltimore Healthy Eating Zones) Study design: RCT N of arms: 2 Unit of allocation: Dyads (youth + caregiver) Unit of analysis: Individual Intervention period: 8 months Follow-up time(s): 8-10 months
Participants	N randomized (intervention): NR N randomized (control): NR Setting: Fourteen randomly selected recreation centers Location: Baltimore City, Maryland; United States Country income: High income Recruitment: "In the present study, 432 African American youth-caregiver dyads were initially recruited from 14 randomly selected recreation centers in East and West Baltimore. To be eligible for the study, youth had to be 10 to 14 years of age, and live within 1 mile of a study recreation center without the intention to move within the next year. In settings where two recreation centers were within 1 mile of each other, children were considered part of the zone of the closest of the two centers to their place of residence. “Caregiver” was defined as a main food shopper and preparer for the youth’s household. Only one youth per household was eligible." % of eligible population enrolled: Children: 63% (242/432) Age: Mean (SD): intervention: 13.0 (1.6); control: 13.0 (1.4) Gender/Sex: Intervention: 42.9%; control: 40.4% boys;
Interventions	Theory: Mindfulness-based Intervention type: Dietary intervention

	Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: Community
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: No funding Writing and/or research independent from funder(s): NA Funding details: "The authors received no financial support for the research, authorship, and/or publication of this article." General notes: NR
Study ID	**Shomaker 2019**
Methods	Study name: Learning to BREATHE Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 6 weeks Follow-up time(s): 6 months; 18 months
Participants	N randomized (intervention): 29 N randomized (control): 25 Setting: An outpatient, pediatric research laboratory at Colorado State University. Location: Colorado; United States

	Country income: High income Recruitment: "Volunteers were recruited through letters to Northern Colorado area families, flyers in schools and physician offices, informational community sessions, newspaper/radio advertisements, and e-mails to community list serves. Materials invited adolescents who may be at-risk for gaining too much weight to participate in a group designed to decrease stress and promote healthy growth. Following a phone screen to estimate eligibility, participants attended a screening appointment to determine eligibility and collect baseline assessments. Parents/guardians and adolescents provided written consent and assent, respectively, after having the study described to them in detail." % of eligible population enrolled: Children: 75% (54/72); Age: Mean (SD): intervention: 13.97 (1.42);cControl: 14.49 (1.72) Gender/Sex: Intervention: 45% boys; control: 44% boys;
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: Attention control Comparison: Dietary intervention vs Control Setting of the intervention: Home + Community
Outcomes	Measured outcome(s): BMI, zBMI and BMI percentile Outcome(s) included in the meta-analysis: BMI short term; BMI long term; zBMI short term; zBMI long term; BMI percentile short term; BMI percentile long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT03085160 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by the Colorado Clinical and Translational Sciences Institute [NIH/NCATS Colorado CTSA Grant Number UL1 TR002535] and the Colorado

	Agricultural Experiment Station [NIFA/USDA Grant Number COLO0724]; Natalia Sanchez's work on this project was supported by a graduate research assistantship from the Colorado School of Public Health. Contents are the authors' sole responsibility and do not necessarily represent official NIH views." General notes: The study included girls and boys at-risk for excess weight gain (i.e., BMI ≥70th percentile or two biological parents with reported obesity [BMI ≥30 kg/m2])
Study ID	**Simons 2015**
Methods	Study name: MyGame Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 10 months Follow-up time(s): 4 months; 10 months
Participants	N randomized (intervention): 140 N randomized (control): 130 Setting: Home Location: Amsterdam, Amersfoort, Leiden, Breda; Netherlands Country income: High income Recruitment: The recruitment of the adolescents occurred in four cities in The Netherlands; i.e., Amsterdam, Amersfoort, Leiden and Breda. Detailed information about the recruitment is described in Simons et al. 2014 (study protocol). Adolescents and family members interested in participating provided their contact details on our project website or via e-mail and subsequently received an online screening questionnaire by email to assess their eligibility based on the inclusion criteria. The eligible families received information about participation that included a written consent form that the adolescents and their parents were required to

	complete prior to the collection of the baseline measurements. % of eligible population enrolled: Children: 69% (270/391); Age: Mean (SD): 13.9 (1.3) Gender/Sex: Intervention: 90% boys; control: 92% boys;
Interventions	Theory: Intervention mapping protocol, Behaviour Change and Environmental frameworks Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: Home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term; zBMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NTR3228 Funder(s) type: Mixed Writing and/or research independent from funder(s): Yes Funding details: "This work was supported by a grant from The Netherlands Organization for Health Research and Development (http://www.zonmw.nl/nl/)(grant number: 120520012). The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. Sony Benelux provided the PlayStation Move packages and video games for the study participants, but did not have any role in the design, data collection, and analysis, decision to publish or preparation of the manuscript." General notes: NR
Study ID	**Singh 2009**

Methods	Study name: DOiT (Dutch Obesity Intervention in Teenagers) 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; 12 months; 20 months
Participants	N randomized (intervention): 632 N randomized (control): 476 Setting: Eighteen prevocational secondary schools Location: Netherlands Country income: High income Recruitment: "A total of 18 prevocational secondary schools participated in the randomized controlled trial. Participating schools were asked to select 3 classes of first-year students (aged 12-14 years). The selection of classes was based on practical reasons (e.g., similar timetables for lessons in physical education). No inclusion criteria were set for students to take part in the study." % of eligible population enrolled: Children: 84% (1108/1323) Age: Mean (SD): intervention boys: 12.8 (0.5); intervention girls: 12.6 (0.5); control boys 12.9 (0.5); control girls 12.7 (0.5) Gender/Sex: 49.55% boys
Interventions	Theory: Self-determination theory, Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School

Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term; BMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: ISRCTN87127361 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This study is part of the Netherlands Research Programme for Weight Gain Prevention and is funded by grant 2000Z002 from the Netherlands Heart Foundation, the Dutch Ministry of Health, Welfare, and Sports, and the Royal Association of Teachers of Physical Education (KVLO)." General notes: Randomization took place at the school level or at location level (in case 2 schools were located in 1 city) and was stratified by urbanization (urban vs rural).
Study ID	**Slawson 2015**
Methods	Study name: Team Up for Healthy Living Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 8 weeks Follow-up time(s): 3 months; 12 months (Note: results at 12 months are not reported)
Participants	N randomized (intervention): 686 N randomized (control): 823 Setting: Ten high schools Location: Southern Appalachia; United States

	Country income: High income Recruitment: Recruitment of schools: "Five county school districts in Appalachia were contacted based on rurality and socioeconomic status. These school districts were invited to a program-planning workshop conducted in Fall 2011 to identify high schools interested in participating in the project. Ten high schools of thirteen available were interested in participating. One school could not participate due to class scheduling concerns and two did not take part due to minimal interest. The principal investigator (PI) and the project coordinator met with principals and Lifetime Wellness teachers at each school to describe the planned intervention and program requirements. Not all wellness teachers were required to participate in order for the school to be included, although no teachers refused to take part. Classroom materials were offered as incentives to each teacher that participated and office supplies were delivered to each school recruited." Recruitment of students: "Current students enrolled in the participating high school Lifetime Wellness classes were eligible to participate in the study. Students were primarily 9th graders with some upper classes minimally represented. Recruitment of study participants occurred over two waves, with the first taking place in January 2012 and the second occurring in September 2012. In order to increase the power, all Lifetime Wellness classes at each of the participating schools were invited to participate in the study for wave two. Trained research staff came to the classrooms to explain the study to students and distribute a study flyer that described the study and asked the parent's permission for his/ her child's participation (via passive parental consent form). A discussion of potential risks and benefits was provided. Inclusion/exclusion criteria were listed in the consent form. The students were asked to take the flyer and consent form to their parents. Parents who did not give consent were not asked whether exclusion criteria were met. This procedure ensured that non-participating students' privacy was protected." Recruitment of college peer facilitators: "A call for applications was distributed to all eligible students through emails and flyers. Students who were interested in serving as peer facilitators submitted a statement of interest and qualification and a brief resume. The applications were reviewed and selected candidate students were then interviewed by project team members."

	% of eligible population enrolled: Schools: 77% (10/13); Children: 91% (1509/1654; number of children excluded because were not eligible is not reported); Age: Mean (SD): 14.9 (0.7) Gender/Sex: 50.7% boys
Interventions	Theory: Theory of Planned Behavior Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: Non-usable data. Effect only reported in the abstract, no precision and no further details on the analysis.
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "The project described was supported by Grant Number R01MD006200 from the National Institute on Minority Health and Health Disparities. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Minority Health and Health Disparities or the National Institutes of Health." General notes: NR
Study ID	**Smith 2014**

Methods	Study name: ATLAS (Active Teen Leaders Avoiding Screen-time) 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	N randomized (intervention): 181 N randomized (control): 180 Setting: Fourteen secondary schools Location: New South Wales ; Australia Country income: High income Recruitment: "The Socio-Economic Indexes for Areas (SEIFA) of relative socioeconomic disadvantage was used to identify eligible secondary schools. All eligible students received information and consent forms. The recruitment target was 25 students per school; however up to 30 students from each school could be accepted. The first 30 students from each school to return their completed consent form were included in the study." % of eligible population enrolled: Schools: 70% (14/20); Children: 42% (361/850); Age: Mean (SD): 12.7 (0.5) Gender/Sex: 100% boys
Interventions	Theory: Self-determination Theory, Social Cognitive theory Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School + Web
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term

	Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: 12612000978864 Funder(s) type: Non-industry Writing and/or research independent from funder(s): Yes Funding details: "This study was funded by an Australian Research Council Discovery Project grant (DP120100611). The sponsor had no involvement in the design or implementation of the study, in analyses of data, or in the drafting of the manuscript." General notes: NR
Study ID	**Takacs 2020**
Methods	Study name: NR Study design: Cluster RCT N of arms: 2 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 9 months Follow-up time(s): 9 months; 12 months
Participants	N randomized (intervention): 117 N randomized (control): 112 Setting: Two state-owned primary schools Location: Budaors-Pest County; Hungary Country income: High income Recruitment: "Two state-owned primary schools (out of four) were enrolled. From the two enrolled schools, a total of eight classes were selected from grade 6th and 7th (two 6th and two 7th grade classes from each school). Recruitment of the study population took place in September 2015 during the registration period. Parents were contacted and informed about

	the purpose and processes of the study during the first parents' meeting of the academic year. All parents agreed to participate in the study and were contacted for completing the baseline parental questionnaire. All study participants gave their informed consent for inclusion before participating in the study." % of eligible population enrolled: Classes: NR; Children: 99% (229/232); Age: Mean (SD): 12.6 (0.1) Gender/Sex: 44.5% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School + School (ASP) + Web
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR General notes: NR
Study ID	**TenHoor 2018**
Methods	Study name: Focus on Strength 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 (Note: BMI and BMI-z as outcome were planned but not measured)
Participants	N randomized (intervention): 353 N randomized (control): 342 Setting: Nine Dutch secondary schools (seven schools with Lower Vocational Education, two schools with Senior General Secondary Education) Location: Netherlands Country income: High income Recruitment: "Nine Dutch secondary schools (seven schools with Lower Vocational Education, two schools with Senior General Secondary Education) were randomised (stratified on education level; by flip of a coin by the first author under supervision of the fourth author) into an intervention condition (four schools) or a standard curriculum control condition (five schools)....Schools were recruited via school management and 695 adolescents (11–15 years old) participated. Following consent from the schools, parents and their children were informed about the intervention and related outcome measurements, and told they could refuse participation at any time." % of eligible population enrolled: Age: Mean (SD): 12.97 (0.54) Gender/Sex: 50.36% boys
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School

Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: NA Outcome self-reported: NA Reason for exclusion from the meta-analysis: Measurement of BMI at follow-up was planned but results are not reported (there is no evidence that it was measured).
Notes	Clinical Trial Registry: NTR5676 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This research was funded by the Netherlands Organization for Health Research and Development (ZonMw; project number 525001004)." General notes: BMI measurement was planned but not reported
Study ID	**Velez 2010**
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	N randomized (intervention): 13 N randomized (control): 15 Setting: A predominantly Hispanic high school Location: Central New Jersey area; United States Country income: High income Recruitment: Students were recruited from physical education classes in a predominantly

	Hispanic high school. % of eligible population enrolled: Children: 90% (28/31) Age: Mean (SD): 16.14 (0.19) Gender/Sex: Intervention: 62% boys; control: 53% boys;
Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Mixed Writing and/or research independent from funder(s): Yes Funding details: "The funding for this study was provided by LifeFitness Academy and the Youth Sports Research Council. All researchers involved impartially collected, analysed, and interpreted the data from this study and have no financial interests concerning the outcome of this investigation." General notes: NR
Study ID	**Viggiano 2015**
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): 6 months; 18 months
Participants	N randomized (intervention): 1663 N randomized (control): 1447 Setting: Twelve public middle schools and eight public high schools Location: Province of Naples and Salerno (Campania); Italy Country income: High income Recruitment: Principals, teachers and all students of 12 public middle schools and 8 public high schools were invited to take part in the trial. % of eligible population enrolled: Schools: 100% (20/20) Children: 95% (3110/3278) Age: Mean (range): intervention:13.3 (13.2-13.4); control: 13.0 (12.9-13.04) Gender/Sex: Intervention: 55% boys; control: 51% boys;
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: No active intervention Comparison: Dietary intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term; zBMI long term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR

	Funding details: "This research was funded by Second University of Naples, Associazione Culturale Kaledo, Regione Campania (Assessorato all'Istruzione), Provincia di Napoli, Provincia di Salerno Assessorato allo Sport, Comune di Cercola (Assessorato all'istruzione) and Fondazione per l'Assistenza all'Infanzia." General notes: NR
Study ID	**Weeks 2012**
Methods	Study name: POWER PE (Preventing Osteoporosis With Exercise Regimes in Physical Education) Study design: RCT N of arms: 2 Unit of allocation: Individual Unit of analysis: Individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	N randomized (intervention): 52 N randomized (control): 47 Setting: One high school Location: Gold Coast, Queensland; Australia Country income: High income Recruitment: Adolescents enrolled in the ninth grade of a local high school (Gold Coast, Australia) were recruited to participate in the trial. % of eligible population enrolled: Children: 49% (99/203; number of children excluded because not eligible is not reported) Age: Mean (SD): 13.8 (0.4) Gender/Sex: 46.5% boys

Interventions	Theory: NR Intervention type: Activity intervention Comparator type: No active intervention Comparison: Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: There were no external funding sources General notes: NR
Study ID	**Whittemore 2013**
Methods	Study name: HEALTH(e)TEEN Study design: Cluster RCT N of arms: 2 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 6-8 weeks Follow-up time(s): 3 months; 6 months
Participants	N randomized (intervention): 207 N randomized (control): 177

	Setting: Three high schools Location: New Haven, Connecticut; United States Country income: High income Recruitment: A convenience sample was recruited from students enrolled in health or biology classes in three high schools in two cities in the north east between October 2010 and January 2011. % of eligible population enrolled: Children: 64% (384/604) Age: Mean (SD): 15.31 (0.69) Gender/Sex: 38% boys
Interventions	Theory: Theory of Interactive Technology, Social Learning Theory Intervention type: Dietary and Activity intervention Comparator type: Dietary and Activity Comparison: Dietary and Activity intervention vs Dietary and Activity intervention Setting of the intervention: School + Home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: None Outcome self-reported: No Reason for exclusion from the meta-analysis: Comparison not eligible (the comparison is between the same type of interventions)
Notes	Clinical Trial Registry: NCT01560676 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "Funding for this study was provided by the National Institutes of Health (NIH)/National Institute of Nursing Research (NINR) RC1NR011594-02. AC was funded by pre-doctoral fellowships from the NIH/NINR (T32NR008346-09) and the Jonas Center for Nursing Excellence (Whittmore 2013b)."

	General notes: The duration of intervention is not clear: the trial registry reports that lessons were delivered over 6-8 weeks and the first follow-up is at 3 months
Study ID	**Wieland 2018**
Methods	Study name: HIF (The Healthy Immigrant Families study) Study design: Cluster RCT N of arms: 2 Unit of allocation: Family (parents + ≥ 1 child) Unit of analysis: Individual Intervention period: 12 months Follow-up time(s): 6 months; 12 months; 24 months (Note: results at 24 months not reported)
Participants	N randomized (intervention): 40 N randomized (control): 41 Setting: Home Location: Rochester, Minnesota; United States Country income: High income Recruitment: "Participants were recruited by Rochester (Minnesota) Healthy Community Partnership (RHCP) partners from the Hispanic, Somali, and Sudanese communities in the Midwest city. These partners completed RHCP-developed human subjects protection training before recruitment, which was accomplished through in-person contact and word of mouth with adult members of households throughout the community. Partners identified families who may meet eligibility criteria, explained the study, and gauged interest in participation. Partners obtained permission from an adult family member of an interested household (man or woman) to forward their contact information to a study staff member. A language-congruent study staff member then called the family and performed telephone screening. Eligible families (all adult and adolescent members) were invited to a study event at a community partner location, where full eligibility screening and informed consent were

	conducted. They identified potentially eligible families through meetings and word-of-mouth advertising. After hearing about the project or after attending community meetings convened by recruitment partners, interested families were then screened by recruitment partners for potential eligibility via a face-to-face meeting or telephone call. They then obtained permission from an interested adult family member to forward their contact information to a study staff member. A language-congruent study staff member then called the family and conducted a full screen for eligibility. Eligible families were invited to participate and enrol in the study. Participants were offered the opportunity to receive family portraits from a professional photographer as an incentive for taking part in these activities." % of eligible population enrolled: Families: 44% (44/99); Children: NR; Age: Mean (SD): 13.5 (2.5) Gender/Sex: 49.4% boy
Interventions	Theory: Social Cognitive Theory Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: Home + Telehealth
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NCT01952808 Funder(s) type: Mixed Writing and/or research independent from funder(s): Yes Funding details: "This publication was supported by NIH Grant No. R01 HL 111407 from the National Heart, Lung, and Blood Institute and by CTSA Grant No. UL1 TR000135 from the National Center for Advancing Translational Science

	(NCATS), and by the Mayo Clinic Office of Health Disparities Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH. The funding bodies had no role in study design; in the collection, analysis, and interpretation of data; writing of the manuscript; and in the decision to submit the manuscript for publication." "J.A. Levine provides advice to Kersh, Inc., inventors of the accelerometer used in this study, without financial gain." General notes: Participants were recruited from immigrant and refugee populations.
Study ID	**Wilksch 2015**
Methods	Study name: Life Smart Study design: Cluster RCT N of arms: 2 Unit of allocation: Classroom Unit of analysis: Individual Intervention period: 5 weeks Follow-up time(s): 6 months; 12 months
Participants	N randomized (intervention): 347 N randomized (control): 473 Setting: Twelve schools Location: South Australia, Victoria, Western Australia; Australia Country income: High income Recruitment: Schools were invited to participate based on a staff member previously expressing an interest in body image programs (n = 4) or where schools were geographically located within 1 h of the participating university in that state (n = 8). % of eligible population enrolled: Schools: 27% (12/45); Children: 93% (1316/1414; number of students correctly matched across waves for inclusion in analyses/students that completed

	baseline) Age: Mean (SD): 13.21 (0.68) Gender/Sex: 36% boys
Interventions	Theory: NR Intervention type: Dietary and Activity intervention Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control Setting of the intervention: School
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term; BMI medium term Outcome self-reported: No Reason for exclusion from the meta-analysis: NA
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This research was funded by a Butterfly Research Institute Grant" General notes: The aim of this research was to investigate the efficacy of an obesity-prevention program (Life Smart) and two eating disorder-prevention programs (Media Smart and HELPP) against each other and a no-intervention control condition. Only data from Life Smart and Control groups are included in this review as the other two interventions (Media Smart and HELPP) are aimed at preventing eating disorders.
Study ID	**Zhou 2019**
Methods	Study name: CHAMPS (Childhood Health; Activity and Motor Performance Study) Study design: Cluster RCT N of arms: 4

	Unit of allocation: School Unit of analysis: Individual Intervention period: 8 months Follow-up time(s): 8 months (Note: BMI and zBMI as outcome were planned but not measured)
Participants	N randomized (intervention): School physical education (SPE) intervention: 204; After school program (ASP) intervention: 200; School Physical Education Intervention + After school program intervention (SPE + ASP): 178 N randomized (control): 176 Setting: Twelve middle schools Location: Beijing, Wuhu, Anhui Province, Weifang, Shandong Province; China Country income: Upper middle income Recruitment: "Student recruitment was coordinated by the school principals and physical education teachers. Parents were informed of the study in announcement posters at the beginning of the school year. All parents received informed consent letters and were asked to indicate if they consented for their children to participate in the study. Signed consent letters were returned to the PE teachers. No incentive was provided for participation in the study." % of eligible population enrolled: Schools: NR; children: NR; Age: Mean (SD): 12.66 (0.56) Gender/Sex: 53.4% boys
Interventions	Theory: Socio-ecological model of health promotion Intervention type: Dietary and Activity; Activity Comparator type: No active intervention Comparison: Dietary and Activity intervention vs Control; Activity intervention vs Control Setting of the intervention: School + School (ASP)
Outcomes	Measured outcome(s): BMI and zBMI Outcome(s) included in the meta-analysis: NA

	Outcome self-reported: NA Reason for exclusion from the meta-analysis: Measurement of BMI at follow-up was planned but results are not reported (there is no evidence that it was measured).
Notes	Clinical Trial Registry: ChiCTR-IOR-14005388 Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "This work was supported by Serving National Special Needs in Doctoral Talents Development Program—Performance Training and Health Promotion for Adolescents; the support program for High-level Teacher TeamDevelopment of Beijing Municipal Institutions (IDHT20170515); Beijing Social Science Funding Project (No. 16YTB018); and the Scientific Research Project of Beijing Educational Committee (No. KM201710029002)." General notes: BMI measurement was planned but not reported
Study ID	**Zota 2016**
Methods	Study name: DIATROFI program Study design: Cluster RCT N of arms: 2 Unit of allocation: School Unit of analysis: Individual Intervention period: 9 months (one school year) Follow-up time(s): 9 months
Participants	N randomized (intervention): 10561 N randomized (control): 10700 Setting: Schools in low socioeconomic status areas Location: Attica, Thessaloniki and the rest of Greece; Greece Country income: High income Recruitment: "After establishing initial contacts with all schools in low socioeconomic 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: Range: 12-18 Gender/Sex: Multicomponent intervention: 40.2% boys; environmental intervention: 40.6% boys
Interventions	Theory: NR Intervention type: Dietary intervention Comparator type: Dietary Comparison: Dietary intervention vs Dietary intervention Setting of the intervention: School + Home
Outcomes	Measured outcome(s): Proportion of children who are obese or overweight Outcome(s) included in the meta-analysis: None Outcome self-reported: Yes (parents-reported) Reason for exclusion from the meta-analysis: Non-usable data. Data reported as odd ratio (OR; the outcome is odds of changing weight status from overweight/obese category to normal weight category comparing these on the multicomponent intervention group to these in the environmental intervention group).
Notes	Clinical Trial Registry: NR Funder(s) type: Non-industry Writing and/or research independent from funder(s): NR Funding details: "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." General notes: Participants were children (4-11 years old) and adolescents (12-18 years old); only data from the adolescent group are included in this review. Data are reported as probability of improving the weight status of adolescents.

Appendix E – Forest plots

Children aged 2 to 4 years

Figure 1: zBMI- dietary intervention vs control

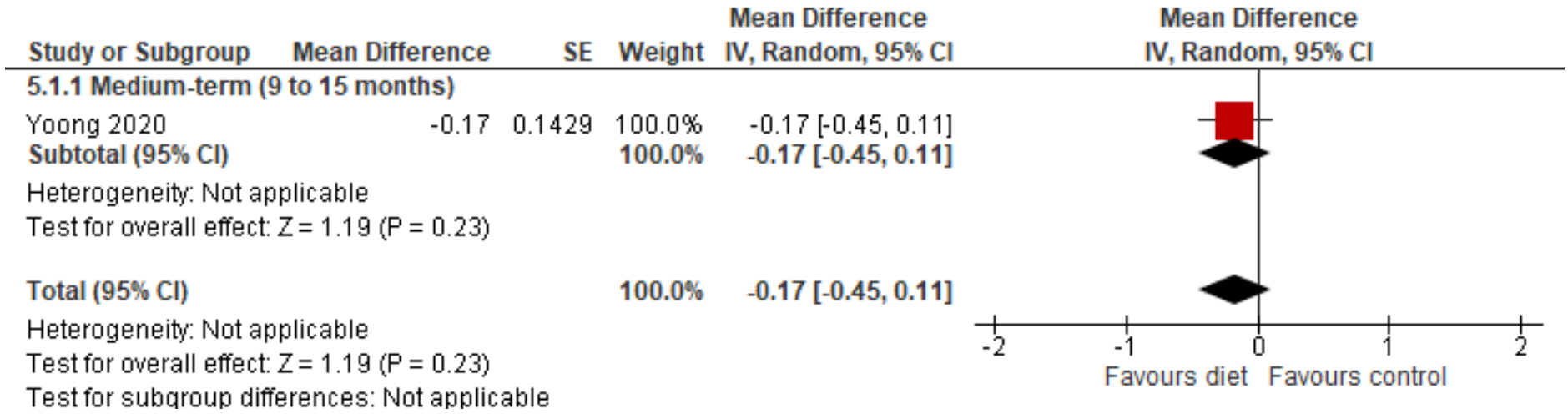


Figure 2: zBMI- Physical activity interventions vs control – subgroup analysis by timepoint

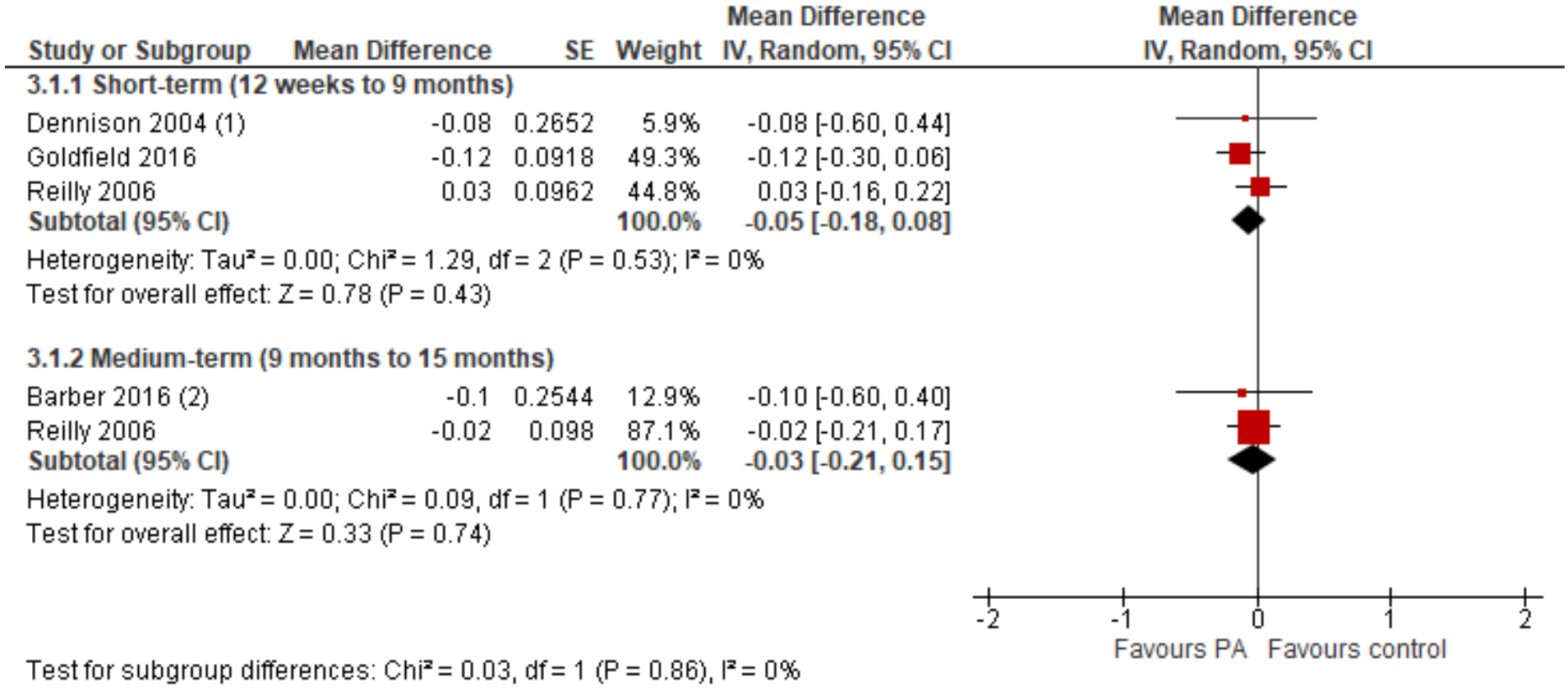


Figure 3: zBMI- Physical activity interventions vs control - by longest timepoint

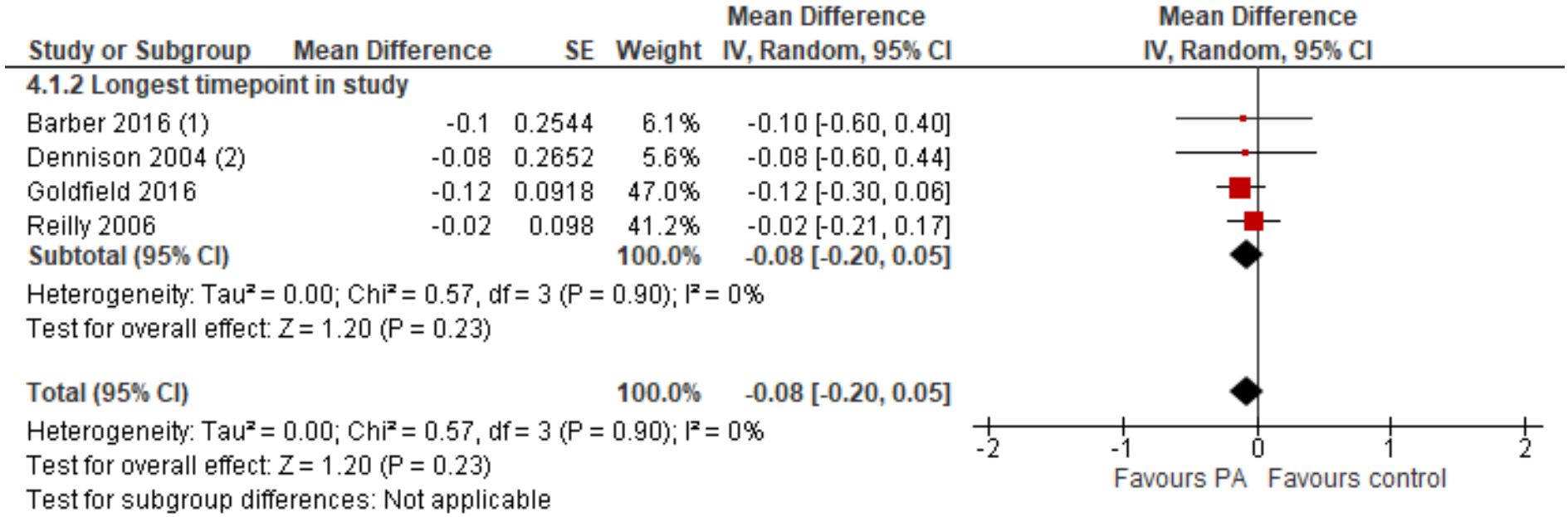


Figure 4: zBMI - dietary and physical activity interventions vs control – subgroup analysis by timepoint

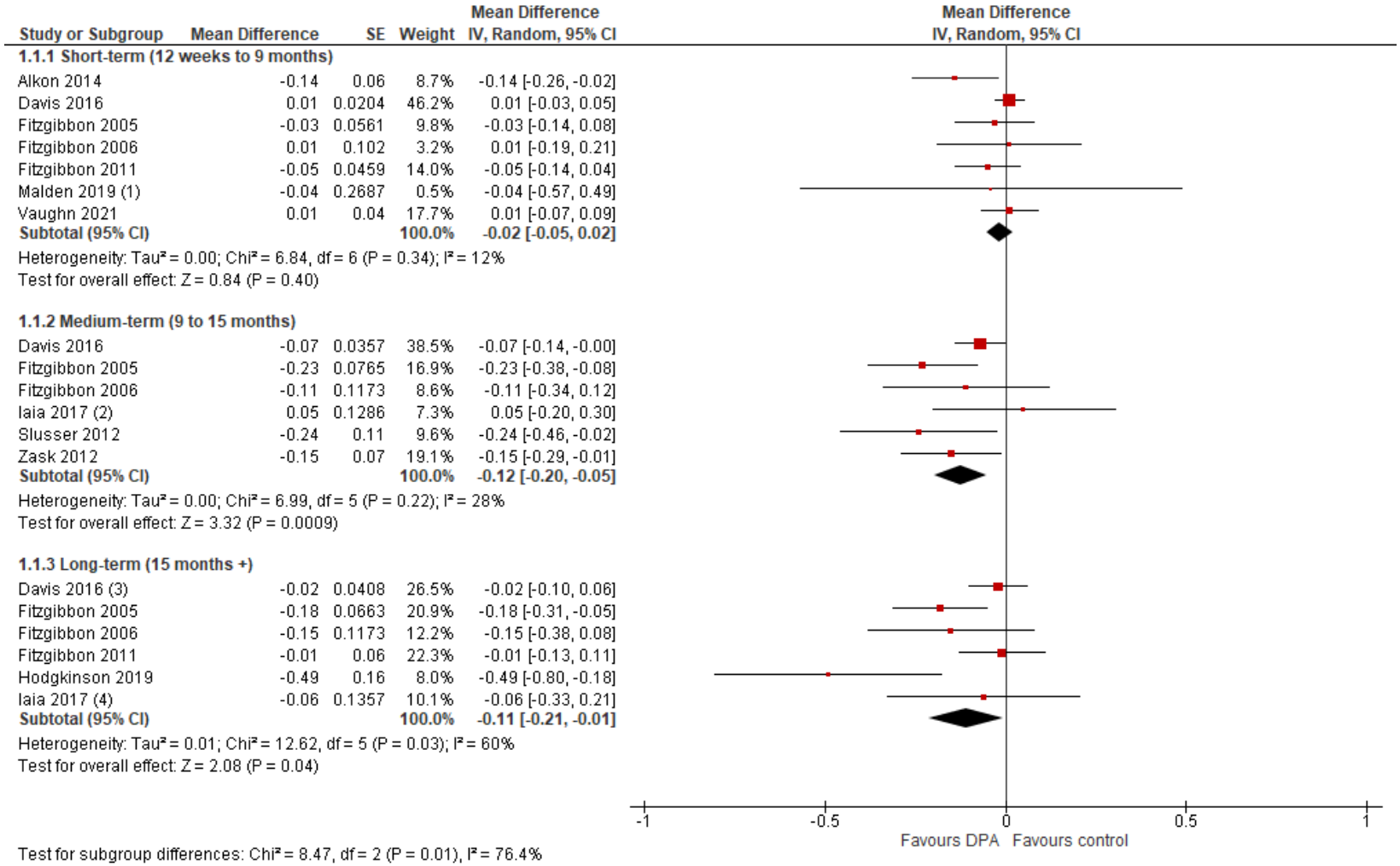
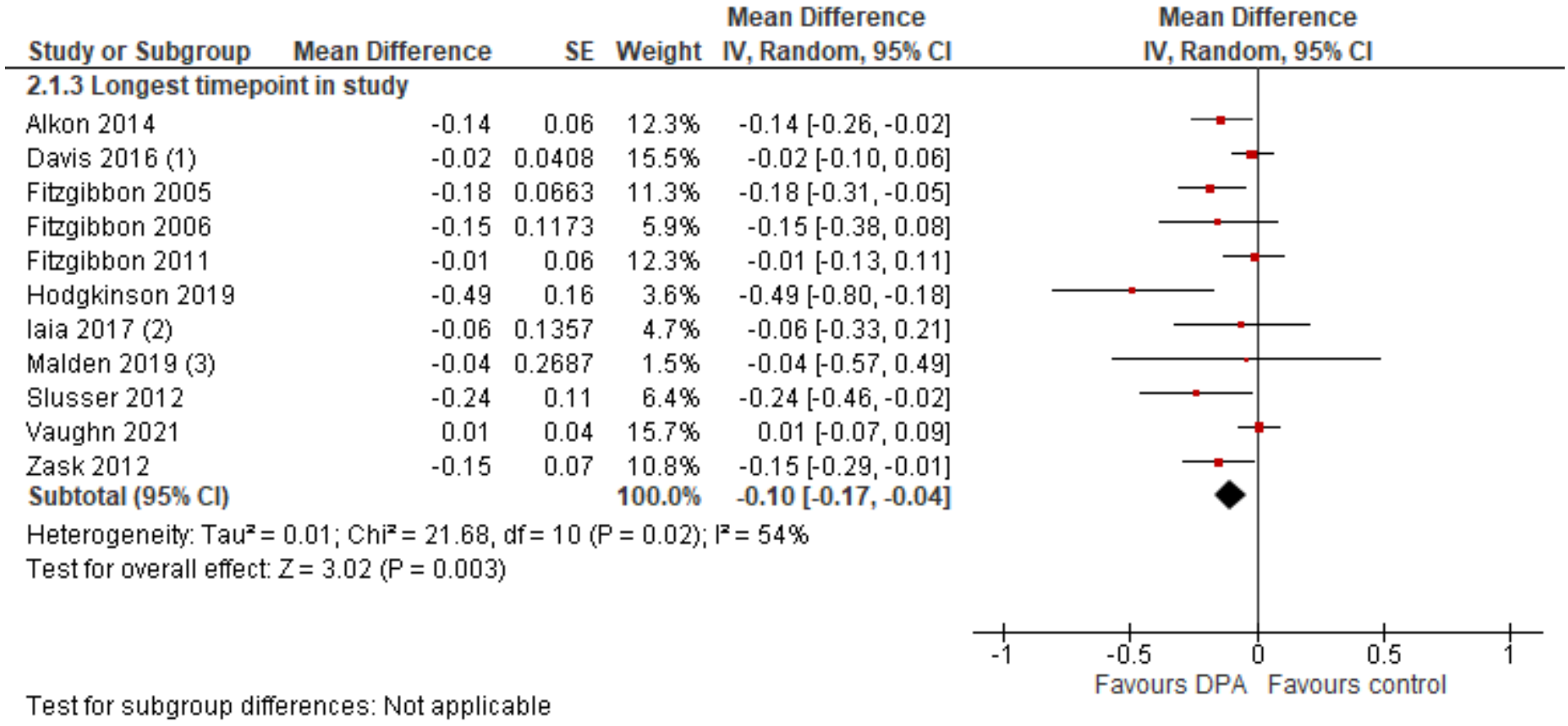


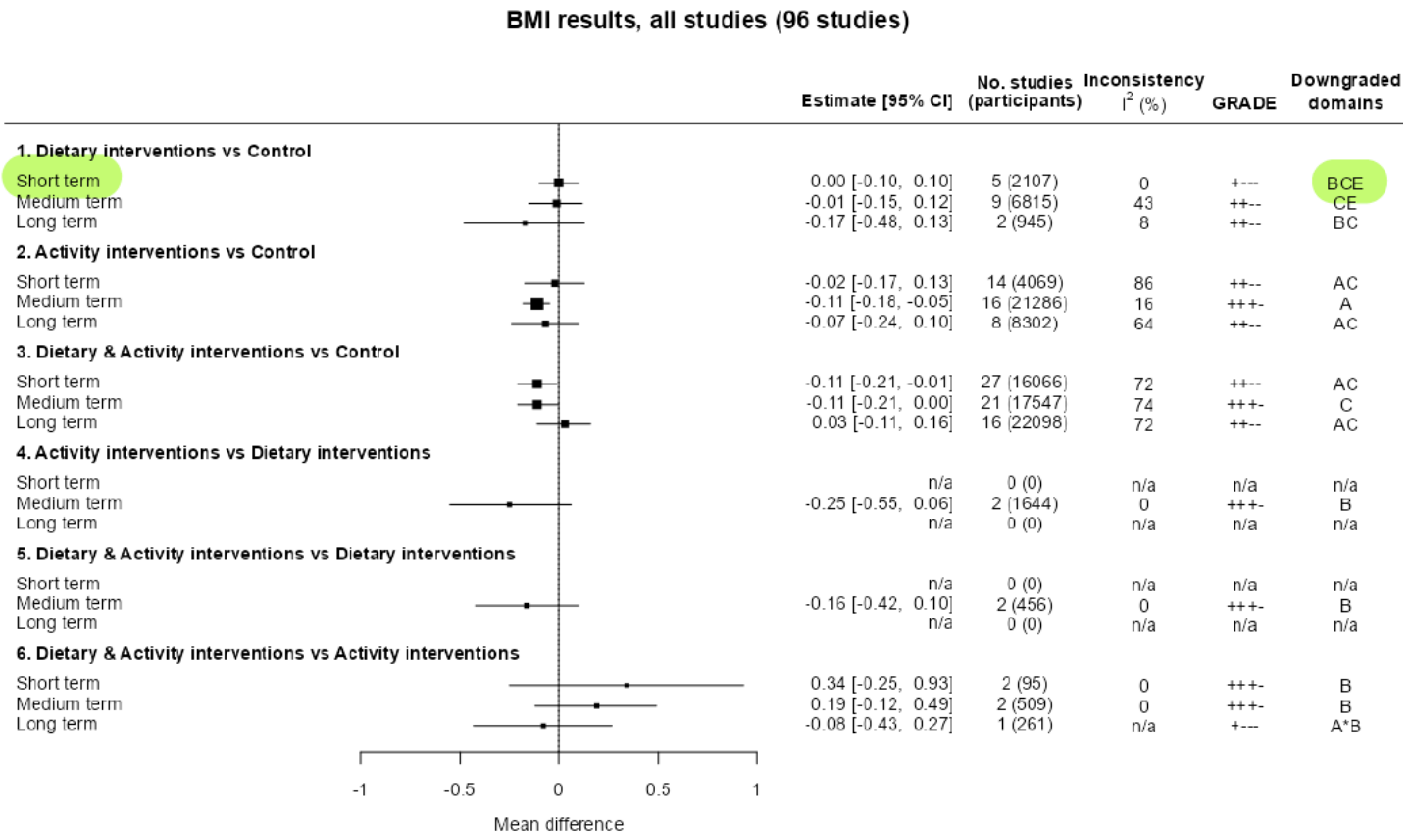
Figure 5: Children aged 2 to 4 years - dietary and physical activity interventions vs control - longest timepoint



Children aged 5 to 11 years

Note for all forest plots: short term = 12 weeks to <9 months; medium term = 9 months to <15 months; long term = >15 months

Figure 6: Children aged 5 to 11 years – BMI – all settings



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 7: Children aged 5 to 11 years – BMI – School settings

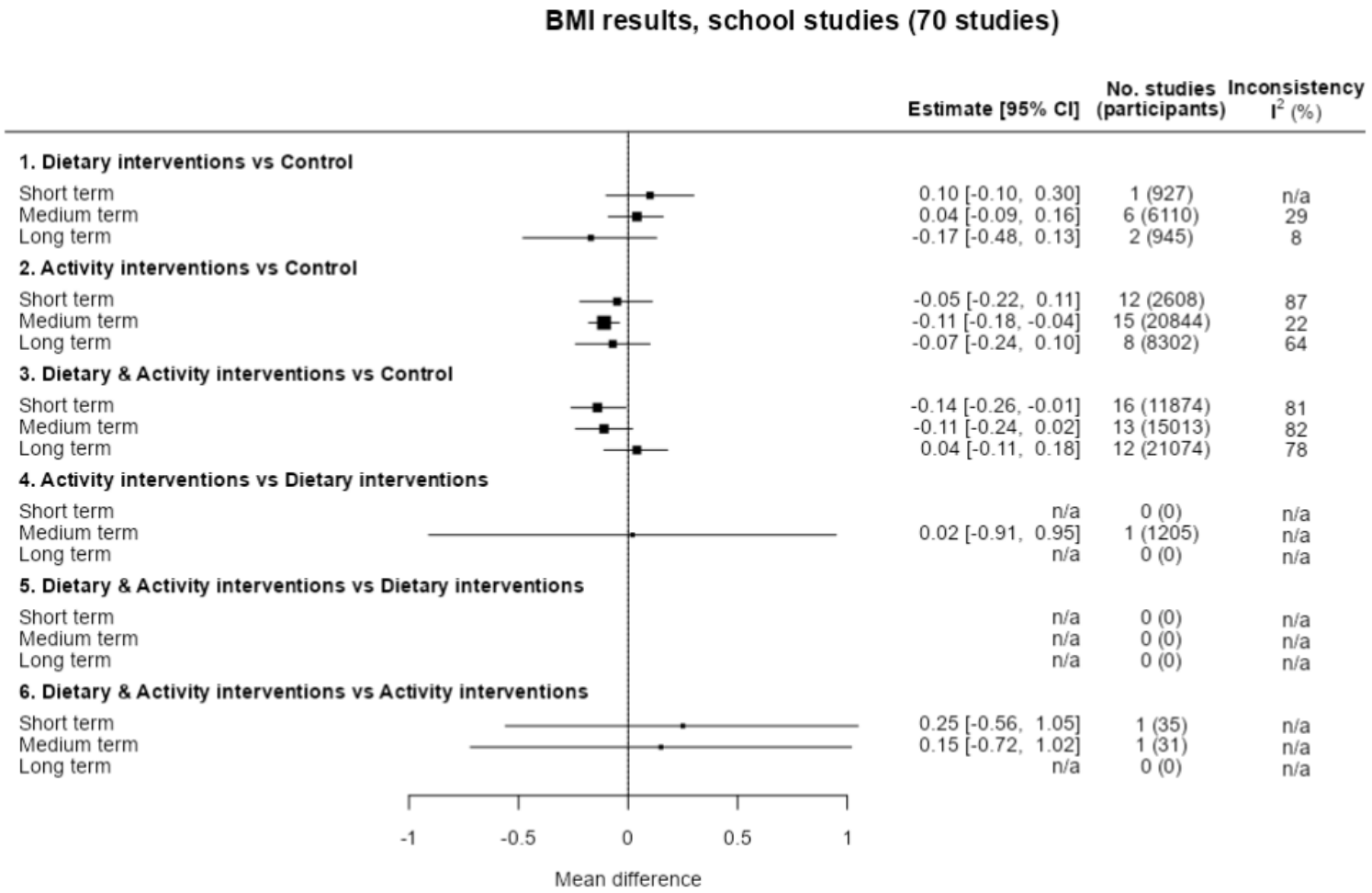


Figure 8: Children aged 5 to 11 years – BMI – School + Home settings

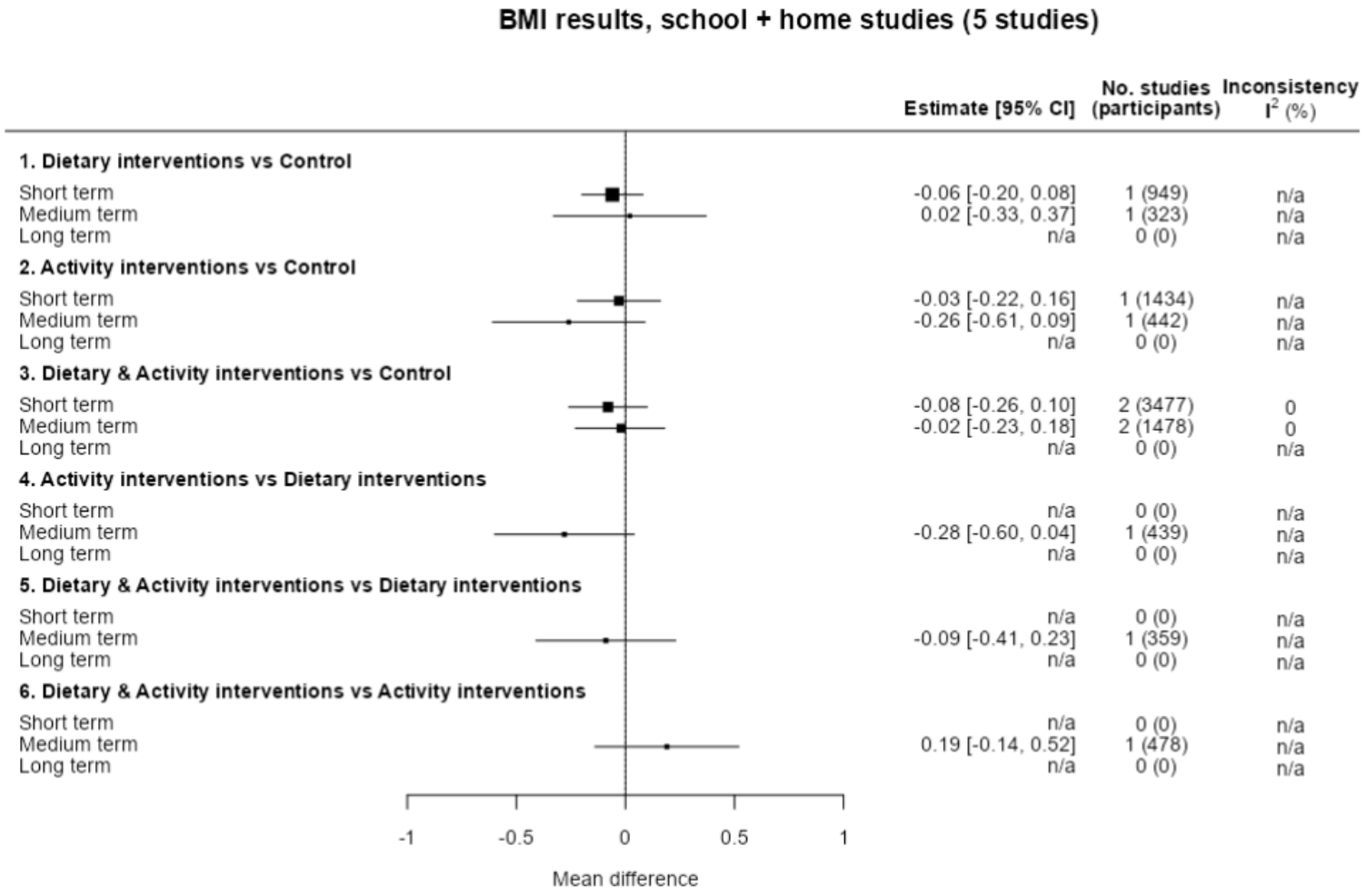
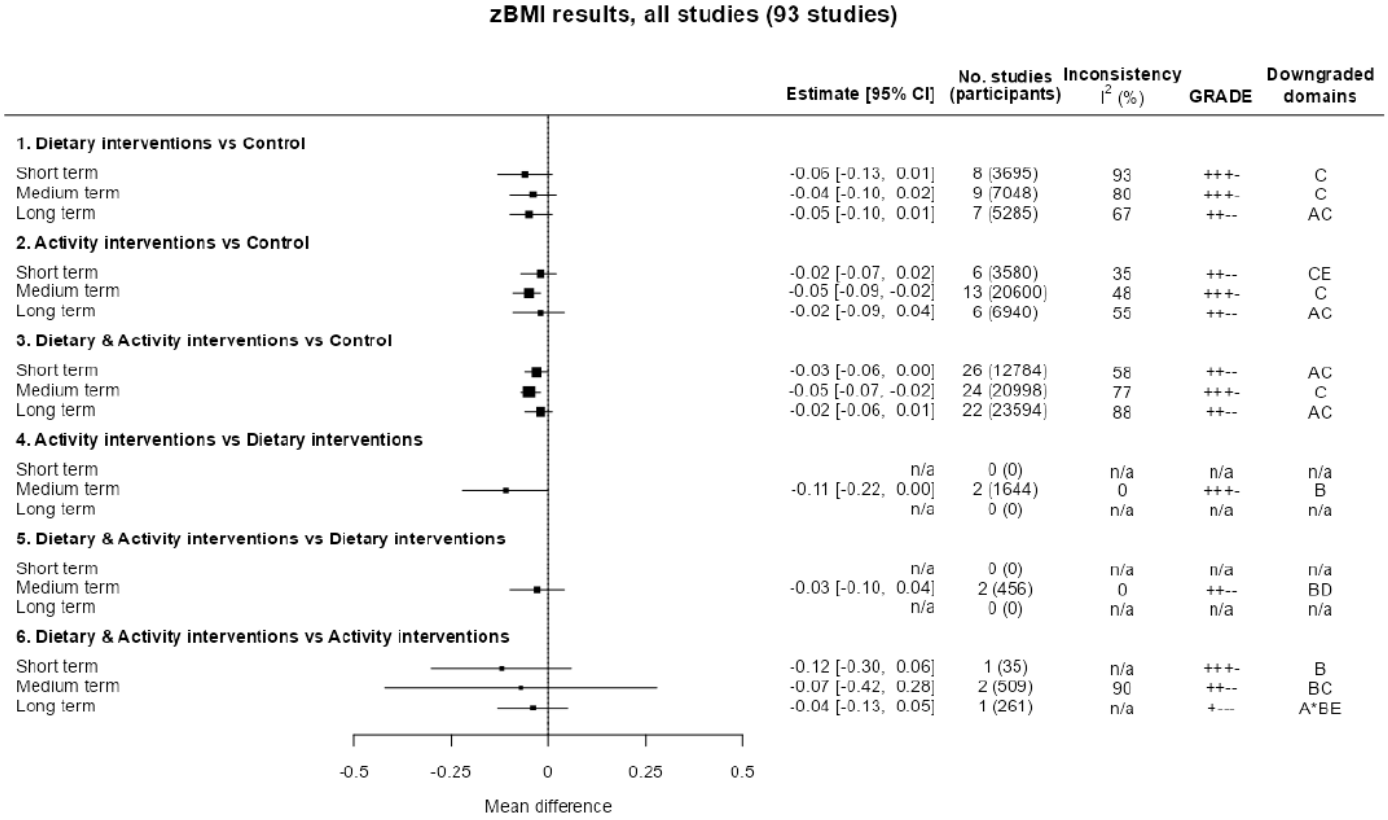

BMI results, school + home studies (5 studies)
Estimate [95% CI]
No. studies (participants)
Inconsistency I² (%)
1. Dietary interventions vs Control
Short term
-0.06 [-0.20, 0.08]
1 (949)
n/a
Medium term
0.02 [-0.33, 0.37]
1 (323)
n/a
Long term
n/a
0 (0)
n/a
2. Activity interventions vs Control
Short term
-0.03 [-0.22, 0.16]
1 (1434)
n/a
Medium term
-0.26 [-0.61, 0.09]
1 (442)
n/a
Long term
n/a
0 (0)
n/a
3. Dietary & Activity interventions vs Control
Short term
-0.08 [-0.26, 0.10]
2 (3477)
0
Medium term
-0.02 [-0.23, 0.18]
2 (1478)
0
Long term
n/a
0 (0)
n/a
4. Activity interventions vs Dietary interventions
Short term
n/a
0 (0)
n/a
Medium term
-0.28 [-0.60, 0.04]
1 (439)
n/a
Long term
n/a
0 (0)
n/a
5. Dietary & Activity interventions vs Dietary interventions
Short term
n/a
0 (0)
n/a
Medium term
-0.09 [-0.41, 0.23]
1 (359)
n/a
Long term
n/a
0 (0)
n/a
6. Dietary & Activity interventions vs Activity interventions
Short term
n/a
0 (0)
n/a
Medium term
0.19 [-0.14, 0.52]
1 (478)
n/a
Long term
n/a
0 (0)
n/a
-1
-0.5
0
0.5
1
Mean difference

Figure 9: Children aged 5 to 11 – zBMI – all settings



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.

Figure 10: Children aged 5 to 11 – zBMI – school settings

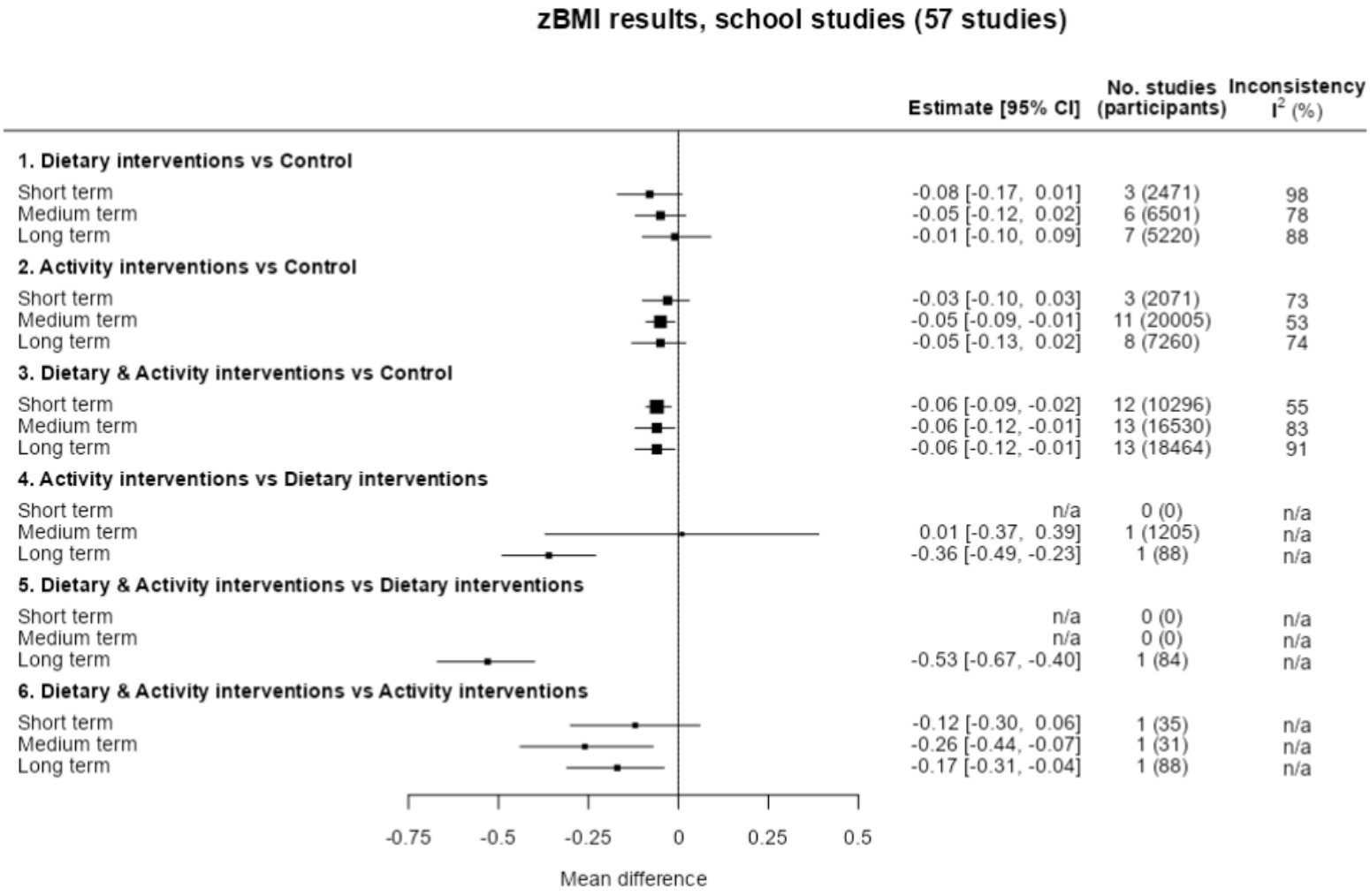
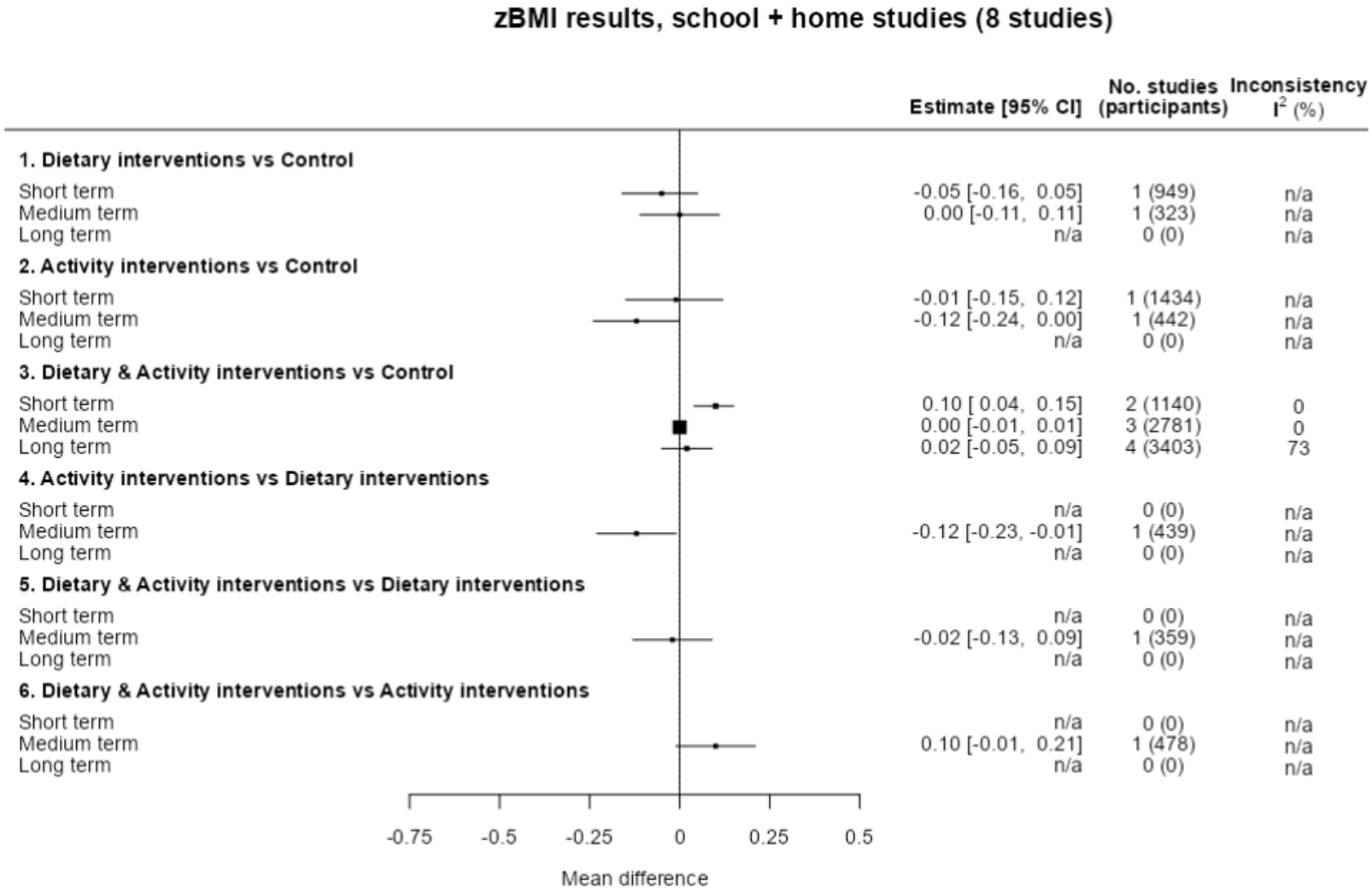

zBMI results, school studies (57 studies)
Estimate [95% CI]
No. studies (participants)
Inconsistency I^2 (%)
1. Dietary interventions vs Control
Short term
-0.08 [-0.17, 0.01]
3 (2471)
98
Medium term
-0.05 [-0.12, 0.02]
6 (6501)
78
Long term
-0.01 [-0.10, 0.09]
7 (5220)
88
2. Activity interventions vs Control
Short term
-0.03 [-0.10, 0.03]
3 (2071)
73
Medium term
-0.05 [-0.09, -0.01]
11 (20005)
53
Long term
-0.05 [-0.13, 0.02]
8 (7260)
74
3. Dietary & Activity interventions vs Control
Short term
-0.06 [-0.09, -0.02]
12 (10296)
55
Medium term
-0.06 [-0.12, -0.01]
13 (16530)
83
Long term
-0.06 [-0.12, -0.01]
13 (18464)
91
4. Activity interventions vs Dietary interventions
Short term
n/a
0 (0)
n/a
Medium term
0.01 [-0.37, 0.39]
1 (1205)
n/a
Long term
-0.36 [-0.49, -0.23]
1 (88)
n/a
5. Dietary & Activity interventions vs Dietary interventions
Short term
n/a
0 (0)
n/a
Medium term
n/a
0 (0)
n/a
Long term
-0.53 [-0.67, -0.40]
1 (84)
n/a
6. Dietary & Activity interventions vs Activity interventions
Short term
-0.12 [-0.30, 0.06]
1 (35)
n/a
Medium term
-0.26 [-0.44, -0.07]
1 (31)
n/a
Long term
-0.17 [-0.31, -0.04]
1 (88)
n/a
-0.75
-0.5
-0.25
0
0.25
0.5
Mean difference

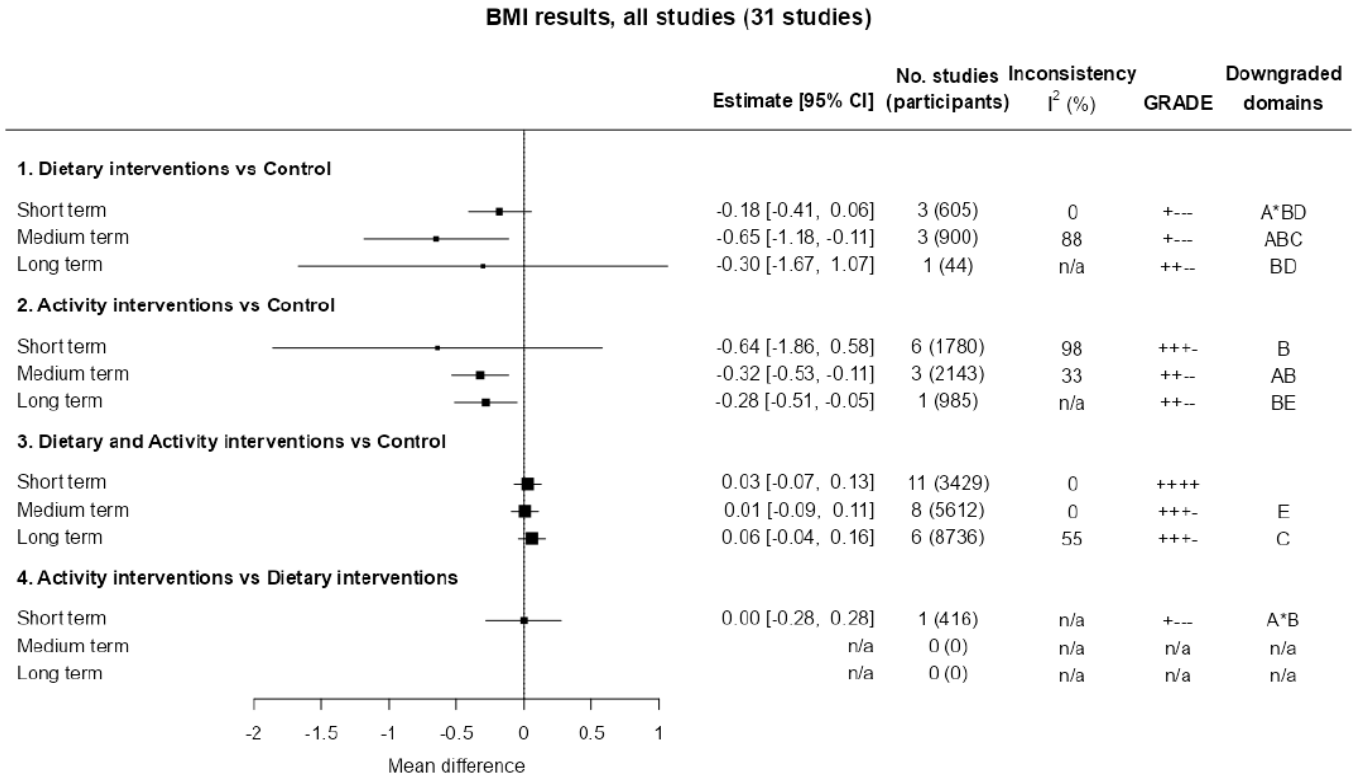
Figure 11: Children aged 5 to 11 – zBMI – School + Home settings


zBMI results, school + home studies (8 studies)
Estimate [95% CI]
No. studies (participants)
Inconsistency I² (%)
1. Dietary interventions vs Control
Short term -0.05 [-0.16, 0.05] 1 (949) n/a
Medium term 0.00 [-0.11, 0.11] 1 (323) n/a
Long term n/a 0 (0) n/a
2. Activity interventions vs Control
Short term -0.01 [-0.15, 0.12] 1 (1434) n/a
Medium term -0.12 [-0.24, 0.00] 1 (442) n/a
Long term n/a 0 (0) n/a
3. Dietary & Activity interventions vs Control
Short term 0.10 [0.04, 0.15] 2 (1140) 0
Medium term 0.00 [-0.01, 0.01] 3 (2781) 0
Long term 0.02 [-0.05, 0.09] 4 (3403) 73
4. Activity interventions vs Dietary interventions
Short term n/a 0 (0) n/a
Medium term -0.12 [-0.23, -0.01] 1 (439) n/a
Long term n/a 0 (0) n/a
5. Dietary & Activity interventions vs Dietary interventions
Short term n/a 0 (0) n/a
Medium term -0.02 [-0.13, 0.09] 1 (359) n/a
Long term n/a 0 (0) n/a
6. Dietary & Activity interventions vs Activity interventions
Short term n/a 0 (0) n/a
Medium term 0.10 [-0.01, 0.21] 1 (478) n/a
Long term n/a 0 (0) n/a
-0.75
-0.5
-0.25
0
0.25
0.5
Mean difference

Children aged 12 to 18 years

Note for all forest plots: short term = 12 weeks to <9 months; medium term = 9 months to <15 months; long term = >15 months

Figure 12: Children aged 12 to 18 years – BMI – all settings



Summary of meta-analysis results for BMI.

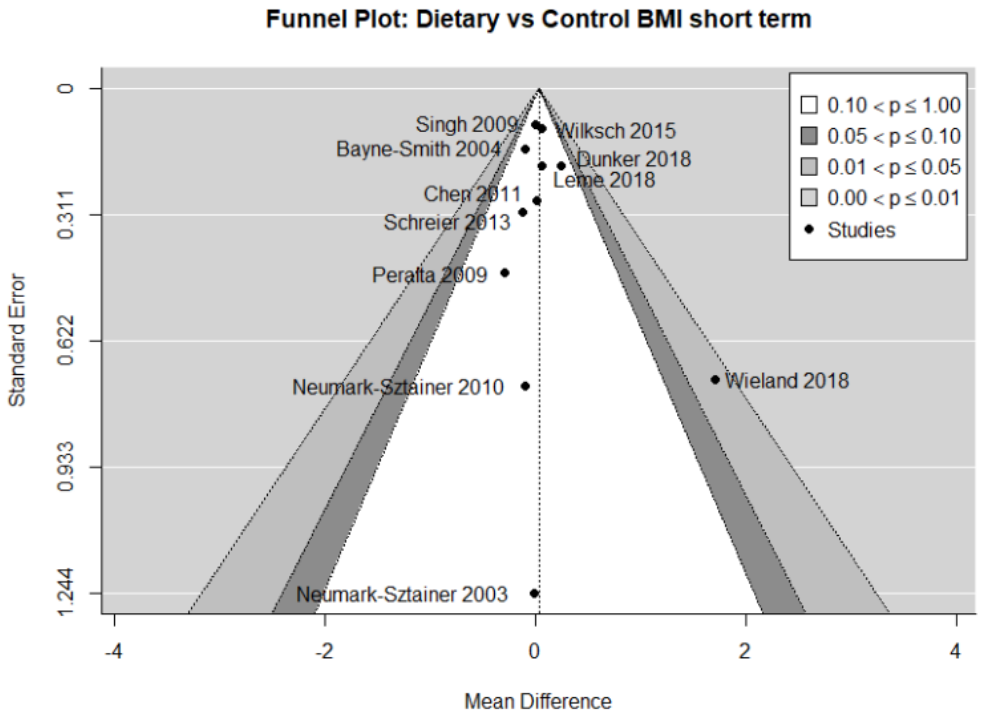
Certainty of the evidence(GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low;

GRADE domains: A=risk of bias; B=imprecision; C=inconsistency; D=indirectness; E=publication bias;

*Downgraded two levels.

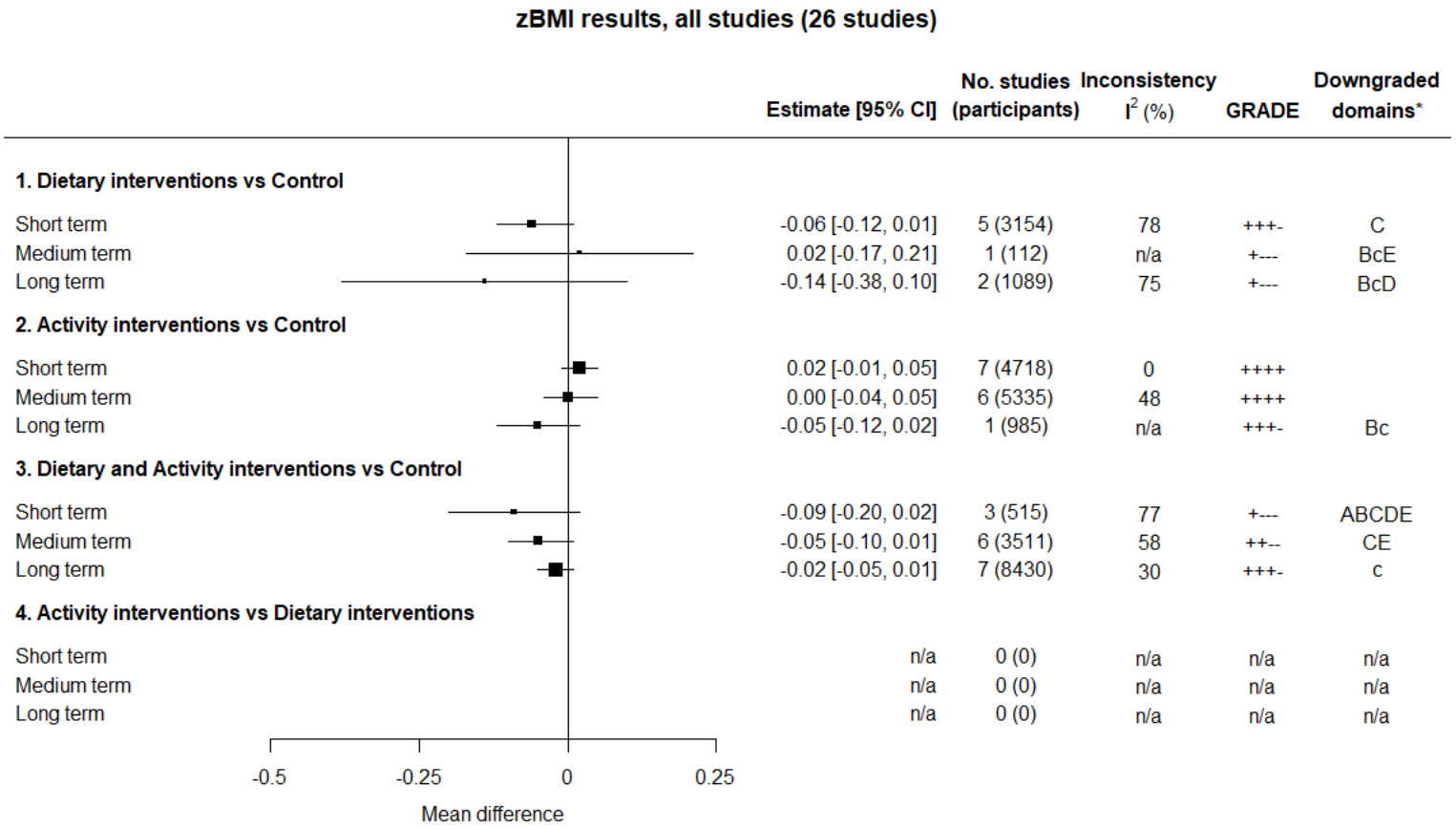
Abbreviations: CI: confidence interval; n/a: not applicable

Figure 13: Children aged 12 to 18 years – Funnel Plot: Dietary vs control – BMI short term



Funnel plot to invetsigate small study effects in the meta-analysis of Dietary intervention vs Control for BMI short term.

Figure 14: Children aged 12 to 18 – zBMI- all settings



**GRADE domains: A/a = risk of bias, B/b = imprecision, C/c = inconsistency, D/d = indirectness, E/e = publication bias. Capital letters indicate a downgrade of one level, lower case letters indicate a downgrade of half a level.*

Figure 15: Children aged 12 to 18 – BMI- school settings

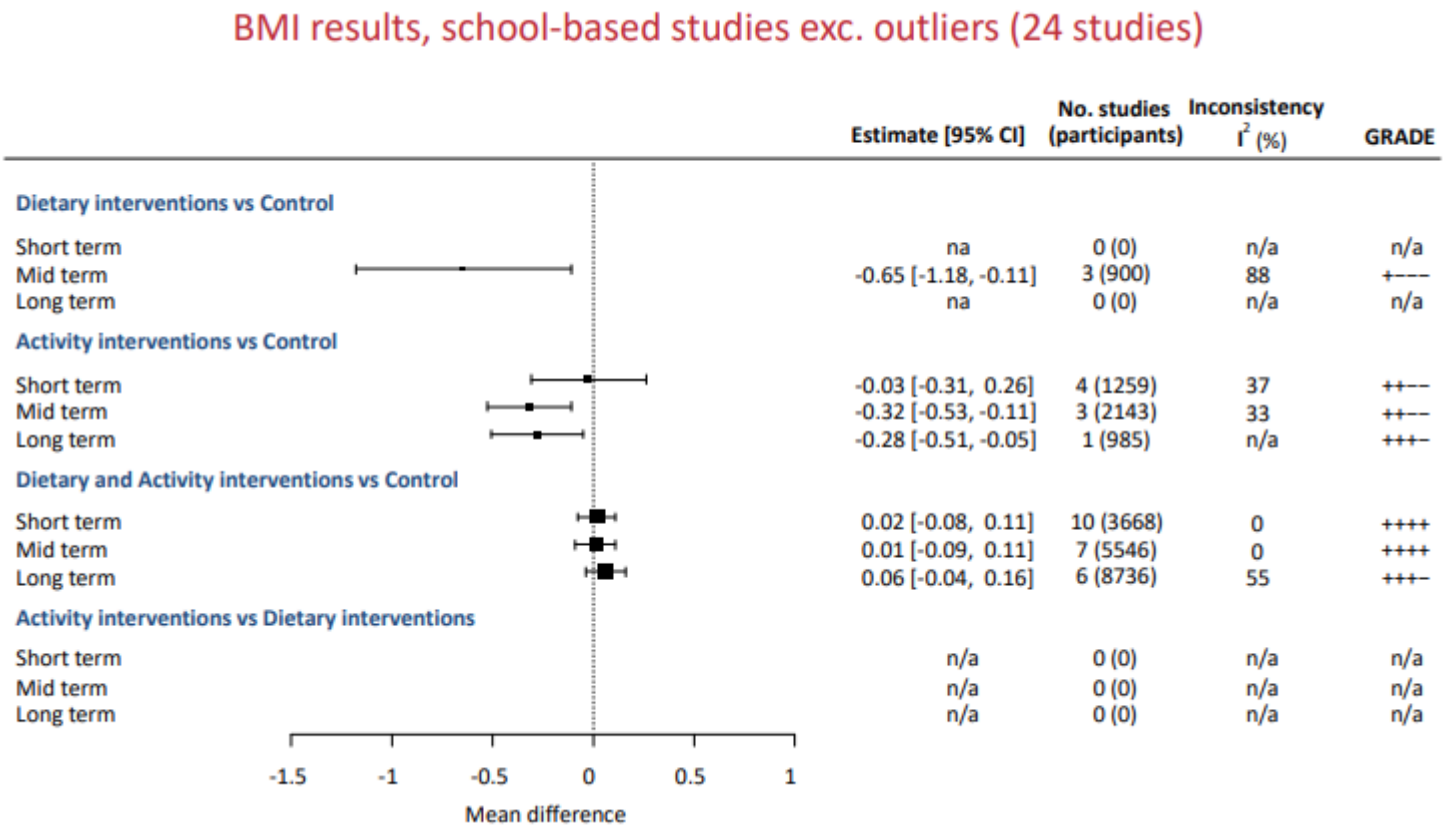
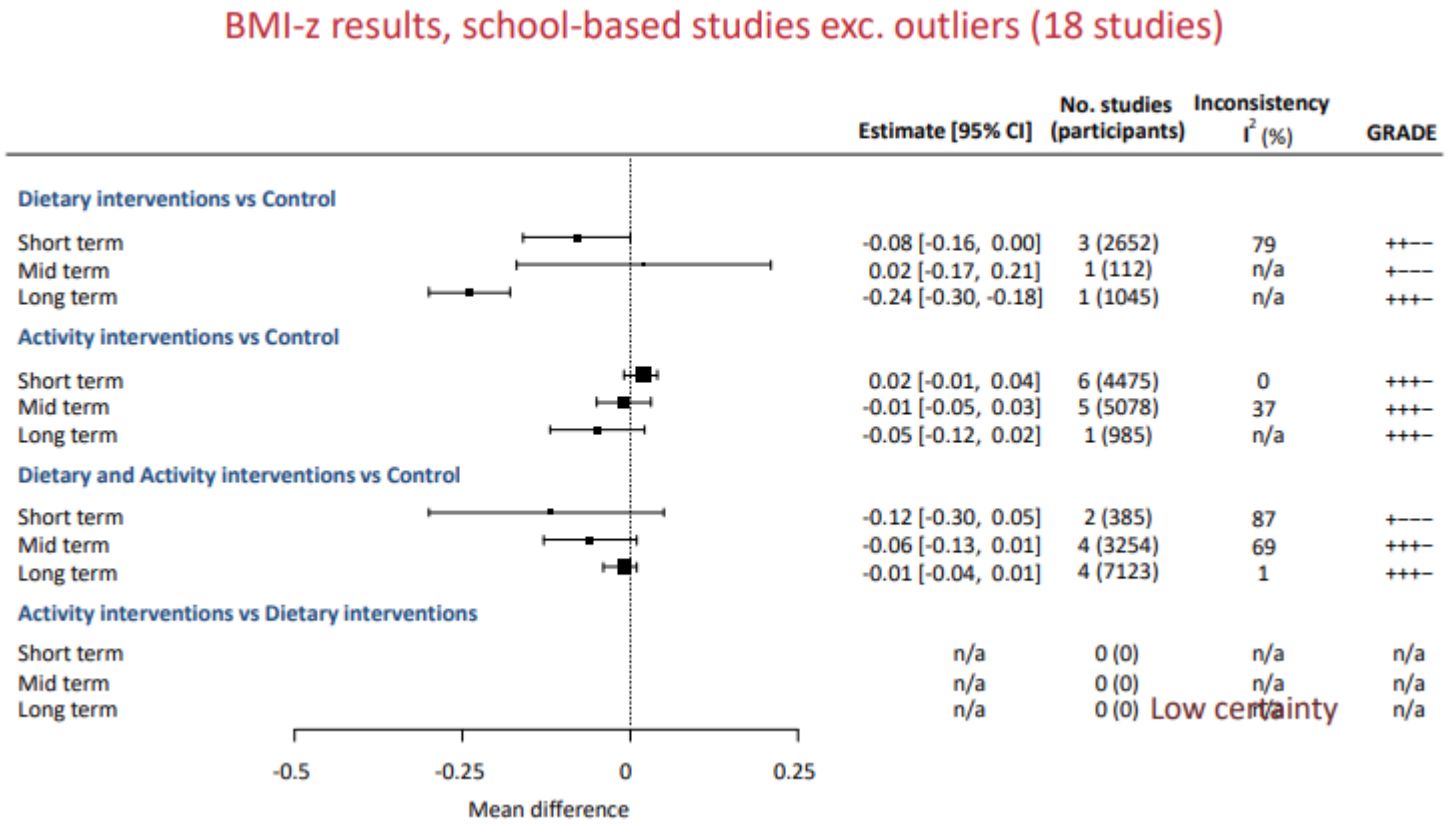


Figure 16: Children aged 12 to 18 – zBMI- school settings



Appendix F – GRADE tables

Children aged 2 to 4 years

Dietary interventions vs control (childcare settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Dietary interventions	Control	Relative (95% CI)	Absolute		
zBMI; Medium term (9 to 15 months). Better indicated by lower values												
1[1]	randomised trials	no serious	possible serious concerns[2]	no serious indirectness	serious[3]	none	288	234	-	MD 0.17 lower (0.45 lower to 0.11 higher)	⊕⊕OO LOW/MODERATE	CRITICAL

[1] Yoong 2020
[2] Downgraded half a point as results are from a single study
[3] Downgraded once for imprecision due to <3000 participants without clear evidence of an effect larger than ± 1/5 of a typical standard deviation (BMI z-score of 0.2)

Physical activity interventions vs control (childcare settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to 9 months). Better indicated by lower values												

3[a]	randomised trials	no serious	no serious[1]	no serious indirectness	serious[2]	none	351	354	-	MD 0.05 lower (0.18 lower to 0.08 higher)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Medium term (9 to 15 months). Better indicated by lower values												
2[b]	randomised trials	no serious	no serious[1]	no serious indirectness	serious[2]	none	297	312	-	MD 0.03 lower (0.21 lower to 0.15 higher)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Long term (longest timepoint in study). Better indicated by lower values												
4[c]	randomised trials	no serious	no serious[1]	no serious indirectness	serious[2]	none	380	389	-	MD 0.08 lower (0.20 lower to 0.05 higher)	⊕⊕⊕O MODERATE	CRITICAL

[a] Dennison (2004), Goldfield (2016), Reilly (2006)
[b] Barber (2016), Reilly (2006)
[c] Barber (2016), Dennison (2004) Goldfield (2016), Reilly (2006)
[1] Estimated heterogeneity variance (tau) = 0
[2] Downgraded once for imprecision due to <3000 participants without clear evidence of an effect larger than ± 1/5 of a typical standard deviation (BMI z-score of 0.2)

Dietary and physical activity interventions vs control (childcare settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Dietary and physical activity interventions**	**Control**	**Relative (95% CI)**	**Absolute**		
zBMI; Short term (12 weeks to 9 months). Better indicated by lower values												
7[a]	randomised trials	serious concerns[1]	no serious[2]	no serious indirectness	no serious imprecision	none			-	MD 0.02 lower (0.05 lower to 0.02 higher)	⊕⊕⊕O MODERATE	CRITICAL

zBMI; Medium term (9 to 15 months). Better indicated by lower values												
6[b]	randomised trials	serious concerns[1]	no serious[2]	no serious indirectness	no serious imprecision	none			-	MD 0.12 lower (0.20 lower to 0.05 lower)	⊕⊕⊕O MODERATE	CRITICAL
zBMI – Long term (15 months +)												
6[c]	randomised trials	serious concerns[1]	no serious[2]	no serious indirectness	no serious imprecision	some concerns[3]			-	MD 0.11 lower (0.21 lower to 0.01 lower)	⊕⊕OO LOW	CRITICAL
zBMI; Long term (longest timepoint in study). Better indicated by lower values												
11[d]	randomised trials	serious concerns[1]	possible serious concerns[4]	no serious indirectness	no serious imprecision	none			-	MD 0.10 lower (0.17 lower to 0.04 lower)	⊕⊕⊕O LOW / MODERATE	CRITICAL

[a] Alkon (2014), Davis (2016), Fitzgibbon (2005), Fitzgibbon (2006), Fitzgibbon (2011), Malden (2019), Vaughn (2021)
[b] Davis (2016), Fitzgibbon (2005), Fitzgibbon (2006), Iaia (2017), Slusser (2012), Zask (2012)
[c] Davis (2016), Fitzgibbon (2005), Fitzgibbon (2006), Fitzgibbon (2011), Hodgkinson (2019), Iaia (2017)
[d] Alkon (2014), Davis (2016), Fitzgibbon (2005), Fitzgibbon (2006), Fitzgibbon (2011), Hodgkinson (2019), Iaia (2017), Malden (2019), Slusser (2012), Vaughn (2021), Zask (2012)
[1] Downgraded once as >30% weight of studies were at high risk of bias
[2] Estimated heterogeneity variance (tau) = 0
[3] Downgraded once for some concerns: Evidence of measured outcomes being missing and an indication that missing results were not statistically significant and able to affect the meta-analyses result
[4] Downgraded half a point as estimated heterogeneity variance (tau) of moderate magnitude and the direction of the results is inconsistent

Children aged 5 to 11 years

zBMI

Dietary interventions vs control (all settings)

Quality assessment	No of participants	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												
8[a]	randomised trials	no serious	serious[1]	no serious	no serious	none			-	MD 0.06 lower (0.13 lower to 0.01 higher)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Medium term (9 to <15 months). Better indicated by lower values												
9[b]	randomised trials	no serious	serious[2]	no serious indirectness	no serious	none			-	MD 0.04 lower (0.1 lower to 0.02 higher)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
7[c]	randomised trials	serious[3]	serious[4]	no serious indirectness	no serious	none			-	MD 0.05 lower (0.1 lower to 0.01 higher)	⊕⊕OO LOW	CRITICAL

[a] Chai 2019, Damsgaard 2014, de Ruyter 2012, Fulkerson 2010, Hendrie 2011, Nicholl 2021, Paineau 2008, Viggiano 2018
[b] Barnes 2021, Coleman 2012, Davis 2021, de Ruyter 2012, Fulkerson 2010, James 2004, Lent 2014, Meng 2013, Stettler 2015
[c] Coleman 2012, de Ruyter 2012, Fulkerson 2015, Han 2006, James 2004, Lent 2014, Viggiano 2018
[1] Downgraded one level due to inconsistency (large heterogeneity (I^2 93%, P<0.00001) and point estimates and confidence intervals vary considerably
[2] Downgraded one level due to inconsistency (large heterogeneity (I^2 80%, P<0.00001) and point estimates and confidence intervals vary considerably
[3] Downgraded one level due to risk of bias (evidence contributing 50.2% of the weight is from four results at high risk of bias)
[4] Downgraded one level due to inconsistency (substantial heterogeneity (I^2 67%, P=0.006) and point estimates and confidence intervals vary considerably

Physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												

6[a]	randomised trials	no serious	serious[1]	no serious	no serious	serious[2]			-	MD 0.02 lower (0.07 lower to 0.02 higher)	⊕⊕OO LOW	CRITICAL
zBMI; Medium term (9 to <15 months). Better indicated by lower values												
13[b]	randomised trials	no serious	serious[3]	no serious	no serious	none			-	MD 0.05 lower (0.09 lower to 0.02 lower)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
6[c]	randomised trials	serious[4]	serious[5]	no serious	no serious	none			-	MD 0.02 lower (0.09 lower to 0.04 higher)	⊕⊕OO LOW	CRITICAL

[a] Barnes 2015, Breheny 2020, Diaz-Castro 2021, Lazaar 2007, Martinez-Vizcaino 2020, Newton 2014
[b] Barnes 2021, Brehent 2020, Farmer 2017, Khan 2014, Li 2010, Martinez-Vizcaino 2022, Meng 2013, Morgan 2019, Muller 2016, Muller 2019, Tanskey 2017, Wang 2018, Yin 2012
[c] Farmer 2017, Kovalskys 2016, Li 2010, Salmon 2022, Simon 2008, Yin 2012
[1] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 35%, P=0.17) and point estimates and confidence intervals vary considerably
[2] Downgraded 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 from two studies are not reported and no information regarding the direction of the effect is reported. Meta-analysis shows no evidence of effect of the intervention; the proportion of missing data is relatively large (35%) and there is potential for missing results to impact on the synthesised effect estimate
[3] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 48%, P=0.03) but point estimates and confidence intervals do not vary considerably
[4] Downgraded one level due to risk of bias (evidence contributing 36.3% of the weight is from two results at high risk of bias)
[5] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 55%, P=0.05) and point estimates and confidence intervals vary considerably

Diet and physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Physical activity interventions**	**Control**	**Relative (95% CI)**	**Absolute**		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												
26[a]	randomised trials	serious[1]	serious[2]	no serious	no serious	none			-	MD 0.03 lower (0.06 lower to 0.00)	⊕⊕OO LOW	CRITICAL

zBMI; Medium term (9 to <15 months). Better indicated by lower values												
24[b]	randomised trials	no serious	serious[3]	no serious	no serious	none			-	MD 0.05 lower (0.07 lower to 0.02 lower)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
22[c]	randomised trials	serious[4]	serious[5]	no serious indirectness	no serious	none			-	MD 0.02 lower (0.06 lower to 0.01 higher)	⊕⊕OO LOW	CRITICAL

[a] Baranowski 2011, Bohnert 2013, Brown 2013, Choo 2020, Fairclough 2013, Griffin 2019, Haire-Joshu 2010, Hull 2018, Kipping 2014, Kocken 2016, Levy 2012, Liu 2019, Liu 2022, Morgan 2011, Morgan 2014, NCT02067728 2014, Nyberg 2015, Nyberg 2016, O'Connor 2020, Pena 2021, Ramirez-Rivera 2021, Rerksuppaphol 2017, Rosario 2012, Rosenkranz 2010, Spiegel 2006, White 2019
[b] Barnes 2021, Cao 2015, Crespo 2012, Elder 2014, Fulkerson 2022, Kain 2014, Keller 2009, Kubik 2021, Li 2019, Lichenstein 2011, Liu 2019, Liu 2022, Nyberg 2015, Nyberg 2016, Sahota 2001, Santos 2014, Sekhavat 2014, Sherwood 2019, Siegrist 2013, Stettler 2015, Wang 2012, White 2019, Xu 2015, Xu 2017
[c] Adab 2018, Cao 2015, Crespo 2012, Elder 2014, Foster 2008, Grydeland 2014, Habib-Mourad 2020, HEALTHY Study Group 2010, Hull 2018, Kipping 2014, Kocken 2016, Kubik 2021, Lichtenstein 2011, Lloyd 2018, Marcus 2009, Rush 2012, Sahota 2019, Sherwood 2019, Story 2012, Topham 2021, White 2019, Williamson 2012
[1] Downgraded one level due to risk of bias (evidence contributing 40.3% of the weight is from 13 results at high risk of bias)
[2] Downgraded once for inconsistency (substantial heterogeneity (I^2 58%, P=0.0001) and point estimates and confidence intervals vary considerably
[3] Downgraded one level due to inconsistency (large heterogeneity (I^2 77%, P<0.00001) and point estimates and confidence intervals vary considerably
[4] Downgraded one level due to risk of bias (evidence contributing 49% of the weight is from 12 results at high risk of bias
[5] Downgraded once for inconsistency (large heterogeneity (I^2 88%, P<0.00001) and point estimates and confidence intervals vary considerably

BMI

Dietary interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Physical activity interventions**	**Control**	**Relative (95% CI)**	**Absolute**		
BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
5[a]	randomised trials	no serious	serious[1]	no serious	serious[2]	serious[3]			-	MD 0.00 (0.1 lower to 0.1 higher)	⊕OOO VERY LOW	CRITICAL

BMI; Medium term (9 to <15 months). Better indicated by lower values												
9[b]	randomised trials	no serious	serious[4]	no serious	no serious	serious[5]			-	MD 0.01 lower (0.15 lower to 0.12 higher)	⊕⊕OO LOW	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
2[c]	randomised trials	no serious	serious[6]	no serious indirectness	serious[7]	none			-	MD 0.17 lower (0.48 lower to 0.13 higher)	⊕⊕OO LOW	CRITICAL

[a] Chai 2019, Hendrie 2011, Nicholl 2021, Paineau 2008, Sichieri 2008
[b] Barnes 2021, Cunha 2013, Davis 2021, James 2004, Keshani 2016, Lent 2014, Meng 2013, NCT00224887 2005, Stettler 2015
[c] James 2004, Lent 2014
[1] Downgraded one level due to inconsistency (low heterogeneity (I^2 0%, P=0.66) but point estimates and confidence intervals vary considerably
[2] Downgraded one level due to imprecision (evidence from 2107 participants)
[3] Downgraded 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 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
[4] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 43%, P=0.08) and point estimates and confidence intervals vary considerably
[5] Downgraded 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 relatively large (37.5%) and there is potential for the missing results to impact on the synthesised effect estimate
[6] Downgraded one level due to inconsistency (low heterogeneity (I^2 8%, P=0.3) but point estimates and confidence intervals vary considerably
[7] Downgraded one level due to imprecision (evidence from 945 participants)

Physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Physical activity interventions**	**Control**	**Relative (95% CI)**	**Absolute**		
BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
14[a]	randomised trials	serious[1]	serious[2]	no serious	no serious	none			-	MD 0.02 lower	⊕⊕OO	CRITICAL

										(0.17 lower to 0.13 higher)	LOW	
BMI; Medium term (9 to <15 months). Better indicated by lower values												
16[b]	randomised trials	serious[3]	no serious	no serious	no serious	none			-	MD 0.11 lower (0.18 lower to 0.05 lower)	⊕⊕⊕O MODERATE	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
8[c]	randomised trials	serious[4]	serious[5]	no serious	no serious	none			-	MD 0.07 lower (0.24 lower to 0.1 higher)	⊕⊕OO LOW	CRITICAL

[a] Clemes 2020, De Bock 2013, de Greeff 2016, Diaz-Castro 2021, Drummy 2016, Ford 2013, Ha 2021, Ketelhut 2022, Lau 2016, Lazaar 2007, Martinez-Vizcaino 2020, Newton 2014, Rhodes 2019, Thivel 2011
[b] Barbeau 2007, Barnes 2021, De Bock 2013, Farmer 2017, Ha 2021, Howe 2011, Khan 2014, Kriemler 2010, Li 2010, Martinez-Vizcaino 2014, Martinez-Vizcaino 2022, Meng 2013, Simon 2008, Tanskey 2017, Vizcaino 2008, Wang 2018
[c] Donnelly 2009, Farmer 2017, Kriemler 2010, Li 2020, Sacchetti 2013, Simon 2008, Telford 2012, Wendel 2016
[1] Downgraded one level due to risk of bias (evidence contributing 46.6% of the weight is from six results at high risk of bias)
[2] Downgraded one level due to inconsistency (large heterogeneity (I^2 86%, P<0.00001) and point estimates and confidence intervals vary considerably
[3] Downgraded one level due to risk of bias (evidence contributing 32.3% of the weight is from six results at high risk of bias)
[4] Downgraded one level due to risk of bias (evidence contributing 56% of the weight is from six results at high risk of bias)
[5] Downgraded one level due to inconsistency (substantial heterogeneity (I^2 64%, P=0.007) and point estimates and confidence intervals vary considerably

Diet and physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Physical activity interventions**	**Control**	**Relative (95% CI)**	**Absolute**		
BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
27[a]	randomised trials	serious[1]	serious[2]	no serious	no serious	none			-	MD 0.11 lower (0.21 lower to 0.1 lower)	⊕⊕OO LOW	CRITICAL
BMI; Medium term (9 to <15 months). Better indicated by lower values												

21[b]	randomised trials	no serious	serious[3]	no serious	no serious	none			-	MD 0.11 lower (0.21 lower to 0.00)	⊕⊕⊕O MODERATE	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
16[c]	randomised trials	serious[4]	serious[5]	no serious	no serious	none			-	MD 0.03 lower (0.11 lower to 0.16 higher)	⊕⊕OO LOW	CRITICAL

[a] Annesi 2016, Annesi 2017, Baranowski 2003, Beech 2003, Brown 2013, Chen 2010, De Heer 2011, Duncan 2019, Fairclough 2013, Gentile 2009, Habib-Mourad 2014, Hopper 2005, Hull 2018, Jansen 2011, Kipping 2008, Liu 2019, Liu 2022, Morgan 2014, Nollen 2014, Pena 2021, Rerksuppaphol 2017, Rosario 2012, Rosenkranz 2010, Safdie 2013, Sgambato 2019, Stolley 1997, Story 2003
[b] Annesi 2016, Annesi 2017, Barnes 2021, Elder 2014, Gentile 2009, Kain 2014, Klesges 2010, Kobel 2017, Kubik 2021, Liu 2019, Liu 2022, Nemet 2011a, Nemet 2011b, Puder 2011, Safdie 2013, Sekhavat 2014, Siegrist 2013, Stettler 2015, Stolley 1997, Xu 2015, Xu 2017
[c] Brandstetter 2012, Caballero 2003, Elder 2014, Foster 2008, Greve 2015, Grydeland 2014, Hull 2018, Klesges 2010, Kubik 2021, Llargues 2012, Lloyd 2018, Magnusson 2012, Nemet 2011b, Safdie 2013, Siegrist 2018, Story 2012
[1] Downgraded one level due to risk of bias (evidence contributing 35.6% of the weight is from 12 results at high risk of bias)
[2] Downgraded one level due to inconsistency (large heterogeneity (I^2 72%, P <0.00001) and point estimates and confidence intervals vary considerably
[3] Downgraded one level due to inconsistency (large heterogeneity (I^2 74%, P<0.00001) and point estimates and confidence intervals vary considerably
[4] Downgraded one level due to risk of bias (evidence contributing 48.7% of the weight is from seven results at high risk of bias
[5] Downgraded one level for inconsistency (large heterogeneity (I^2 72%, P<0.00001) and point estimates and confidence intervals vary considerably

Children aged 12 to 18 years

Please see the forest plots (figure 12 and figure 14 of this review) for GRADE ratings for all settings (Cochrane provides GRADE ratings in the forest plots rather than as separate GRADE tables). For this age group, GRADE ratings are also provided setting subgroups (figure 15 and figure 16 of this review).

zBMI

Dietary interventions vs control (all settings)

Quality assessment	No of participants	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												
5[a]	randomised trials	serious[1]	serious[2]	no serious	no serious	none			-	MD 0.06 lower (0.12 lower to 0.01 higher)	⊕⊕OO LOW	CRITICAL
zBMI; Medium term (9 to <15 months). Better indicated by lower values												
1[b]	randomised trials	no serious	serious[3]	no serious	no serious	serious[4]			-	MD 0.02 higher (0.17 lower to 0.21 higher)	⊕OOO VERY LOW	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
2[c]	randomised trials	no serious	serious[5]	serious[6]	serious[7]	none			-	MD 0.14 lower (0.38 lower to 0.1 higher)	⊕OOO VERY LOW	CRITICAL

[a] Amaro 2006, Ooi 2021, Papadaki 2010, Shomaker 2019, Viggiano 2015
[b] Kuroko 2020
[c] Shomaker 2019, Viggiano 2015
[1] Downgraded one level due to risk of bias (evidence contributing 38.9% of the weight is from two results at high risk of bias)
[2] Downgraded one level due to inconsistency (considerable heterogeneity (I^2 = 78%, P = 0.001) and point estimates and confidence intervals vary considerably
[3] Downgraded one level due to imprecision (evidence is from 112 participants)
[4] Downgraded one level due to outcome non-reporting bias (one large study reported no significant difference with potential of overturning the results of the meta-analysis
[5] Downgraded one level due to inconsistency (considerable heterogeneity (I^2 = 75%, P = 0.04) and point estimates and confidence intervals vary considerably
[6] Downgraded one level due to indirectness (concerns on substantial contribution to weight of one study in a highly specific population: one study included girls and boys at-risk for excess weight gain (i.e., BMI ≥70th percentile or two biological parents with reported obesity [BMI ≥30 kg/m2]
[7] Downgraded one level due to imprecision (evidence is from 1089 participants)

Physical activity interventions vs control (all settings)

Quality assessment	No of participants	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												
7[a]	randomised trials	no serious	no serious	no serious	no serious	none			-	MD 0.02 higher (0.01 lower to 0.05 higher)	⊕⊕⊕⊕ HIGH	CRITICAL
zBMI; Medium term (9 to <15 months). Better indicated by lower values												
6[b]	randomised trials	no serious	serious[1]	no serious	no serious	none			-	MD 0.00 (0.04 lower to 0.05 higher)	⊕⊕⊕O MODERATE	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
1[c]	randomised trials	no serious	no serious	no serious	serious[2]	none			-	MD 0.05 lower (0.12 lower to 0.02 higher)	⊕⊕⊕O MODERATE	CRITICAL

[a] Arlinghaus 2021, Harrington 2018, Kennedy 2018, Lubans 2021, Pfeiffer 2019, Prins 2012, Simons 2015
[b] Harrington 2018, Hollis 2016, Kennedy 2018, Lubans 2021, Pate 2005, Simons 2015
[c] Hollis 2016
[1] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 = 48%, P = 0.08) and point estimates and confidence intervals vary considerably
[2] Downgraded one level due to imprecision (evidence is from 985 participants)

Diet and physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
zBMI; Short term (12 weeks to <9 months). Better indicated by lower values												
3[a]	randomised trials	serious[1]	serious[2]	serious[3]	serious[4]	serious[5]			-	MD 0.09 lower	⊕OOO	CRITICAL

										(0.02 lower to 0.02 higher)	VERY LOW	
zBMI; Medium term (9 to <15 months). Better indicated by lower values												
6[b]	randomised trials	no serious	serious[6]	no serious	no serious	serious[7]			-	MD 0.05 lower (0.01 lower to 0.01 higher)	⊕⊕OO LOW	CRITICAL
zBMI; Long term (>15 months). Better indicated by lower values												
7[c]	randomised trials	serious[8]	no serious	no serious	no serious	serious[9]			-	MD 0.02 lower (0.05 lower to 0.01 higher)	⊕⊕OO LOW	CRITICAL

[a] Leme 2018, NCT02067728 2014, Reesor 2019
[b] Black 2010, Dewar 2013, French 2011, Haerens 2006, Leme 2018, Reesor 2019
[c] Andrade 2014, Black 2010, Bonsergent 2013, Dewar 2013, Haerens 2006, Hovell 2018, Kuhlemeier 2022
[1] Downgraded two levels due to risk of bias (evidence contributing 69.5% of the weight is from two results at high risk of bias)
[2] Downgraded one level due to inconsistency (considerable heterogeneity (I^2 = 77%, P = 0.01) and point estimates and confidence intervals vary considerably)
[3] Downgraded one level due to indirectness (concerns on substantial contribution to weight of two studies in highly specific populations: in one study eligible girls were girls considered “at risk” of obesity based on their physical activity and dietary behaviours; one study targeted adolescent boys with sub-optimal cardiorespiratory fitness (i.e., at risk of obesity))
[4] Downgraded one level due to imprecision (evidence from 515 participants)
[5] Downgraded one level due to outcome non-reporting bias (there is missing evidence from two studies, one shows beneficial effect of the intervention and one does not provide any information on the direction of the effect; as the meta-analyses shows no effect there is potential impact on the result)
[6] Downgraded one level due to inconsistency (substantial heterogeneity (I^2 = 58%, P = 0.03) and point estimates and confidence intervals vary considerably)
[7] Downgraded one level due to outcome non-reporting bias (there is missing evidence from five studies, two show no effect and three do not provide any information on the direction of the effect; the meta-analyses show no effect, but the lack of information has potential to impact on the result)
[8] Downgraded one level due to risk of bias (evidence contributing 42.8% of the weight is from three results at high risk of bias)
[9] Downgraded one level due to inconsistency (moderate heterogeneity (I^2 = 30%, P = 0.20) and point estimates and confidence intervals vary considerably

BMI

Dietary interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		

BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
3[a]	randomised trials	serious[1]	no serious	serious[2]	serious[3]	none			-	MD 0.18 lower (0.41 lower to 0.06 higher)	⊕OOO VERY LOW	CRITICAL
BMI; Medium term (9 to <15 months). Better indicated by lower values												
3[b]	randomised trials	serious[4]	serious[5]	no serious	serious[6]	none			-	MD 0.65 lower (1.18 lower to 0.11 lower)	⊕OOO VERY LOW	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
1[c]	randomised trials	no serious	serious[6]	no serious[7]	serious[8]	none			-	MD 0.3 lower (1.67 lower to 1.07 higher)	⊕⊕OO LOW	CRITICAL

[a] Ebbeling 2006, Papadaki 2010, Shomaker 2019
[b] Luszczynska 2016b, Mihas 2010, Takacs 2020
[c] Shomaker 2019
[1] Downgraded two levels due to risk of bias (evidence contributing 61.4% of the weight is from one result at high risk of bias)
[2] Downgraded one level for indirectness: concerns on substantial contribution to weight of two studies in highly specific populations: one study targeted adolescents who reported consuming at least 1 serving per day of sugar-sweetened beverages (SSB) and lived predominately in one household; one study included girls and boys at-risk for excess weight gain (i.e., BMI ≥70th percentile or two biological parents with reported obesity [BMI ≥30 kg/m2])
[3] Downgraded one level due to imprecision (evidence from 605 participants)
[4] Downgraded one level due to risk of bias (evidence contributing 37.3% of the weight is from one result at high risk of bias)
[5] Downgraded one level due to inconsistency (considerable heterogeneity (I^2 = 88%, P = 0.0002), and point estimates and confidence intervals vary considerably
[6] Downgraded one level due to imprecision (evidence is from 900 participants)
[7] Downgraded one level due to indirectness (concerns on the study being conducted in a highly specific population: the study included girls and boys at-risk for excess weight gain (i.e., BMI ≥70th percentile or two
biological parents with reported obesity [BMI ≥30 kg/m2])
[8] Downgraded one level due to imprecision (evidence is from 44 participants)

Physical activity interventions vs control (all settings)

Quality assessment	No of participants	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		
BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
6[a]	randomised trials	no serious	no serious	no serious	serious[1]	none			-	MD 0.64 lower (1.86 lower to 0.58 higher)	⊕⊕⊕O MODERATE	CRITICAL
BMI; Medium term (9 to <15 months). Better indicated by lower values												
3[b]	randomised trials	serious[2]	no serious	no serious	serious[3]	none			-	MD 0.32 lower (0.58 lower to 0.11 lower)	⊕⊕OO LOW	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
1[c]	randomised trials	no serious	no serious	no serious	serious[4]	serious[5]			-	MD 0.28 lower (0.51 lower to 0.05 lower)	⊕OOO VERY LOW	CRITICAL

[a] El Ansari 2010, Kennedy 2018, Melnyk 2013, Smith 2014, Velez 2010, Weeks 2012
[b] Hollis 2016, Kennedy 2018, Melnyk 2013
[c] Hollis 2016
[1] Downgraded one level due to imprecision (evidence is from 1780 participants)
[2] Downgraded one level due to risk of bias (evidence contributing 32.2% of the weight is from one result at high risk of bias)
[3] Downgraded one level due to imprecision (evidence from 2143 participants);
[4] Downgraded one level due to imprecision (evidence from 985 participants)
[5] Downgraded one level due to outcome non-reporting bias (there is missing evidence from one study, as the meta-analysis shows benefit there is potential to impact on the result)

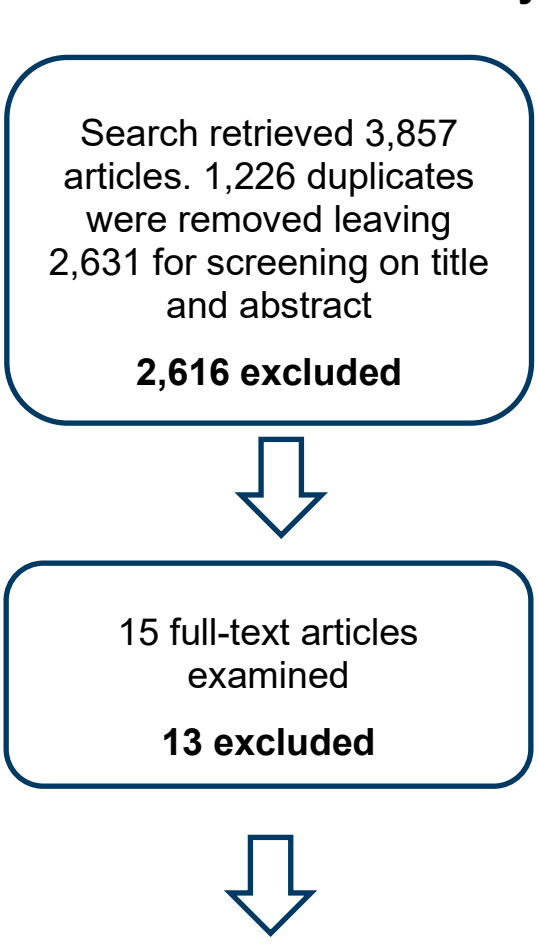
Diet and physical activity interventions vs control (all settings)

Quality assessment							No of participants		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Physical activity interventions	Control	Relative (95% CI)	Absolute		

BMI; Short term (12 weeks to <9 months). Better indicated by lower values												
11[a]	randomised trials	no serious	no serious	no serious	no serious	none			-	MD 0.03 lower (0.07 lower to 0.13 higher)	⊕⊕⊕⊕ HIGH	CRITICAL
BMI; Medium term (9 to <15 months). Better indicated by lower values												
8[b]	randomised trials	no serious	no serious	no serious	no serious	serious[1]			-	MD 0.01 lower (0.09 lower to 0.11 higher)	⊕⊕⊕O MODERATE	CRITICAL
BMI; Long term (>15 months). Better indicated by lower values												
6[c]	randomised trials	no serious	serious[2]	no serious	no serious	none			-	MD 0.06 higher (0.04 lower to 0.16 higher)	⊕⊕⊕O MODERATE	CRITICAL

[a] Bayne-Smith 2004, Chen 2011, Dunker 2018, Leme 2018, Neumark-Sztainer 2003, Neumark-Sztainer 2010, Peralta 2009, Schreier 2013, Singh 2009, Wieland 2018, Wilksch 2015
[b] Brito Beck da Silva 2019, Dewar 2013, Haerens 2006, Leme 2018, Neumark-Sztainer 2010, Singh 2009, Wieland 2018, Wilksch 2015
[c] Andrade 2014, Bonsergent 2013, Dewar 2013, Ezendam 2012, Haerens 2006, Singh 2009
[1] Downgraded one level due to outcome non-reporting bias (there is missing evidence from three studies, two studies show no effect and one study does not provide any information on the direction of the effect; the meta-analyses show no effect, but the lack of information has potential to impact on the result)
[2] Downgraded one level due to inconsistency (substantial heterogeneity (I^2 = 55%, P = 0.05) and point estimates and confidence intervals vary considerably

Appendix G – Economic evidence study selection



Appendix I – Economic evidence tables

Table 1: Canaway et al (2022)

<table>
<tr><th colspan="2">Canaway et al. (2022). Economic evaluation of a childhood obesity prevention programme for children: Results from the WAVES cluster randomised controlled trial conducted in schools</th></tr>
<tr><td>Study details</td><td>Analysis: Cost-utility analysis
Approach to analysis: A cost-utility analysis based on a cluster randomised controlled trial, using the West Midlands ActiVe lifestyle and healthy Eating in School children (WAVES) intervention, a multi-component intervention that targets both the school and family environment in the West Midlands (UK). This analysis considers costs and effects from baseline to 18 months after the end of the intervention (30 months from baseline). This analysis used a public sector perspective and considered delivery costs only for the base case scenario. Three sensitivity analysis covered the following scenarios: using a fixed effect multiple imputation approach with seemingly unrelated regressions; including the costs of setting up the intervention; inflating the costs to match the average class size and attaching the costs to only those children that consented to participation. Effects were measured in QALYs using the CHU-9D quality of life questionnaire. Secondary analysis assessed the cost per obesity case prevented. Costs and effects were reported per child, with a class size of 30. All prices were adjusted to 2014 prices.
Time horizon: 30 months
Discounting: 3.5% for costs and QALYs
Setting: English State Schools based in the West Midlands (UK)</td></tr>
<tr><td>Interventions</td><td>Intervention 1: Control – usual activities
Intervention 2: WAVES - West Midlands ActiVe lifestyle and healthy Eating in School. This was comprised of four components: a school based physical activity component; a dietary activity component; a 6-week programme delivered by an iconic sporting institution to encourage healthy eating and physical activity; and family signposting to activities outside of school</td></tr>
<tr><td>Population</td><td>Year 2 school children (aged 6–7 years) with a mean age of 6.3 years (SD = 0.3)this excluded 70 of 1397 where age was not known from schools in the West Midlands, England (UK).

<table>
<tr><th>Characteristics</th><th>Intervention arm (n = 622)</th><th>Control arm n = 735</th><th>Total n = 1397</th></tr>
<tr><td>Mean (SD) age (years); not known</td><td>6.3 (0.3); 27</td><td>6.3(0.3); 43</td><td>6.3(0.3); 70</td></tr>
<tr><td>Sex: Male (%)/Female (%)</td><td>339 (49.2)/ 350 (50.8)</td><td>410 (52.7)/368 (47.3)</td><td>749 (51.1)/ 718 (48.9)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Ethnicity:</td><td>n = 676</td><td>n = 775</td><td>n = 1451</td></tr>
<tr><td>White British</td><td>297(43.9)</td><td>361(46.6)</td><td>658(45.3)</td></tr>
</table>
</td></tr>
</table>

Canaway et al. (2022). Economic evaluation of a childhood obesity prevention programme for children: Results from the WAVES cluster randomised controlled trial conducted in schools

South Asian	221(32.7)	222(28.6)	443(30.5)
Black African- Caribbean	62(9.2)	53(6.8)	115(7.9)
Other	96(14.2)	139(17.9)	235(16.2)
Not known	13	3	16

Data sources

Baseline characteristics: Baseline characteristics such as age, sex, ethnicity, IMD quintile were collected as part of the WAVES study.

Effectiveness: Costs and outcomes were analysed separately using a multilevel regression framework to control for prespecified covariates and clustered randomisation, including cluster level covariates used in the randomisation (school size, proportion of children eligible for free school meals, ethnicity), and child-level covariates (gender, baseline CHU9D score, ethnicity, deprivation, baseline total energy consumption and baseline physical activity energy expenditure).

Resource use & costs: The resources used were covered by two categories: the development of the intervention and the delivery of the intervention (full details can be found in supplementary table S1) but only the delivery costs were included in the base case analysis. However, there is one scenario in the sensitivity analysis which includes developmental costs. All resource use and costs were collected and presented at the class level. The cost per class was calculated using logbooks where staff had recorded the resources used. For staff costs, the unit costs were obtained from publicly available sources including Department of Education, University staff pay scales and Office of National Statistics (ONS) earning surveys. Where relevant, mid-scale salary points were used to assign cost to school and research staff time. For the travel costs associated with the delivery of materials to schools, an assumed rate of £0.45 was applied based on HMRC guidance. The base case analysis assumed an average class size of 30 children as all resource use data associated with the delivery of the intervention were collected at the school class level. As the control arm in this study had no intervention, no costs were associated with this arm.

QoL: Quality of life was measured using the generic preference-based Child Health Utility 9-Dimension (CHU-9D) questionnaire. The CHU-9D was administered using an interview, at baseline, follow up 1 (3 months after the intervention was administered) and follow up 2 which was 18 months after the intervention. Then a health-related quality of life was generated for each child expressed as a utility value. The QALYs were calculated by combining utility estimates with time, using the area under the curve method.

Base-case result

Intervention	Absolute		Incremental		
	Costs (£)*	QALYs	Costs (£)*	QALYs [1]	ICER (£)*
Control	0	2.141 (Absolute results have not been adjusted)	-	-	-
WAVES intervention (2019)	**£155.53** (95% CI: £139.97, £171.09) per child	2.171 (Absolute results have not been adjusted)	£155.53 (95% CI: £139.97, £171.09) per child	0.006 (95% CI: -0.024, 0.036), per child	£26,815 per QALY There was a 52% chance the intervention was cost-effective using a WTP threshold of £30,000

Canaway et al. (2022). Economic evaluation of a childhood obesity prevention programme for children: Results from the WAVES cluster randomised controlled trial conducted in schools	
	**All prices were adjusted to 2014 prices and any costs/QALYs that accrued after the first year of the trial were discounted at 3.5% per year.* 1. adjusted for baseline cluster-level covariates and baseline child-level covariates.
Sensitivity analyses	**Deterministic:** There were three scenarios there were investigated as sensitivity analyses. The first sensitivity analysis used an alternative approach to imputing and analysing data (seemingly unrelated regressions). This had little impact on costs (£153) but the incremental QALYs decreased to 0.0033 and increased the ICER to £46,363 per QALY. The second sensitivity analysis included development costs. This increased mean cost per child to £199 and an ICER of £34,000 per QALY. The third sensitivity analysis adjusted costs upwards to first match the average class size (ICER £28,265) and then for only the consented children (ICER £46,083). **Probabilistic:** No probabilistic sensitivity analysis reported**.**
Comments	**Source of funding:** The National Institute for Health and Care Research funded the study and had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. **Limitations:** The intervention could be generalisable to other school settings based on class size but this also depends on whether there is a local sports institute such as Aston Villa that can help deliver the intervention. The time horizon for analysis 30 months is too short to capture long terms effects such as weight regain. The implications for healthcare costs are not considered. In terms of costing, delivery and development are outlined in the supplementary table but it is unclear how these have been defined. For example, the intervention setup meeting where the researcher visits the school is categorised as a development cost but if this cost is incurred per school then it could be classed as a delivery cost. Including the development costs in the economic evaluation increases the ICER from £26,815 per QALY to £34,000 per QALY therefore the sensitivity of the ICER on the classification should be acknowledged.

Table 2: Breheny et al (2020)

Breheny et al. (2020). Effectiveness and cost-effectiveness of The Daily Mile on childhood weight outcomes and wellbeing: a cluster randomised controlled trial	
Study details	**Analysis:** Cost-utility analysis **Approach to analysis:** A cost-utility analysis of The Daily Mile intervention for preventing obesity in children, compared to usual health and wellbeing activities in schools. The participating schools were encouraged to implement the Daily Mile intervention in all year groups, but outcome measurements were obtained only from children in years 3 and 5. The between arm difference in costs and QALYs at 12 months was calculated to produce an incremental cost-effectiveness ratio (ICER). Participants with outcome assessment data were analysed according to allocated arm, irrespective of whether or not the participants adhered to the intervention. Analysis of the primary outcome used a mixed-effect linear regression model with 12-month BMI z-score as the dependent variable and trial arm and baseline BMI z-score as independent variables with School (cluster) included as a random effect. **Time horizon:** 12 months **Discounting:** The trial was conducted over 12 months therefore discounting of costs and outcomes was not conducted. **Setting:** 40 state-funded primary and junior schools (clusters) located in the south of Birmingham (UK) with at least 20 children in school years 3 (aged 7–8 years) and 5 (aged 9–10 years) at baseline were eligible to participate.
Interventions	**Intervention 1:** Control – usual school health and wellbeing activities

<table>
<tr><th colspan="2">Breheny et al. (2020). Effectiveness and cost-effectiveness of The Daily Mile on childhood weight outcomes and wellbeing: a cluster randomised controlled trial</th></tr>
<tr><td></td><td>Intervention 2: The ‘Daily Mile’ is a school-based intervention that involves children undertaking an additional 15 minutes of physical activity every school day, over and above national curriculum physical education (PE) and timetabled break times.</td></tr>
<tr><td>Population</td><td>Children in school year 3 (aged 7–8 years) and 5 (aged 9–10 years) with a mean age of 8.9 (1.0)</td></tr>
<tr><td>Data sources</td><td>Baseline characteristics: Baseline characteristics include age, sex, ethnicity, IMD quintile, BMI z-score, physical activity , quality of life and academic attainment.
Effectiveness: All outcome measures were collected at baseline and 12 months. The primary outcome for clinical effectiveness was BMI z-score at the 12-month follow-up and the primary economic analysis outcome was incremental cost per QALY gained. At 4 months selected secondary outcomes collected were BMI z-score, fitness and body fat percentage. Secondary outcomes at 12-months were fitness, body fat percentage, child reported quality of life, child-wellbeing, and teacher-rated academic attainment (overall attainment and attainment in maths, reading and writing). QALYs were estimated from the CHU-9D data, using the UK tariff set.
Resource use & costs: The study assumed that the only costs of the intervention were the teacher’s time from supervision and that other costs were deemed to be negligible such as classroom displays, certificates and first-aid kits. It was assumed that the control schools had zero cost therefore the analysis focused on the cost of implementing the Daily Mile, in addition to their usual activities. All costs were reported in 2017 GBP prices and the annual intervention cost per child was estimated based on the average pupil/teacher ratio of 27:1.
QoL: Quality of life was measured using the generic preference-based Child Health Utility 9-Dimension (CHU-9D) questionnaire. The CHU-9D was administered using an interview, at baseline, follow up 1 (3 months after the intervention was administered) and follow up 2 which was 18 months after the intervention. Then a health-related quality of life was generated for each child expressed as a utility value. The QALYs were calculated by combining utility estimates with time, using the area under the curve method.</td></tr>
<tr><td>Base-case results</td><td>Whole Sample
<table>
<tr><th rowspan="2">Intervention</th><th rowspan="2">Population</th><th colspan="2">Mean</th><th colspan="3">Mean Difference</th></tr>
<tr><th>Costs (£) per child</th><th>QALYs</th><th>Costs (£) per child</th><th>QALYs</th><th>ICER (£)*</th></tr>
<tr><td>Control</td><td rowspan="2">Whole Sample</td><td>0</td><td>0.839 (±0.13)</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Intervention: Daily Mile</td><td>£45.44 (±5.67)</td><td>0.836 (±0.134)</td><td>48.33 (48.21: 48.45)</td><td>0.006 (-0.005: 0.018)</td><td>7,455.21</td></tr>
</table>
Subgroup: Girls
<table>
<tr><th rowspan="2">Intervention</th><th rowspan="2">Population</th><th colspan="2">Mean</th><th colspan="3">Mean Difference</th></tr>
<tr><th>Costs (£) per child</th><th>QALYs</th><th>Costs (£) per child</th><th>QALYs</th><th>ICER (£)*</th></tr>
<tr><td>Control</td><td>Girls</td><td>0</td><td>0.826 (±0.13)</td><td>-</td><td>-</td><td>-</td></tr>
</table></td></tr>
</table>

Breheny et al. (2020). Effectiveness and cost-effectiveness of The Daily Mile on childhood weight outcomes and wellbeing: a cluster randomised controlled trial

Intervention: Daily Mile		**£45.34** (±5.79)	**0.840** (±0.13)	47.85 (47.71: 48.01)	0.192 (0.002: 0.036)	

Subgroup: Boys

Intervention	Population	Mean		Mean Difference		
		Costs (£) per child	QALYs	Costs (£) per child	QALYs	ICER (£)*
Control	**Boys**	0		-	-	-
Intervention: Daily Mile		**£45.453** (±5.56)	**0.833** (±0.14)	47.08 (46.92: 47.23)	-0.007 (-0.021: 0.008)	

Sensitivity analyses

Deterministic: No deterministic sensitivity analyses were reported.

Probabilistic: A probabilistic sensitivity analysis was applied using bootstrapping and a cost-effectiveness acceptability curve was constructed that shows the probability of cost-effectiveness at difference cost per QALY thresholds. The cost-effectiveness plane illustrated 1,000 jointly bootstrapped cost-QALY pairs distributed across four quadrants. Most of the pairs are in the north-east quadrant which indicates that the Daily Mile leads to QALY gains at an additional cost, but 14% of the pairs are in the north-east quadrant indicating a loss in QALYs. When analysed separately for boys, the majority (84%) of bootstrapped cost-QALY pairs are in the north-west quadrant, this means that the Daily Mile incurs costs and leads to a QALY loss. If the effect on outcome is analysed independently (without considering cost) for boys, although there is a loss in QALYs, which is not statistically significant at the 5% level. For girls, the opposite is the case with most of the cost-effect pairs being in the north-east quadrant meaning the Daily Mile leads to a gain in QALYs and is cost-incurring. When outcome is considered independently for girls, this positive effect is statistically significant at the 5% level. The CEAC represents the uncertainty around implementing the Daily Mile over usual activities and shows there is a 76% chance of being cost-effectiveness for the whole sample, 97% for girls and 12% for boys, at the UK threshold value of £20,000 per QALY.

Comments

Source of funding: The 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 two of the authors. Five out of the seven authors had previously received research grants from the NIHR.

Limitations: The key limitation with this study is the high percentage of missing data for the economic outcomes, QALYs generated from CHU9D where 47% of data was missing. It was deemed too high to justify multiple imputation therefore the economic evaluation should be considered exploratory.

Table 3: Applicability checklist

Study	1.1 Is the study population appropriate for the review question?	1.2 Are the interventions appropriate for the review question?	1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	1.4 Is the perspective for costs appropriate for the review question?	1.5 Is the perspective for outcomes appropriate for the review question?	1.6 Are all future costs and outcomes discounted appropriately?	1.7 Are QALYs, derived using NICE's preferred methods, or an appropriate social care-related equivalent used as an outcome?	1.8 Overall judgement
Canaway et al	Yes – school setting in the UK	Yes	Yes	Yes	Yes	Yes – at 3.5%	Partly – CHU-9D questionnaire	Partially applicable
Breheny et al. 2020	Yes – school setting in the UK	Yes	Yes	Yes	Yes	N/A – 12 month study	Partly – CHU-9D questionnaire	Partially applicable

Table 4: Limitations checklist

Study	2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	2.3 Are all important and relevant outcomes included?	2.4 Are the estimates of baseline outcomes from the best available source?	2.5 Are the estimates of relative intervention effects from the best available source?	2.6 Are all important and relevant costs included?	2.7 Are the estimates of resource use from the best available source?	2.8 Are the unit costs of resources from the best available source?	2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	2.11 Has no potential financial conflict of interest been declared?	2.12 Overall assessment
Canaway et al. 2022	N/A – within trial analysis	Partly – time horizon of 30 months	Yes – QoL from RCT captures all relevant outcomes	Yes – from RCT	Yes – from a single RCT	Party – only cost of intervention	Party – only cost of intervention	Party – only cost of intervention	Yes	Yes	Yes	Potentially serious limitations
Breheny et al. 2020	N/A – within trial analysis	Partly – time	Partly – high amount of	Yes – from RCT	Partly – high amount of missing data	Partly – only cost of intervention	Party – only cost of intervention	Party – only cost of intervention	Yes	Yes	Yes	Potentially serious limitations

Study	2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	2.3 Are all important and relevant outcomes included?	2.4 Are the estimates of baseline outcomes from the best available source?	2.5 Are the estimates of relative intervention effects from the best available source?	2.6 Are all important and relevant costs included?	2.7 Are the estimates of resource use from the best available source?	2.8 Are the unit costs of resources from the best available source?	2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	2.11 Has no potential financial conflict of interest been declared?	2.12 Overall assessment
		horizon of 18 months	missing data in QoL information captured		in QoL information captured							

Appendix J – Health economic model

Not applicable.

Appendix K – Excluded studies

Effectiveness evidence - Children aged 2 to 4 years

Data currently unavailable; awaiting final list of excluded studies from Cochrane.

Effectiveness evidence - Children aged 5 to 11 years and 12 to 18 years

Note the same database searches were conducted for the two age groups simultaneously therefore there is some overlap in the excluded studies.

n	Full reference	Reason for exclusion	Age group
1	Abbott-Shim, Martha, Richard Lambert, and Frances McCart. 2000. "A Study of Head Start Effectiveness Using a Randomized Design." In.	Ineligible population	5-11; 12-18
2	Abood, Doris A., David R. Black, and Daniel C. Coster. 2008. 'Evaluation of a School-Based Teen Obesity Prevention Minimal Intervention', Journal of Nutrition Education and Behavior, 40: 168-74.	Outcome of interest was not measured	5-11; 12-18
3	ACTRN12616000974404. 2016. 'The effect of a web-based, menu planning intervention on childcare provision of food in line with dietary guidelines', http://www.who.int/trialsearch/Trial2.aspx?TrialID=ACTRN12616000974404.	Ineligible population	5-11; 12-18
4	ACTRN12616000980437. 2016. "Whole of Systems Trial Of Prevention Strategies for childhood obesity: WHO STOPS childhood obesity." In, ACTRN12616000980437.	Ineligible study design	5-11
5	ACTRN12618000293268. 2018. 'Embedding High Intensity Interval Training (HIIT) into the school day: the 'Burn 2 Learn' program for senior school students', http://www.who.int/trialsearch/Trial2.aspx?TrialID=ACTRN12618000293268.	Ineligible intervention aim	5-11; 12-18
6	ACTRN12621000055808. 2021b. 'Healthy Conversations @ Playgroup: effect of a Healthy Conversations intervention for parents, targeting healthy lifestyle behaviours and obesity in young children attending community playgroups', http://www.who.int/trialsearch/Trial2.aspx?TrialID=ACTRN12621000055808.	Ineligible population	5-11; 12-18
7	ACTRN12621000529842. 2021a. 'Giving donor milk instead of formula in moderate-late preterm infants: the GIFT trial', http://www.who.int/trialsearch/Trial2.aspx?TrialID=ACTRN12621000529842.	Ineligible population	5-11; 12-18

8	ACTRN12621000987864. 2021. 'Assessing the impact of a multi-component implementation intervention on early childhood education and care (ECEC) services implementation of indoor-outdoor free play recommendations and the effect on opportunities for child outdoor free play.'.	Outcome of interest was not measured	5-11; 12-18
9	ACTRN12622000406707. 2022c. 'Evaluating the efficacy of a multi-component dissemination strategy on the adoption of a school-based lunchbox nutrition program on the NSW Mid North Coast Local Health District of New South Wales'.	Outcome of interest was not measured	5-11; 12-18
10	ACTRN12622000600741. 2022e. 'Testing the effectiveness and implementation at scale of TransformUs program on physical activity and sitting time in Australian Secondary Schools.'.	Ineligible interventio n aim	5-11; 12-18
11	ACTRN12622000861752. 2022d. 'Identifying strategies to support implementation of the Resistance Training for Teens (RT for Teens) school-based health-related fitness program for adolescents'.	Outcome of interest was not measured	5-11; 12-18
12	ACTRN12622000878774. 2022a. ''Adventure & Veg' - the effectiveness of a parental text message and social media program on primary-school aged children's physical activity and vegetable eating behaviours; a randomised, controlled trial (pilot study).'.	Outcome of interest was not measured	5-11; 12-18
13	ACTRN12622001089729. 2022b. 'Assessing the feasibility, acceptability and potential impact of utilising a strategy to increase the sustainment of outdoor free play programs in early childhood education and care services.'.	Ineligible study design	5-11; 12-18
14	Aflague, T. F., G. Badowski, H. Sanchez, D. Sablan, C. M. Schroeder, E. Sanchez, and R. T. Leon Guerrero. 2021. 'Improving Willingness to Try Fruits and Vegetables and Gross Motor Skills in Preschool Children in Guam', Nutrients, 14.	Outcome of interest was not measured	5-11; 12-18
15	Ainara Garde, Aryannah Umedaly, S. Mazdak Abulnaga, Leah Robertson, Anne Junker, Jean Pierre Chanoine, J. Mark Ansermino, and Guy A. Dumont. 2015. 'Assessment of a Mobile Game ("MobileKids Monster Manor") to Promote Physical Activity Among Children', Games for health journal, 4: 149-58.	Ineligible study design	5-11; 12-18
16	Akçinar, Faruk, and Bilge Eroglu. 2020. 'An Investigation of the Effect of Aerobic and Aerobic-Submaximal Exercises on Body Mass Index in Adolescents at the Risk of Obesity', African Educational Research Journal, 8: 110-20.	Outcome of interest was not measured	5-11; 12-18
17	Allender, S. , Millar L., Hovmand P., Bell C., Moodie M., Carter R., Swinburn B., Strugnell C., Lowe J., de la Haye K., Orellana L., and Morgan S. 2016. 'Whole of Systems Trial of Prevention Strategies for Childhood Obesity: WHO STOPS Childhood Obesity', International Journal of Environmental Research & Public Health [Electronic Resource], 13: 16.	Ineligible study design	5-11

18	Allender, S., L. Orellana, N. Crooks, K. A. Bolton, P. Fraser, A. D. Brown, H. Le, J. Lowe, K. de la Haye, L. Millar, and et al. 2021. '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 (Silver Spring, Md.), 29: 1022-35.	Ineligible study design	5-11; 12-18
19	Alon, D., C. V. Sousa, and A. S. Lu. 2021. 'What Type of Body Shape Moves Children? An Experimental Exploration of the Impact of Narrative Cartoon Character Body Shape on Children's Narrative Engagement, Wishful Identification, and Exercise Motivation', Front Psychol, 12: 653626.	Outcome of interest was not measured	5-11; 12-18
20	Annan, R. A., C. Apprey, G. O. Agyemang, D. M. Tuekpe, O. Asamoah-Boakye, S. Okonogi, T. Yamauchi, and T. Sakurai. 2021. 'Nutrition education improves knowledge and bmi-for-age in ghanaian school-aged children', African Health Sciences, 21(2): 927-41.	Ineligible intervention aim	5-11; 12-18
21	Anshory J, Ahmad LOI. 2019. 'The effect of dhikr before bedtime on sleeping duration and weight among primary school children', Indian journal of public health research and development, 10: 539-44.	Ineligible study design	5-11; 12-18
22	Ara, G., M. Khanam, N. Papri, I. Kabir, and M. Dibley. 2017. 'Does peer counseling promote appropriate infant feeding and better growth in infants in urban slums in Bangladesh?', Annals of nutrition & metabolism, 71: 397-98.	Ineligible population	5-11; 12-18
23	Arianas, E. A., K. M. Rankin, K. F. Norr, and R. C. White-Traut. 2017. 'Maternal weight status and responsiveness to preterm infant behavioral cues during feeding', BMC pregnancy and childbirth, 17: 113.	Ineligible population	5-11; 12-18
24	Arlinghaus, K. R., D. P. O'Connor, T. A. Ledoux, S. O. Hughes, and C. A. Johnston. 2021. 'The Role of Early and Later Response on Overall Outcomes in School-Based Obesity Intervention', Obesity (Silver Spring, Md.), 29: 177-83.	Ineligible study design	5-11; 12-18
25	Arnaiz, P., L. Adams, I. Muller, M. Gerber, C. Walter, R. du Randt, P. Steinmann, M. M. Bergman, H. Seelig, D. van Greunen, J. Utzinger, and U. Puhse. 2021. 'Sustainability of a school-based health intervention for prevention of non-communicable diseases in marginalised communities: protocol for a mixed-methods cohort study', BMJ Open, 11: e047296.	Ineligible study design	5-11; 12-18
26	Arthur, K., N. Christofides, and G. Nelson. 2021. 'Effectiveness of a pre-adolescent inter-generational intervention to address HIV and obesity in South Africa, using a pretest-posttest design', BMC Public Health, 21: 2251.	Ineligible study design	5-11; 12-18

27	Askelson, Natoshia M., Patrick Brady, Grace Ryan, Cristian Meier, Cristina Ortiz, Carrie Scheidel, and Patti Delger. 2019. 'Actively involving middle school students in the implementation of a pilot of a behavioral economics-based lunchroom intervention in rural schools', Health Promotion Practice, 20: 675-83.	Ineligible study design	5-11; 12-18
28	Austin, E. W., B. Austin, C. K. Kaiser, Z. Edwards, L. Parker, and T. G. Power. 2020. 'A Media Literacy-Based Nutrition Program Fosters Parent-Child Food Marketing Discussions, Improves Home Food Environment, and Youth Consumption of Fruits and Vegetables', Child Obes, 16: S33-S43.	Outcome of interest was not measured	5-11; 12-18
29	Autkar Pusdekar Y, Dixit JV, Badhoniya N. 2022. 'Effectiveness of a lifestyle intervention for pre-hypertension and hypertension among school children of age group 13-17 years in an urban area in Eastern Maharashtra: study protocol for a pragmatic cluster randomized controlled trial', NeuroQuantology, 20: 1916.	Outcome of interest was not measured	5-11; 12-18
30	Ayala, Guadalupe Xochitl. 2006. "An experimental evaluation of a group- versus computer-based intervention to improve food portion size estimation skills." In, 133-45. United Kingdom.	Ineligible population	5-11; 12-18
31	Babic, M. J., J. J. Smith, P. J. Morgan, C. Lonsdale, R. C. Plotnikoff, N. Eather, G. Skinner, A. L. Baker, E. Pollock, and D. R. Lubans. 2016. 'Intervention to reduce recreational screen-time in adolescents: outcomes and mediators from the 'Switch-Off 4 Healthy Minds' (S4HM) cluster randomized controlled trial', Preventive medicine, 91: 50-57.	Ineligible intervention aim	5-11; 12-18
32	Ball, C., E. Novotny, S. J. Ahn, L. Hahn, M. D. Schmidt, L. Rathbun S, K. Johnsen, and M. Potel. 2022. 'Scaling the Virtual Fitness Buddy Ecosystem as a School-Based Physical Activity Intervention for Children', IEEE Comput Graph Appl, 42: 105-15.	Ineligible study design	5-11; 12-18
33	Baltaci, A. 2022. 'Latino Father-Focused, Healthy Lifestyle Intervention to Improve Adolescent Energy Balance-Related Behaviors', Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/226661.	Outcome of interest was not measured	5-11; 12-18
34	Baltaci, A., G. A. Hurtado Choque, C. Davey, A. Reyes Peralta, S. Alvarez de Davila, Y. Zhang, A. Gold, N. Larson, and M. Reicks. 2022. 'Padres Preparados, Jovenes Saludables: intervention impact of a randomized controlled trial on Latino father and adolescent energy balance-related behaviors', BMC Public Health, 22: 1932.	Outcome of interest was not measured	5-11; 12-18
35	Banerjee, Paromita, Vishnu Vardhana Rao Mendu, Damayanthi Korrapati, and SubbaRao M. Gavaravarapu. 2020. 'Calorie counting smart phone apps: Effectiveness in nutritional awareness, lifestyle modification and weight management	Ineligible population	5-11; 12-18

	among young Indian adults', Health Informatics Journal, 26: 816-28.		
36	Banos, R. M., A. Cebolla, E. Oliver, M. Alcaniz, and C. Botella. 2013. 'Efficacy and Acceptability of an Internet Platform to Improve the Learning of Nutritional Knowledge in Children: The ETIOBE Mates', Health Education Research, 28: 234-48.	Ineligible study design	5-11; 12-18
37	Barkin, Shari L., Sabina B. Gesell, Eli K. Po'e, Juan Escarfuller, and Tommaso Tempesti. 2019. '"Culturally tailored, family-centered, behavioral obesity intervention for Latino-American preschool-aged children": Errata', Pediatrics, 143.	Ineligible population	5-11; 12-18
38	Barlow, S. E., A. Lorenzi, A. Reid, R. Huang, J. S. Yudkin, and S. E. Messiah. 2021. 'The Implementation and Five-Year Evolution of a Childhood Healthy Weight Program: Making a Health Care-Community Partnership Work', Child Obes, 17: 432-41.	Ineligible population	5-11; 12-18
39	Bartelink, Nina H. M., Sandra Mulkens, Suhreta Mujakovic, and Maria W. J. Jansen. 2018. 'Long-Term Effects of the Realfit Intervention on Self-Esteem and Food Craving', Child Care in Practice, 24: 65-75.	Ineligible study design	5-11; 12-18
40	Bavarian, N., K. M. Lewis, A. Acock, D. L. DuBois, Z. Yan, S. Vuchinich, N. Silverthorn, J. Day, and B. R. Flay. 2016. 'Effects of a School-Based Social-Emotional and Character Development Program on Health Behaviors: a Matched-Pair, Cluster-Randomized Controlled Trial', Journal of primary prevention, 37: 87-105.	Outcome of interest was not measured	5-11; 12-18
41	Bean, M. K., H. A. Raynor, L. M. Thornton, L. de Jonge, and S. E. Mazzeo. 2022. 'Design and rationale for evaluating the impact of salad bars on elementary school students' fruit, vegetable, and energy intake: a wait list control, cluster randomized controlled trial', BMC Public Health, 22: 2304.	Ineligible population	5-11; 12-18
42	Bean, M. K., J. G. LaRose, H. A. Raynor, E. L. Adams, R. K. Evans, S. Farthing, E. P. Wickham, 3rd, and S. E. Mazzeo. 2022. 'The role of parents in adolescent obesity treatment: Results of the TEENS+ randomized clinical pilot trial', Pediatr Obes, 17: e12858.	Outcome of interest was not measured	5-11; 12-18
43	Beckmann, J., S. Nqweniso, S. Ludyga, R. du Randt, A. Gresse, K. Z. Long, M. Nienaber, H. Seelig, U. Puhse, P. Steinmann, J. Utzinger, C. Walter, M. Gerber, and C. Lang. 2022. 'Evaluation of a Physical Activity and Multi-Micronutrient Intervention on Cognitive and Academic Performance in South African Primary Schoolchildren', Nutrients, 14.	Outcome of interest was not measured	5-11; 12-18
44	Beets, M. W. Glenn Weaver, R. Turner-McGrievy, G. Huberty, J. Ward, D. S. Freedman, D. A. Saunders, R. Pate, R. R. Beighle, A. Hutto, B. Moore, J. B. 2014. 'Making healthy eating and physical activity policy practice: the design and overview of a group	Ineligible study design	5-11

	randomized controlled trial in afterschool programs', Contemporary clinical trials, 38: 291-303.		
45	Beets, M. W. Weaver, R. G. Turner-McGrievy, G. Huberty, J. Ward, D. S. Pate, R. R. Freedman, D. Hutto, B. Moore, J. B. Bottai, M. Chandler, J. Brazendale, K. Beighle, A. 2016. 'Physical activity outcomes in afterschool programs: A group randomized controlled trial', Preventive medicine, 90: 207-15.	Outcome of interest was not measured	5-11
46	Belansky, Elaine S., Nick Cutforth, Robert Chavez, Lori A. Crane, Emily Waters, and Julie A. Marshall. 2013. 'Adapted Intervention Mapping: A Strategic Planning Process for Increasing Physical Activity and Healthy Eating Opportunities in Schools via Environment and Policy Change', Journal of School Health, 83: 194-205.	Outcome of interest was not measured	5-11; 12-18
47	Belcher, J. D., R. C. Ellison, W. E. Shepard, C. Bigelow, L. S. Webber, J. H. Wilmore, G. S. Parcel, D. M. Zucker, and R. V. Luepker. 1993. 'Lipid and lipoprotein distributions in children by ethnic group, gender, and geographic location--preliminary findings of the Child and Adolescent Trial for Cardiovascular Health (CATCH)', Preventive medicine, 22: 143-53.	Outcome of interest was not measured	5-11; 12-18
48	Bellows, Laura Leigh. 2008. 'Development and evaluation of food friends get movin' with mighty moves(tm), a physical activity program to prevent obesity in low-income preschoolers', Dissertation Abstracts International: Section B: The Sciences and Engineering, 69: 254.	Ineligible population	5-11; 12-18
49	Berger-Jenkins, Evelyn, John Rausch, Ebiere Okah, Daisy Tsao, Andres Nieto, Elizabeth Lyda, Dodi Meyer, and Mary McCord. 2014. 'Evaluation of a Coordinated School-Based Obesity Prevention Program in a Hispanic Community: Choosing Healthy and Active Lifestyles for Kids/healthy Schools Healthy Families', American Journal of Health Education, 45: 261-70.	Outcome of interest was not measured	5-11; 12-18
50	Blaney, David D., Regina T. Flynn, Nancy R. Martin, and Ludmila Anderson. 2010. 'Establishing the Baseline Height and Weight Status of New Hampshire Head Start Children, 2007-2008', NHSA Dialog, 13: 217-24.	Ineligible population	5-11; 12-18
51	Blom-Hoffman, Jessica, Kaila R. Wilcox, Liam Dunn, Stephen S. Leff, and Thomas J. Power. 2008. 'Family Involvement in School-Based Health Promotion: Bringing Nutrition Information Home', School Psychology Review, 37: 567-77.	Ineligible study design	5-11; 12-18
52	Blue Bird Jernigan, V., T. Taniguchi, A. Haslam, M. B. Williams, T. L. Maudrie, C. J. Nikolaus, M. S. Wetherill, T. Jacob, C. V. Love, and S. Sisson. 2022. 'Design and Methods of a Participatory Healthy Eating Intervention for Indigenous Children: The FRESH Study', Front Public Health, 10: 790008.	Ineligible study design	5-11; 12-18

53	Bohnert, Amy M., Edin T. Randall, Stephanie Tharp, and Julie Germann. 2011. 'The Development and Evaluation of a Portion Plate for Youth: A Pilot Study', Journal of Nutrition Education and Behavior, 43: 268-73.	Ineligible intervention aim	5-11; 12-18
54	Bratic, Milovan, Andela Dosic, Danijela Zivkovic, Mladen Zivkovic, Ljiljana Bjelakovic, Nikola Stojanovic, Marija Dordevic, Nikola Prvulovic, and Sasa Pantelic. 2022. 'The Effects of the Aerobic Endurance Running Program on the Morphological Characteristics of Adolescent Girls with Different Nutritional Status', International Journal of Morphology, 40: 1335-43.	Ineligible study design	5-11; 12-18
55	Braun, A., E. Hill, K. Al-Muhanna, N. Stigall, J. Lobb, J. Rausch, J. Portner, K. Evans, C. Spees, and I. Adams. 2019. 'Garden-Based Intervention for Youth Improves Dietary and Physical Activity Patterns, Quality of Life, Family Relationships, and Indices of Health', Journal of Nutrition Education and Behavior, 51: S20.	Outcome of interest was not measured	5-11
56	Braun, M. , Cook C., Mukherjea R., and Liska D. A. 2016. "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.	Outcome of interest was not measured	5-11
57	Brewer, L. C., S. Jenkins, S. N. Hayes, A. Kumbamu, C. Jones, L. E. Burke, L. A. Cooper, and C. A. Patten. 2022. 'Community-Based, Cluster-Randomized Pilot Trial of a Cardiovascular Mobile Health Intervention: Preliminary Findings of the FAITH! Trial', Circulation, 146: 175-90.	Ineligible population	5-11; 12-18
58	Brooks, Fiona, and Magnusson. 2006. "Taking part counts: adolescents' experiences of the transition from inactivity to active participation in school-based physical education." In, 872-83. United Kingdom.	Ineligible study design	5-11; 12-18
59	Brown, C. L., and E. M. Perrin. 2018. 'Obesity Prevention and Treatment in Primary Care', Acad Pediatr, 18: 736-45.	Ineligible type of publication	12-18
60	Brown, H. S., 3rd, A. Pérez, Y. P. Li, D. M. Hoelscher, S. H. Kelder, and R. Rivera. 2007. 'The cost-effectiveness of a school-based overweight program', Int J Behav Nutr Phys Act, 4: 47.	Ineligible study design	5-11
61	Brown, V., M. Moodie, H. N. Q. Tran, M. Sultana, K. E. Hunter, R. Byrne, D. Zarnowiecki, A. L. Seidler, R. Golley, R. Taylor, K. D. Hesketh, and K. Matvienko-Sikar. 2021. 'Protocol for the development of Core Outcome Sets for Early intervention trials to Prevent Obesity in CHildren (COS-EPOCH)', BMJ Open, 11: e048104.	Ineligible study design	5-11; 12-18
62	Bryant, M., M. Collinson, W. Burton, E. Stamp, H. Schofield, B. Copsey, S. Hartley, E. Webb, and A. J. Farrin. 2021. 'Cluster randomised controlled feasibility study of HENRY: a community-	Ineligible population	5-11; 12-18

	based intervention aimed at reducing obesity rates in preschool children', Pilot feasibility stud, 7: 59.		
63	Buosi, William. 2017. 'Breakfast and morning appetite in children and adolescents', British Library - Electronic Theses Online Service (EThOS).	Outcome of interest was not measured	5-11; 12-18
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149	Ferguson, G. M., J. M. Meeks Gardner, M. R. Nelson, C. Giray, H. Sundaram, B. H. Fiese, B. Koester, S. P. Tran, and R. Powell. 2021. 'Food-Focused Media Literacy for Remotely Acculturating Adolescents and Mothers: A Randomized Controlled Trial of the "JUS Media? Programme"', J Adolesc Health, 69: 1013-23.	Outcome of interest was not measured	5-11; 12-18
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344	NCT03885115. 2019. 'Lace Up and Move: structured After School Intervention for Hispanic and African American Youth', https://clinicaltrials.gov/show/NCT03885115.	Outcome of interest was not measured	5-11; 12-18;
345	NCT04022694. 2019. 'Preventing Non-communicable Diseases in Guatemala Through Sugary Drink Reduction', https://clinicaltrials.gov/show/NCT04022694.	Ineligible study design	5-11; 12-18
346	NCT04223687. 2020. 'Impact of Warnings on Sugar-Sweetened Beverages', https://clinicaltrials.gov/show/NCT04223687.	Outcome of interest was not measured	5-11; 12-18

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363	NCT05025995. 2021. 'The Effect of a Serious Health Game on Children's Eating Behavior', https://clinicaltrials.gov/show/NCT05025995.	Outcome of interest was not measured	5-11; 12-18
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365	NCT05070377. 2021. 'A Physical Activity Program for Adolescents - ActTeens', https://clinicaltrials.gov/show/NCT05070377.	Outcome of interest was not measured	5-11; 12-18
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529	Weaver, R. G., B. Armstrong, E. Adams, M. Beets, J. White, K. Flory, D. Wilson, A. McLain, and B. Tennie. 2022. 'Feasibility & Preliminary Efficacy of Structured Programming and a	Outcome of interest was	5-11; 12-18

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535	Wilksch, S. M. 2015. 'School-based eating disorder prevention: a pilot effectiveness trial of teacher-delivered Media Smart', Early intervention in psychiatry, 9: 21-28.	Ineligible intervention aim	5-11; 12-18
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540	Wyse, R., T. Delaney, F. Stacey, C. Lecathelinais, K. Ball, R. Zoetemeyer, H. Lamont, R. Sutherland, N. Nathan, J. H. Wiggers, and L. Wolfenden. 2021. 'Long-term Effectiveness of a Multistrategy Behavioral Intervention to Increase the Nutritional Quality of Primary School Students' Online Lunch Orders: 18-Month Follow-up of the Click & Crunch Cluster Randomized Controlled Trial', J Med Internet Res, 23: e31734.	Outcome of interest was not measured	5-11; 12-18
541	Yoong, S. L., N. Pearson, K. Reilly, L. Wolfenden, J. Jones, N. Nathan, A. Okely, P. J. Naylor, J. Jackson, L. Giles, N. Imad, K. Gillham, J. Wiggers, P. Reeves, K. Highfield, M. Lum, and A. Grady. 2022. 'A randomised controlled trial of an implementation strategy delivered at scale to increase outdoor free play opportunities in early childhood education and care (ECEC) services: a study protocol for the get outside get active (GOGA) trial', BMC Public Health, 22: 610.	Ineligible population	5-11; 12-18
542	Young, M. 2009. 'Get up and grow', Every Child, 15: 26-27.	Ineligible population	5-11; 12-18
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546	Zhang, X., R. M. Martin, E. Oken, I. M. Aris, S. Yang, and M. S. Kramer. 2020. 'Growth during Infancy and Early Childhood and	Ineligible population	5-11; 12-18

	Its Association with Metabolic Risk Biomarkers at 11.5 Years of Age', American Journal of Epidemiology, 189(4): 286-93.		
547	Zhong, D., M. R. Gunnar, A. S. Kelly, S. French, N. E. Sherwood, J. M. Berge, and A. Kunin-Batson. 2022. 'Household food insecurity and obesity risk in preschool-aged children: A three-year prospective study', Soc Sci Med, 307: 115176.	Ineligible population	5-11; 12-18

Economic evidence

Study	Reason for exclusion
Ananthapavan J, Nguyen PK, Bowe SJ, Sacks G, Mantilla Herrera AM, Swinburn B, Brown V, Sweeney R, Lal A, Strugnell C, Moodie M. Cost-effectiveness of community-based childhood obesity prevention interventions in Australia. Int J Obes (Lond). 2019 May;43(5):1102-1112. doi: 10.1038/s41366-019-0341-0.	Excluded as it was on a community-based intervention
Derwig M, Tiberg I, Björk J, Welander Tärneberg A, Hallström IK. A child-centered health dialogue for the prevention of obesity in child health services in Sweden - A randomized controlled trial including an economic evaluation. Obes Sci Pract. 2021 Aug 12;8(1):77-90. doi: 10.1002/osp4.547.	Excluded as it was on a community-based intervention
Döring N, Zethraeus N, Tynelius P, de Munter J, Sonntag D, Rasmussen F. Economic Evaluation of PRIMROSE-A Trial-Based Analysis of an Early Childhood Intervention to Prevent Obesity. Front Endocrinol (Lausanne). 2018 Mar 14;9:104. doi: 10.3389/fendo.2018.00104.	Excluded as it was non-UK study, different from the current UK context
Ekwaru JP, Ohinmaa A, Tran BX, Setayeshgar S, Johnson JA, Veugelers PJ. Cost-effectiveness of a school-based health promotion program in Canada: A life-course modeling approach. PLoS One. 2017 May 18;12(5):e0177848. doi: 10.1371/journal.pone.0177848.	Excluded as it was non-UK study, different from the current UK context
Ekwaru JP, Ohinmaa A, Veugelers PJ. An Enhanced Approach for Economic Evaluation of Long-Term Benefits of School-Based Health Promotion Programs. Nutrients. 2020 Apr 16;12(4):1101. doi: 10.3390/nu12041101.	Excluded as it was not a cost-utility analysis
Hayes A, Lung T, Wen LM, Baur L, Rissel C, Howard K. Economic evaluation of "healthy beginnings" an early childhood intervention to prevent obesity. Obesity (Silver Spring). 2014 Jul;22(7):1709-15. doi: 10.1002/oby.20747. Epub 2014 Mar 27.	Excluded as it was not a cost-utility analysis
Kesztyüs D, Lauer R, Kesztyüs T, Kilian R, Steinacker JM; “Join the Healthy Boat” Study Group. Costs and effects of a state-wide health promotion program in primary schools	Excluded as it was non-UK study, different from the current UK context

Study	Reason for exclusion
in Germany - the Baden-Württemberg Study: A cluster-randomized, controlled trial. PLoS One. 2017 Feb 21;12(2):e0172332. doi: 10.1371/journal.pone.0172332.	
Oosterhoff M, Over EAB, van Giessen A, Hoogenveen RT, Bosma H, van Schayck OCP, Joore MA. Lifetime cost-effectiveness and equity impacts of the Healthy Primary School of the Future initiative. BMC Public Health. 2020 Dec 9;20(1):1887. doi: 10.1186/s12889-020-09744-9.	Excluded due to serious methodological limitations as the treatment effects were estimated from a quasi-experimental study where schools are not randomised.
Rush E, Obolonkin V, McLennan S, Graham D, Harris JD, Mernagh P, Weston AR. Lifetime cost effectiveness of a through-school nutrition and physical programme: Project Energize. Obes Res Clin Pract. 2014 Mar-Apr;8(2):e115-22. doi: 10.1016/j.orcp.2013.03.005.	Excluded due to serious methodological limitations as the study did not use data from a RCT. *Project Energize* was originally designed as a RCT and ran for 2 years. After then, the programme was implemented in schools across the region. The study was based on data after the programmes was rolled out across the region.
Sutherland R, Reeves P, Campbell E, Lubans DR, Morgan PJ, Nathan N, Wolfenden L, Okely AD, Gillham K, Davies L, Wiggers J. Cost effectiveness of a multi-component school-based physical activity intervention targeting adolescents: the 'Physical Activity 4 Everyone' cluster randomized trial. Int J Behav Nutr Phys Act. 2016 Aug 22;13(1):94. doi: 10.1186/s12966-016-0418-2.	Excluded as it was not a cost-utility analysis
Tran HNQ, Killedar A, Tan EJ, Moodie M, Hayes A, Swinburn B, Nichols M, Brown V. Cost-effectiveness of scaling up a whole-of-community intervention: The Romp & Chomp early childhood obesity prevention intervention. Pediatr Obes. 2022 Sep;17(9):e12915. doi: 10.1111/ijpo.12915.	Excluded as it was a community based RCT
Vieira M, Carvalho GS. Costs and benefits of a school-based health intervention in Portugal. Health Promot Int. 2019 Dec 1;34(6):1141-1148. doi: 10.1093/heapro/day085.	Excluded due to applicability and methodological limitations. The cost-consequence analysis had a short time-horizon and used a societal perspective. Moreover, treatment effects were estimated comparing treated schools with a non-randomised control group.
Wyatt K, Lloyd J, Creanor S, Green C, Dean SG, Hillsdon M, Abraham C, Tomlinson R, Pearson V, Taylor RS, Ryan E, Streeter A, McHugh C, Hurst A, Price L, Crathorne L, Krägeloh C, Siegert R, Logan S. 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 Jan.	Excluded as it was not a cost-utility analysis

Appendix L – Research recommendations – full details

No research recommendations were made.

Appendix M– GRADE Criteria

Children aged 2-4 years

Domain	Explanation
Risk of bias	We downgraded one point where contributing weight of evidence at high risk is greater than 30%. There were no criteria for downgrading twice. Non-reporting bias was not assessed as part of risk of bias and was instead used to inform non-reporting bias in GRADE.
Imprecision	Imprecision could only be downgraded one point where there were less than 3000 participants without clear evidence of an effect larger than ± 1/5 of a typical standard deviation (which corresponds to 0.2 for zBMI or 0.5 for BMI). There were no criteria for downgrading twice.
Inconsistency	Inconsistency was downgraded based on estimated heterogeneity variance (tau) and the direction of the results. Evidence was not downgraded for inconsistency if tau was 0 or results were all in the same direction. Evidence was downgraded half a point if tau was of moderate magnitude and the direction of the results was inconsistent, or the results were from a single study. Evidence was downgraded one point if tau was high and the direction of the results were inconsistent.
Indirectness	Indirectness could not be downgraded two points and could only be downgraded one point if the contributing weight of the studies in highly specific populations was greater than 30%.
Non-reporting bias	Judgements on non-reporting bias were based on assessment of within-study non-reporting if there was evidence of outcome measurement and indication of unreported non-statistically significant result(s) and potential for the missing result(s) to impact on the meta-analysis. Publication bias was not assessed. Results were downgraded half a point if there was evidence of measured outcomes being missing but no indication of the reason and missing studies were potentially large enough to affect the result. Results were downgraded one point if there was evidence of measured outcomes being missing and an indication that missing results were not statistically significant and able to affect the result of meta-analyses.

Children aged 5-11 years and 12 to 18 years

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 considered.
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) > 0 and the direction of the results is inconsistent. - Very serious concerns (two points down): not considered.
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 considered.
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.