National Institute for Health and Care Excellence

Draft for Consultation

# Tobacco: preventing uptake, promoting quitting and treating dependence: update

## [E] Evidence reviews for Smokefree Class Competitions

*NICE guideline <number>*

*Evidence reviews*

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*These evidence reviews were developed by PH-IGD*

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ISBN:

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# Smokefree class competitions

## Review questions

Are smokefree class competitions effective and cost effective at preventing children and young people from taking up smoking?

Are smokefree class competitions acceptable to children and young people? Do they affect their ability to cope with stress or pressure, or their self-esteem and self-efficacy? What are the barriers and facilitators to successful adoption of the intervention by the population?

## Introduction

Smokefree Class Competitions (SFCC) are a school-based incentive intervention for preventing the uptake of smoking, usually among children between 11 and 14 years old. SFCC gives responsibility for preventing smoking uptake (and stopping smoking for the duration of the competition, for those who already smoke) to the class of students. The intended effect is to denormalise smoking and create a smokefree class through the use of peer expectations of each other. There has previously been mixed evidence of effectiveness, and some concerns about whether the intervention might have adverse effects when implemented to do with bullying and peer pressure.

## PICO table

The following table summarises the protocol for this review.

**Table 1: PICO inclusion criteria for SFCC for smoking prevention**

| | |
|---|---|
| **Population** | Children and young people[a] attending school or another further education setting |
| **Interventions** | Smokefree Class Competitions of any duration delivered in schools and other further educational settings to prevent uptake of smoking. |
| **Comparator** | Other active interventions, including:<br>• No intervention<br>• Usual education as part of curriculum<br>• Other school-based interventions. |
| **Outcomes** | Effectiveness studies (review question E.i.)<br><br>*Critical outcomes*<br>• Smoking status at longest available follow-up.<br>• Classroom peer effects. Measured as:<br>○ Relative risk of enacting or experiencing bullying, peer pressure, isolation or similar.<br>Where biochemically validated measures are available, these are preferred to self-reported measures.<br><br>*Important outcomes*<br>• Knowledge of smoking harms<br>• Attitude towards smoking (including intention to smoke) |

[a] For the purposes of this guidance, children are aged 5-11 and young people are 12-17. Young adults are 18-24 inclusive and are not included in the population for this review unless they attend further education.

| | |
|---|---|
| | • Adverse or unintended (positive or negative) effects, for example peer pressure and bullying.<br>• Health-related quality of life (using validated patient-report measures, for example EQ-5D).<br><br>Qualitative studies (review question E.ii.)<br><br>For smokefree class competitions only, qualitative evidence relating to the following will be examined where available:<br><br>Children and young people's views on:<br>• The acceptability of the intervention (including preferences for content, mode, adverse effects etc.)<br>• Their ability to cope with stress or peer pressure<br>• Self-esteem and self-efficacy<br>• Barriers to and facilitators of successful adoption of the intervention by the population. |

## Methods and process

This 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.

Declarations of interest were recorded according to NICE's 2018 conflicts of interest policy.

See the methods chapter for additional information on methods for the Tobacco guideline.

To mitigate for unit of allocation error, studies should correct for clustering. If no adjustment has been carried out, the review team adjusted for clustering by inflating the standard errors as described in the Cochrane manual. To do this, an intracluster correlation coefficient (ICC) is required. For this review, an ICC of 0.075 was used, as found for class level interventions for smoking prevention behaviour[b].

## Identification of public health evidence

### Included studies

This review is an update of part of an existing review. Included studies from the original review were sifted and two studies were identified for inclusion and were ordered for full-text review. This new review includes non-randomised controlled studies which the original review did not, so all studies excluded from the original review on the basis of study design were also sifted but no papers were identified for inclusion from this route.

A new systematic search of relevant databases was undertaken in October 2018 for studies published since 2008 (when the previous search was conducted) and in the English language. Further details on the search strategy are available in Appendix B. After removal of duplicates 1,835 unique results were identified. Of this search, 32 articles with potential to answer the review questions were ordered for full-text review.

Of these 34 articles (from the original review and the new searches), 6 met the inclusion criteria for this review. All six are quantitative studies. Some systematic reviews closely

[b] M R Crone, S A Reijneveld, M C Willemsen et al., 2003. Prevention of smoking in adolescents with lower education: a school-based intervention study. *Journal of Epidemiology and Community Health,* 57:675-680.

relating to the review question were identified. These were retrieved and cross-checked to ensure inclusion of all relevant primary studies.

Dual sifting was completed on 183 items (10% of the new search). The reviewers agreed on 181 of these (98.9%) and resolved the remaining two by discussion. It was decided that a single reviewer could proceed with the remaining sifting.

### Excluded studies

Of the 34 articles with potential to answer review question E, 28 articles were identified for consideration but were subsequently excluded from this review. See Appendix K for a full list of excluded studies and the reasons for exclusion.

## Summary of public health studies included in the evidence review

**Table 2: Summary of public health studies included in the evidence review**

**[All interventions are SFCC or very closely similar intervention]**

| Study | Setting | Population | Comparator | Outcome(s) | Definition of smoking |
|---|---|---|---|---|---|
| Crone 2003<br><br>cRCT | Netherlands<br>'First grade' classes (average age 13 years) | Students at the school | Students at schools with usual drug education | • Never smoking<br>• Smoking | Experimenting, smoking daily / weekly |
| Hanewinkel 2010<br><br>cRCT | Germany<br>Classes, mean age 12.5 | Students at the schools | Students with no intervention (details not reported) | • Ever been bullied<br>• Ever been isolated | Current smoking (less than once a month to daily) |
| Kairouz 2009<br><br>Non-randomised controlled cluster | Canada<br>Grade 6 students (11-12) | Students at the schools | Students with no intervention (details not reported) | • Measures of isolation (people should not hang out with / be friends with a smoker) | Ever smoking in their life 'even a puff' |
| Schultze 2006<br><br>cRCT | Germany<br>Classes age 11-15 | Students at the schools | Students with no intervention (details not reported) | • Never smoking | Answering "I have never smoked" |
| Stucki 2014<br><br>Non-randomised controlled cluster | Switzerland<br>7th and 8th graders (age 12-14) | Students at the schools | Students with no intervention (details not reported) | • Smoking | Smoking in the last 6 months 'even a puff' |
| Wiborg 2002<br><br>Non-randomised controlled cluster | Germany<br>Classes, mean age 12.9 | Students at the schools | Students with no intervention | • Smoking | Smoking in past 4 weeks |

See Appendix D for full evidence tables.

## Synthesis and appraisal of public health studies included in the evidence review

### Data synthesis

Six studies were identified for inclusion in this review. Limited meta-analysis was possible as some studies reporting smoking and some reporting non-smoking, and due to the data reported by the studies.

See Appendix F for full GRADE tables.

### Evidence appraisal

- This review addresses an intervention question. Randomised controlled trial (RCT) evidence was therefore assessed using Cochrane's *Risk of Bias* tool, and all other study designs using the *Risk of Bias in Non-Randomised Studies – of Interventions* (ROBINS-I) tool, according to the NICE Manual.
- All GRADE ratings start at 'high' and are downgraded as appropriate.

See Appendix F for full GRADE tables.

See Methods document for details of rationale for GRADE judgements.

**Table 3: Minimal Important Differences (MIDs) agreed**

| Review | Outcome | Importance | MID |
|---|---|---|---|
| E | Prevention: smoking habitually | Critical | Statistical significance |
| E | Prevention: bullying or isolation outcomes | Critical | 5% increase or decrease (RR0.95, 1.05) |
| E | Prevention: knowledge of smoking harms | Important | 5% increase or decrease (RR0.95, 1.05) |

See Appendix E and Appendix F for forest plots of analyses and GRADE tables by outcome.

## Economic evidence

### Included studies

A joint search was used to identify relevant studies for the cost effectiveness elements of review questions A (digital mass media and apps), B (cessation campaigns), C (proxy sales), D (illicit supply) and E (smokefree class competitions) combined. This search incorporated the search strategies of the original effectiveness searches plus the top-up searches and then applied an agreed cost effectiveness filter.

The joint systematic search was undertaken in January 2019 for studies published in the English language from 1998-29 January 2019. After removal of duplicates 3110 unique results were identified. A further 4 results were identified from other sources.

3,114 records were assessed against the eligibility criteria.

2,984 records were excluded based on information in the title and abstract. One reviewer assessed all of the records and a second reviewer blind-screened 10% of the records. The level of agreement between the two reviewers was 100%.

The full-text papers of 130 documents were retrieved and assessed and 1 study was assessed as meeting the eligibility criteria for review question E.i. One reviewer assessed all

of the full texts and a second reviewer blind-screened 10% of the records. The level of agreement between the two reviewers was 100%. For review question E.i. one study was included.

**Excluded studies**

129 full text documents were excluded for these review questions. The documents and the reasons for their exclusion are listed in Appendix K – Excluded studies. Documents were excluded for the following reasons: ineligible intervention (n=76), ineligible outcomes (n=21), ineligible study design (n=18), ineligible patient population (n=13) and non-English language (n=1). The selection process is shown in Appendix G**.**

## 1 Summary of studies included in the economic evidence review

### 2 Table 4: Summary of the study included in the economic evidence review for smokefree class competitions

| Study | Limitations | Applicability | Other comments | Costs | Effects | Incremental cost | Incremental effects | Economic analyses outcomes | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| Hoeflmayr 2008 (Germany)<br><br>Population: 150,566 students on the Smoke Free Class Competition (SFC) programme as a whole in the school year 2001/2002<br><br>Interventions:<br>SFC is a school-based smoking prevention programme. It reinforces non-smoking behaviour with rewards/prizes for non-smokers who stay smoke | Minor limitations [b] | Partially applicable [c] | There was no explicit exclusion of children who were already smoking. The prevention element is stopping children becoming lifetime established smokers. | SFC<br>Overall total: €5,871,694<br>Total direct costs: €772,056,<br>Total indirect costs (school productivity costs): €5,099,638 | SFC would prevent 2.04% of students becoming established smokers.<br><br>Benefit of stopping a student becoming an established smoker<br>Total benefit: €6,786<br>Direct benefit: €2,068<br>Indirect benefit: €4,718 | NR | NR | Net benefit of SFC competition<br>Direct costs and benefits only: €5,589,126<br>Benefit cost ratio of 8.2<br>Direct, indirect costs and benefits: €15,000,308<br>Benefit cost/ratio of 3.6 | Sensitivity analyses was performed using different discount rates (0%, 3% and 10%; 5% had been used in the baseline analysis), smoking cessation rates (10% variance), each of the alternative progression rates to established smoking from the published studies rather than the average, percentages of most extreme variances in the number of smokers prevented in Wang *et al*, alternative ages of initiation of costs associated with smoking and indirect cost termination, inclusion of |

| Study | Limitations | Applicability | Other comments | Costs | Effects | Incremental cost | Incremental effects | Economic analyses outcomes | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| free. The goal is to make non-smoking the norm. [a]<br><br>Comparators: A hypothetical control group was used to establish the number of smokers prevented only | | | | | | | | | programme agencies marginal activities and various other analyses around cost assumptions such as underestimation of costs by 10%.<br><br>The model was most sensitive to discount rates (total costs per smoker increasing 871% with 0% discount rate and decreasing 85.3% with 10% discount rate). A threshold analysis was performed that showed that benefits would have to decrease by 88% and 72%, or costs increase by 724% and 255% to change the overall result (i.e. result in a negative net benefit). It is assumed that these refer to direct and total costs respectively, but |

| Study | Limitations | Applicability | Other comments | Costs | Effects | Incremental cost | Incremental effects | Economic analyses outcomes | Uncertainty |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | this is not clear. In deterministic and scenario analysis, only a discount rate of 10% resulted in the programme costs exceeding the benefits. Full probabilistic sensitivity analysis (PSA) was also performed with 10,000 iterations, with a resulting mean net benefit of €5,769,124 (standard deviation: €545,083). |

*NR: not reported; PSA: probabilistic sensitivity analysis; QALY: quality-adjusted life-year; SFC: Smoke Free Class Competition; UK: United Kingdom*

*(a)* The three general rules of the programme are: 1.Classes make the decision to be a non-smoking class for 6 months (from autumn to spring); 2. The pupils themselves and their teachers monitor the smoking status of the pupils and report on it regularly; 3. Regular smoking is not accepted. Classes that refrain from smoking can win a number of attractive prizes, with the main prize being a trip to another European country.

*(b)* The model was poorly described. As the analysis was a cost benefit analysis, there was no consideration of QALYs undertaken (meaning that the authors underestimated the benefits and, thus, their conclusions are stronger).

*(c)* The study was in Germany where the organisation of school and health systems is similar to the UK but may be different enough to limit the generalisability of findings.

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## Economic model

Due to the paucity and quality of effectiveness evidence review question E was not prioritised for economic modelling.

## Resource impact

No new recommendations were made, so no resource impact is expected.

## Summary of the evidence

This table is a very high level overview of the results presented in the GRADE tables. These results should not be considered apart from the GRADE tables, which contain more information about confidence in the evidence and limitations.

**Table 5: Evidence summary (intervention is SFCC)**

| Outcome | Summary | Confidence | GRADE profile |
|---|---|---|---|
| Non-smokers taking up smoking | The intervention is effective at reducing the outcome compared with no intervention (Crone 2003, Kairouz 2009, Wiborg 2002). | Low | 1 |
| Non-smokers not taking up smoking | The intervention could not differentiate between comparators (Schultze 2006). | Low | 2 |
| Total smoking among whole group | RCT: The intervention was effective at reducing the outcome compared with no intervention (Crone 2003). | Low | 3 |
| | nRCT: The intervention could not differentiate between comparators (Stucki 2004) | Very low | |
| Bullying, isolation and other adverse events | The intervention could not differentiate between comparators for:<br>• Believing that people should not hang out with smokers<br>• Believing that people should not be friends with smokers<br>(Kairouz 2009). | Very low | 4 |
| | The intervention could not differentiate between comparators for:<br>• Being bullied in the last couple of months compared with no intervention<br>• Being isolated in the last couple of months (when comparing those who unsuccessfully completed the intervention with control) (Hanewinkel 2010) | Low | |
| | The intervention could not differentiate between comparators for:<br>• Being isolated in the last couple of months (when comparing those who successfully completed the intervention with control) | Moderate | |
| Knowledge and attitudes | The intervention could not differentiate between comparators for the outcomes (Kairouz 2009). | | 5 |

## The committee's discussion of the evidence

### Interpreting the evidence

#### *The outcomes that matter most*

The committee agreed that the outcome that mattered the most for effectiveness was the measure of smoking, and the most important outcomes for assessing harm were measures of adverse peer outcomes such as bullying, peer pressure and isolation. Both outcomes were considered of equal importance for decision-making in this review.

#### *The quality of the evidence*

Interventions consistently applied the fundamental principles of the SFCC: Classes were required to be non-smoking for a period of six months, the programme is carried out as a class and participation in the program is voluntary. Pupils must also sign a class contract and an individual contract promising not to smoke during the competition. Lastly, classes which refrain from smoking for that period are rewarded with participation in a national as well as a European prize draw. Rules were slightly adapted and tailored per country as necessary.

The committee acknowledged the limited evidence base identified in this review. There were three cluster RCTs (Crone 2003, Hanewinkel 2010, Schulze 2006) and three controlled before and after studies (Kairouz 2009, Stucki 2014, Wiborg 2002) included in this review.

Smoking outcomes (critical)

Smoking outcomes were reported in various ways: non-smokers taking up smoking (Crone 2003, Kairouz 2009, Wiborg 2002), non-smokers not taking up smoking (Schulze 2006) and total smoking among baseline smokers and non-smokers (Crone 2003, Stucki 2014).

The committee noted that although non-smokers taking up smoking reduced in the SFCC groups, their confidence in this outcome – and the other smoking outcomes - was low to very low. The committee noted that confidence in the effects was reduced because the interventions included various definitions of 'smoking', from *any smoking in the past 4 weeks* to *ever smoking, even a puff*. There was generally a high rate of attrition, ranging from 8-70%, and no assumption that these drop outs are smoking or similar. Only one study adjusted for levels of family smoking, which the committee had pre-specified as an important potential confounder of the effect. In addition, the committee noted that the intervention may encourage participants to report that they do not smoke even if they do, as this will increase their chances of receiving the prize, a bias which is facilitated by self-reported and non-validated outcomes. The committee also discussed that the interventions were conducted when smoking prevalence was higher than it is currently, and the comparative rarity of young people smoking now might reduce the effectiveness of the intervention. The committee also noted that only one study described a theoretical basis for the intervention and that there was a general lack of reporting of effect by socio-economic status.

In particular, the committee noted that the meta-analysis of non-smokers taking up smoking included two outcomes at high risk of bias and included only one study which had controlled for family smoking. In addition, one study could not be adjusted for clustering and so had artificially narrow confidence intervals.

The committee agreed that the outcome of non-smokers not taking up smoking was imprecise and did not show an effect of the intervention. They noted that although the randomised trial reporting on total smoking showed a reduction in the intervention group, this outcome does not focus on non-smokers which is the population of interest. Therefore they could not tell whether the changes were due to non-smokers not taking up smoking, or smokers quitting, which reduced their confidence in the effect.

Bullying, isolation and adverse events (critical)

The study outcomes included belief that people should not hang out with smokers and belief that people should not be friends with smokers (Kairouz 2009) as well as having been bullied in last couple of months and having been isolated in last couple of months (Hanewinkel 2010).

The committee noted that none of the outcomes were statistically significant. Confidence ranged from moderate to very low. Although the confidence intervals indicated potential for SFCC to have caused a positive or a negative effect, the committee agreed that there was no evidence that the intervention had an effect on any measures of bullying or isolation.

Knowledge of smoking harms (important)

Evidence also showed no effect of the intervention on knowledge of negative effects of smoking or acceptability of smoking (Kairouz 2009).

These factors all contributed to the committee's decision not to recommend this intervention when there was no evidence that the intervention may be effective over and above other adult-led interventions already recommended.

***Benefits and harms***

The committee debated making a 'do not do' recommendation due to the lack of evidence and poor quality of the evidence. However, the committee decided that there was not sufficient evidence of harm to warrant this action. In addition, the committee discussed that there may be some educational benefits of interventions like SFCC which may be above and beyond smoking outcomes and they would not want these to stop happening.

The committee discussed research recommendations relating to SFCC. They agreed not to make research recommendations, as there are much lower rates of smoking in school aged children then when interventions like SFCC were designed and overall approaches like this are not a research priority.

**Cost effectiveness and resource use**

Only one study of cost effectiveness was identified. Although the results showed a positive net benefit the topic experts on the committee were reluctant to recommend such an intervention given that the outcome in this study was based on pupils self-reported smoking status as well as their teachers and the limited evidence identified in the effectiveness literature.

The committee also pointed out that the effectiveness evidence did not give information about what size of incentive might be required to create change, raising questions about potential resource use.

**Other factors the committee took into account**

The committee discussed that the intervention might have the potential to work better in less deprived areas and populations. There was a concern that recommending the intervention might divert resources away from other interventions which were more effective and more likely to benefit low income groups.

The committee reviewed the existing recommendations on adult-led interventions in light of the new evidence presented in this review. They discussed whether the new evidence warranted any additions or changes to the existing recommendations but declined to make changes due to the low confidence in the new evidence, and due to the fact that the existing recommendations covered a broad range of adult-led interventions.

## Recommendations supported by this evidence review

No recommendations were made from this evidence review.

## Included study list

Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. J Epidemiol Community Health. 57p675-680

Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? J Epidemiol Community Health 64, 202-208.

Hoeflmayr D, Hanewinkel R. Do school-based tobacco prevention programmes pay off? The cost-effectiveness of the 'Smoke-free Class Competition'. Public Health. 2008;122(1):34-41.

Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. Tobacco Control, 18 p474-478

Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. Preventive Medicine, 42p33-39

Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7

Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. Preventive Medicine 35, 241-249.

# Appendices

## Appendix A - Review protocols

**Review protocol for Smokefree Class Competitions (SFCC).**

| ID | Field (based on PRISMA-P | Content |
|---|---|---|
| I | Review question | 3.1a. Are smokefree class competitions effective and cost effective at preventing children and young people from taking up smoking[3]?<br><br>3.1b. Are smokefree class competitions acceptable to children and young people? Do they affect their ability to cope with stress or pressure, or their self-esteem and self-efficacy? What are the barriers and facilitators to successful adoption of the intervention by the population? |
| II | Type of review question | Mixed methods |
| III | Objective of the review | This review aims to ascertain whether smokefree class competitions, which give responsibility for whether or not they smoke to the pupils themselves, are effective and cost effective. This review also aims to determine whether the intervention might widen inequalities and to determine whether there are adverse effects when implemented which might outweigh any benefits gained. |
| IV | Eligibility criteria – population/disease/condition/issue/domain | **Included**: |

[3] Throughout, smoking refers to the use of all smoked tobacco products.

| | | |
|---|---|---|
| | | Children and young people[4] attending school or another further education setting who do not smoke and have never smoked habitually[5].<br><br>**Excluded**:<br><br>Children and young people not in education.<br><br>Children and young people who smoke or have ever smoked habitually.<br><br>Young adults or others in higher education.<br><br>**Settings**<br><br>Schools and other further educational settings. |
| V | Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s) | **Included**:<br><br>Smokefree Class Competitions of any duration delivered in schools and other further educational settings to prevent uptake of smoking.<br><br>**Excluded**:<br><br>Interventions not explicitly named as a smokefree class competitions.<br><br>Interventions where other substances were included (i.e. illicit drugs) and smoking outcomes were not reported separately. |

[4] For the purposes of this guidance, children are aged 5-11 and young people are 12-17. Young adults are 18-24 inclusive and are not included in the population for this review unless they attend further education.

[5] 'Smoking' or 'smoking habitually' refers, unless specifically stated otherwise, to people who smoke weekly or more often. Smoking experimentally is defined as smoking less than weekly.

| | | |
|---|---|---|
| | | Interventions to prevent the uptake of other types of tobacco use (chewed or smokeless tobacco, for example).<br><br>Interventions to encourage or support children and young people to quit smoking. |
| VI | Eligibility criteria – comparator(s)/control or reference (gold) standard | **Included**:<br><br>No intervention<br><br>Usual education as part of curriculum<br><br>Other school-based interventions. |
| VII | Outcomes and prioritisation | **Quantitative outcomes (3.1a)**<br><br>Smoking status is the key outcome for this review. Studies reporting any of the listed important outcomes but not smoking status (the critical outcome) will be excluded.<br><br><u>Critical outcomes</u><br><br>• Smoking status at longest available follow-up. Measured as:<br>– Relative risk of smoking habitually<br>– Relative risk of smoking experimentally<br><br>Where biochemically validated measures are available, these will be preferred to self-reported measures.<br><br>Risk ratio will be adjusted for cluster randomised trials.<br><br>• Classroom peer effects. Measured as: |

| | | |
|---|---|---|
| | | – Relative risk of enacting or experiencing bullying, peer pressure, isolation or similar.<br><br><u>Important outcomes</u><br><br>These will be extracted only if the study also reports a critical outcome.<br><br>• Knowledge of smoking harms<br><br>• Attitude towards smoking (including intention to smoke)<br><br>• Adverse or unintended (positive or negative) effects, for example peer pressure and bullying.<br><br>• Health-related quality of life (using validated patient-report measures, for example EQ-5D).<br><br>**Excluded**:<br><br>Any study which does not include a critical outcome.<br><br>**Qualitative outcomes (3.1b)**<br><br>For smokefree class competitions only, qualitative evidence relating to the following will be examined where available:<br><br>Children and young people's views on:<br><br>• The acceptability of the intervention (including preferences for content, mode, adverse effects etc.) |

| | | |
|---|---|---|
| | | • Their ability to cope with stress or peer pressure<br>• Self-esteem and self-efficacy<br>• Barriers to and facilitators of successful adoption of the intervention by the population.<br><br>**Cost/resource use associated with the intervention**<br><br>The following outcomes will be extracted in reviews of the health economic evidence, where available:<br><br>• cost per quality-adjusted life year<br>• cost per unit of effect<br>• net benefit<br>• net present value<br>• cost/resource impact or use associated with the intervention or its components |
| VIII | Eligibility criteria – study design | **Included study designs**:<br><br>• Systematic reviews of randomised controlled trials (RCTs)<br>• RCTs (including cluster RCTs)<br>• Non-randomised controlled trials<br><br><u>Economic studies</u>: |

| | | |
|---|---|---|
| | | • Cost-utility (cost per QALY)<br>• Cost benefit (i.e. net benefit)<br>• Cost-effectiveness (Cost per unit of effect)<br>• Cost minimization<br>• Cost-consequence<br><br><u>Qualitative studies:</u><br><br>• Focus groups, interview-based studies or surveys with open-ended responses. Must be linked to a Smokefree Class Competition which aimed to prevent the uptake of smoking in children and young people.<br><br>**Excluded study designs**:<br><br>• Cohort studies<br>• Controlled or uncontrolled 'Before-and-after' intervention studies (i.e. where there is at least one follow up measure after baseline)<br>• Cross-sectional surveys<br>• Correlation studies<br>• Case control studies<br>  ○ Qualitative studies not related to a Smokefree Class Competition. |

| | | |
|---|---|---|
| IX | Other inclusion exclusion criteria | **Studies**<br><br>PH23 considered school-based interventions in general. This is an update of that question considering only smokefree class competitions.<br><br>**Exclusions**<br><br>Only papers published in the English language will be included.<br><br>Only studies carried out in OECD countries will be included.<br><br>Only studies published 2008 onwards will be searched for; these will be included alongside any studies from the original review which meet the inclusion criteria in this protocol.<br><br>Only full published studies (not protocols or summaries) will be included.<br><br>**Systematic reviews**<br><br>As for RQ1.1. |
| X | Proposed sensitivity/sub-group analysis, or meta-regression | Where sufficient data are available, subgroup analysis or meta-regression will be carried out to address the following subsidiary review questions:<br><br>• How does the way that the intervention is delivered influence effectiveness?<br>• Does effectiveness vary according to factors related to inequality? For example, age, sex, socio-economic status or ethnicity of the target audience?<br><br>The following population characteristics may be associated with differences in patterns of smoking and so are of interest:<br><br>• age |

| | | |
|---|---|---|
| | | • sex<br>• mental health conditions<br>• ethnic group<br>• sexual orientation<br>• socio-economic deprivation<br>• those in custodial settings<br>• looked after children and young people<br><br>The following factors will be of interest in any meta-regression analyses:<br><br>• Mode of delivery<br>  ○ Multicomponent versus standalone SFCC intervention. |
| XI | Selection process – duplicate screening/selection/analysis | As for RQ1.1. |
| XII | Data management (software) | As for RQ1.1. |
| XIII | Information sources – databases and dates | The following methods will be used to identify the evidence.<br><br>Relevant studies included in PH23 or the surveillance reviews for PH23 will be added to the search results.<br><br>Relevant studies included in any relevant Cochrane Reviews identified in the scoping searches will be added to the search results.<br><br>The reference lists of the relevant studies included in PH23 and the surveillance reviews for PH23 will be added to the search results.<br><br>Forwards citation searching will be done using the relevant studies included in PH23, the scoping search and the surveillance reviews for PH23. |

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| | | Searches will be done for additional relevant papers by selected authors of the relevant studies included in PH23 and the surveillance reviews for PH23.<br><br>Database strategies will be conducted in the sources listed below using the principal strategy set out in Appendix A.<br><br>The websites listed below will be searched or browsed with appropriate strategies.<br><br>If the review team decide it is appropriate further steps may be taken to follow up named authors or named interventions identified while screening the search results.<br><br>**Database strategies**<br>The principal search strategy is listed in Appendix A. The search strategy will take this broad approach:<br>(smokefree class competitions) OR<br>(smokefree policies AND schools)<br>AND 2008 AND Limits<br><br>Feedback on the principal database strategy will be sought from PHAC members.<br><br>The principal search strategy will be developed in MEDLINE (Ovid interface) and then adapted, as appropriate, for use in the other sources listed, taking into account their size, search functionality and subject coverage. The databases will be:<br>• Applied Social Science Index and Abstracts (ASSIA) via ProQuest<br>• Cochrane Central Register of Controlled Trials (CENTRAL) via Wiley<br>• Cochrane Database of Systematic Reviews (CDSR) via Wiley<br>• Embase via Ovid<br>• Educational Resources Information Center (ERIC) via ProQuest |

| | | |
|---|---|---|
| | | • Health Management Information Consortium (HMIC) via Ovid<br>• MEDLINE via Ovid<br>• MEDLINE-in-Process (including Epub Ahead-of-Print) via Ovid<br>• PsycINFO via Ovid<br>• Social Policy and Practice (SPP) via Ovid<br>• Sociological Abstracts via ProQuest<br><br>**Database search limits**<br>Database functionality will be used, where available, to exclude:<br>• non-English language papers<br>• animal studies<br>• editorials, letters and commentaries<br>• conference abstracts and posters<br>• registry entries for ongoing or unpublished clinical trials<br>• duplicates.<br><br>Sources will be searched from 2008 to current.<br><br>The database search strategies will not use any search filters for specific study types.<br><br>**Cost effectiveness evidence**<br><br>A separate search will be done for cost effectiveness evidence. The following databases will be searched again with agreed study-type search filters applied to a strategy based on the one in Appendix A:<br>• Embase via Ovid<br>• MEDLINE via Ovid<br>• MEDLINE-in-Process (including Epub Ahead-of-Print) via Ovid |

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| | | In addition, the following sources will be searched without study-type filters:<br>• Campbell Collaboration via https://campbellcollaboration.org/library.html<br>• CEA Registry via http://healtheconomics.tuftsmedicalcenter.org/cear4/Home.aspx<br>• EconLit via Ovid<br>• HTA database via CRD https://www.crd.york.ac.uk/CRDWeb/<br>• NHS EED via CRD https://www.crd.york.ac.uk/CRDWeb/<br><br>**Citation searching**<br>Forwards and backwards citation searching will be conducted using Web of Science (WOS). Only those references which NICE can access through its WOS subscription will be added to the search results. Only papers published in 2008-Current and in the English language will be included in the search results. Duplicates will be removed in WOS before downloading.<br><br>**Website searching**<br>The following websites will be searched with an appropriate strategy:<br>• Health Services/Technology Assessment Texts (HSTAT) https://www.ncbi.nlm.nih.gov/books/NBK16710<br>• NICE Evidence Search https://www.evidence.nhs.uk<br>• Tobacco Control Database for the WHO European Region http://data.euro.who.int/tobacco<br><br>The websites of relevant organisations, including the ones below, will be browsed:<br>• Action on Smoking and Health (ASH) http://ash.org.uk/home<br>• Department for Education https://www.gov.uk/government/organisations/department-for-education<br>• Local Government Association https://www.local.gov.uk<br>• National Centre for Smoking Cessation and Training http://www.ncsct.co.uk |

| | | |
|---|---|---|
| | | • Northern Ireland Assembly http://www.niassembly.gov.uk/<br>• Public Health England https://www.gov.uk/government/organisations/public-health-england<br>• Royal College of Paediatrics and Child Health https://www.rcpch.ac.uk/<br>• Royal College of Physicians https://www.rcplondon.ac.uk<br>• Scottish Government https://www.gov.scot<br>• Smokefree Class Competition http://www.smokefreeclass.info<br>• Smoking Toolkit Study http://www.smokinginengland.info<br>• Treat Tobacco http://www.treatobacco.net/en/index.php<br>• UK Centre for Tobacco and Alcohol Studies http://ukctas.net/index.html<br>• University of Bath Tobacco Control Research Group https://researchportal.bath.ac.uk/en/organisations/uk-centre-for-tobacco-control-studies<br>• University of Stirling Centre for Tobacco Control Research https://www.stir.ac.uk/about/faculties-and-services/health-sciences-sport/research/research-groups/centre-for-tobacco-control-research/publications<br>• Welsh Government https://gov.wales/?lang=en<br><br>Additional searches will be conducted using Google for any authors or specific projects identified earlier in the search process. It may be necessary to restrict the search results to particular file types (e.g. pdf or Word), to particular countries (e.g. UK), the most recent results (e.g. 2008-current) or to review on screen a limited number pages (e.g. the first 100 results), depending on the number of results retrieved. This will be done in consultation with the review team.<br>• Google https://www.google.co.uk<br><br>The results of the website searches and browsing will be reviewed on screen and documents in English and published from 2008-Current that are potentially relevant will be listed with their title and abstract (if available) in a Word document. The review team |

| | | |
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| | | will make an initial screening decision using this Word file. Any items selected for review at full text will be added to EPPI-Reviewer.<br><br>**Quality assurance**<br>The guidance Information Services team at NICE will quality assure the principal search strategy and peer review the strategies for the other databases.<br><br>Any revisions or additional steps will be agreed by the review team before being implemented. Any deviations and a rationale for them will be recorded alongside the search strategies.<br><br>**Search results**<br>The database search results will be downloaded to EndNote before duplicates are removed using automated and manual processes. The de-duplicated file will be exported in RIS format for loading into EPPI-Reviewer for data screening. |
| XIV | Identify if an update | This question is an update of an existing question in PH23 [published February 2010].<br><br>PH23 original RQ1 read: *Which school-based interventions, or combination of school-based interventions, are effective and cost-effective in preventing children and young people from taking up smoking?*<br><br>Searches for this question were conducted in November 2008 and would have included any studies on smokefree class competitions published before that date. |
| XV | Author contacts | Please see the guideline development page. |
| XVI | Highlight if amendment to previous protocol | For details please see section 4.5 of Developing NICE guidelines: the manual |

| | | |
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| XVII | Search strategy – for one database | For details please see Appendix B |
| XVIII | Data collection process – forms/duplicate | A standardised evidence table format will be used and published as Appendix D (effectiveness evidence tables) or H (economic evidence tables). |
| XIX | Data items – define all variables to be collected | For details please see evidence tables in Appendix D (effectiveness evidence tables) or H (economic evidence tables). |
| XX | Methods for assessing bias at outcome/study level | Standard study checklists will be used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual<br><br>The risk of bias across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/<br><br>GRADE will be used to assess confidence in the findings from quantitative evidence synthesis.<br><br>GRADE-CERQual will be used to assess confidence in the findings from qualitative evidence syntheses. |
| XXI | Criteria for quantitative synthesis (where suitable) | For details please see section 6.4 of Developing NICE guidelines: the manual<br><br>Non-randomised studies are at risk of confounding. These studies should adjust for confounders which are decided by the committee to have important potential to affect the result, or the allocation into intervention or control groups. These factors are:<br><br>- Peer or family smoking |

| | | |
|---|---|---|
| | | - Baseline smoking status (where sample includes people who smoke)<br>- Socioeconomic status<br>Where adjusted results are provided, these will be used in analysis. Where no adjustment has taken place, this will be considered when assessing risk of bias. |
| XXII | Methods for analysis – combining studies and exploring (in)consistency | **Heterogeneity**<br>Data from different studies will be pooled in a meta-analysis where they are investigating the same outcome and where the resulting meta-analysis may be useful for decision-making.<br>Cluster and individual randomised controlled trials will be pooled. Randomised and non-randomised trials investigating the same outcomes will be pooled. Sensitivity analyses will be conducted to assess the impact of study design on the pooled result.<br>It is anticipated that studies included in the review will be heterogeneous with respect to participants, interventions, comparators, setting and study design. Where significant between study heterogeneity in methodology, population, intervention or comparator is identified by the reviewer in advance of data analysis, random effects models will be used. If methodological heterogeneity is not identified in advance but the I2 value is ≥50%, random effects models will also be used.<br>If the $I^2$ value is above 50%, heterogeneity will be judged to be serious and so will be downgraded by one level in GRADE.<br>If the $I^2$ value is above 75%, heterogeneity will be judged to be very serious and will be downgraded by two levels in GRADE.<br>If the studies are found to be too heterogeneous to be pooled statistically, a narrative synthesis will be conducted. |

| | | |
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| | | **Imprecision**<br><br>No minimally important difference (MID) thresholds relevant to this guideline were identified from the COMET database or other published source. MIDs were agreed by committee.<br><br>Uncertainty is introduced where confidence intervals cross the MID threshold. If the confidence interval crosses one lower MID threshold, this indicates 'serious' risk of imprecision. Crossing both MID thresholds indicates 'very serious' risk of imprecision in the effect estimate. Where the MID is 'any significant change' there is effectively only one threshold (the line of no effect), and so only one opportunity for downgrading. In this instance, outcomes will be downgraded again if they are based on small samples (<300 people).<br><br>MIDs for outcomes will be included in the methods section of the individual reviews. |
| XXIII | Meta-bias assessment – publication bias, selective reporting bias | For details please see section 6.2 of Developing NICE guidelines: the manual. |
| XXIV | Assessment of confidence in cumulative evidence | For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual. |
| XXV | Rationale/context – Current management | For details please see the introduction to the evidence review. |
| XXVI | Describe contributions of authors and guarantor | A multidisciplinary committee will develop the guideline. The committee will be convened by Public Health Internal Guidelines Development (PH-IGD) team and chaired by Sharon Hopkins in line with section 3 of Developing NICE guidelines: the manual.<br><br>Staff from Public Health Internal Guidelines Development team will undertake systematic literature searches, appraise the evidence, conduct meta-analysis where appropriate and draft the guideline in collaboration with the committee. Cost-effectiveness analysis will be |

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| | | conducted by YHEC where appropriate. For details please see Developing NICE guidelines: the manual. |
| XXVII | Sources of funding/support | PH-IGD is funded and hosted by NICE |
| XXVIII | Name of sponsor | PH-IGD is funded and hosted by NICE |
| XXIX | Roles of sponsor | NICE funds PH-IGD to develop guidelines for those working in the NHS, public health and social care in England. |
| XXX | PROSPERO registration number | TBC |

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# Appendix B - Literature search strategies

The MEDLINE searches below were run after QA, peer review and consultation with the committee. The strategies were adapted as appropriate to the other databases listed in the protocol (see the sources tables below). An additional top-up search was done to ensure sensitive coverage of the 5-11 years age group.

Additional search results were obtained from the surveillance review for PH23, scoping searches, the studies included in a Cochrane Review (Johnston et al., 2012) and from forwards citation searching and reference checking using Web of Science.

Further searches were undertaken for grey literature using the websites listed in the protocol. These results were screened separately in Word.

Full details of all the search strategies are available in a separate document from the NICE guidance Information Services team.

## Main search

**Sources searched to identify the evidence**

| Database name | Date searched | Platform | Database segment or version | No. of records |
|---|---|---|---|---|
| Applied Social Science Index and Abstracts (ASSIA) | 16/11/2018 | ProQuest | 1987 - current | 252 |
| Cochrane Central Register of Controlled Trials (CENTRAL) | 16/11/2018 | Wiley | Issue 11 of 12, November 2018 | 57 |
| Cochrane Database of Systematic Reviews (CDSR) | 16/11/2018 | Wiley | Issue 11 of 12, November 2018 | 2 |
| Embase | 16/11/2018 | Ovid | Embase 1974 to 2018 November 14 | 212 |
| Educational Resources Information Center (ERIC) | 16/11/2018 | ProQuest | 1966 - current | 186 |
| Health Management Information Consortium (HMIC) | 16/11/2018 | Ovid | HMIC Health Management Information Consortium 1979 to September 2018 | 215 |
| MEDLINE | 16/11/2018 | Ovid | Ovid MEDLINE(R) 1946 to November 14, 2018 | 298 |
| MEDLINE-in-Process (including Epub Ahead-of-Print) | 16/11/2018 | Ovid | Ovid MEDLINE(R) Epub Ahead of Print November 14, 2018, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations November 14, 2018 | 64 |
| PsycINFO | 16/11/2018 | Ovid | PsycINFO 1806 to November Week 2 2018 | 162 |

| | | | | |
|---|---|---|---|---|
| Social Policy and Practice (SPP) | 16/11/2018 | Ovid | Social Policy and Practice 201810 | 45 |
| Sociological Abstracts | 16/11/2018 | ProQuest | 1952 - current | 81 |
| Relevant includes from PH23 | 16/11/2018 | - | - | 3 |
| Relevant includes from surveillance review of PH23 | 16/11/2018 | - | - | 4 |
| Reference checking from Cochrane review | 16/11/2018 | - | - | 14 |
| Reference checking from PH23 and surveillance | 16/11/2018 | Web of Science | Web of Science Core Collection (1990-present) | 79 |
| Fwd citation searching on PH23, surveillance, scoping | 16/11/2018 | Web of Science | Web of Science Core Collection (1990-present) | 152 |
| Additional forwards citation searching | 16/11/2018 | Web of Science | Web of Science Core Collection (1990-present) | 465 |
| Author searches | 16/11/2018 | Web of Science | Web of Science Core Collection (1990-present) | 226 |
| Website browse and search | 21/11/2018 | - | - | 7 |

### Database strategy for main search – as run in MEDLINE and adapted for other sources

Database(s): Ovid MEDLINE(R) 1946 to November 14, 2018

Search Strategy:

| # | Searches | Results |
|---|---|---|
| 1 | Smoke-Free Policy/ | 665 |
| 2 | ((smoking* or smoke* or tobacco* or nicotin* or cigar* or cigs) adj3 (incentive* or incentiviz* or incentivis* or reward* or prize* or voucher* or lotter* or raffle* or gift* or inducement* or motivat* or cash or money* or monetar* or finance* or financial* or competition* or contest*)).ti,ab. | 2925 |
| 3 | ((Smokefree* or smoke-free* or "smoke free") adj3 (incentive* or incentiviz* or incentivis* or reward* or prize* or voucher* or lotter* or raffle* or gift* or inducement* or motivat* or cash or money* or monetar* or finance* or financial* or policy* or policies*)).ti,ab. | 811 |
| 4 | ((Smokefree* or smoke-free* or smoke free*) and (competition* or contest*)).ti,ab. | 41 |
| 5 | or/1-4 | 4143 |
| 6 | Schools/ | 33652 |
| 7 | school health services/ | 16236 |
| 8 | students/ | 50812 |
| 9 | school nursing/ | 5075 |
| 10 | school teachers/ | 713 |
| 11 | curriculum/ | 69522 |
| 12 | teaching/ | 47171 |
| 13 | (school* or academy or academies or "city technology*" or "sixth form*" or "6th form" or "education cent*" or "secure unit*" or "training unit*" or "secure training*" or "referral unit*" | 321407 |

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|---|---|---|
| | or "offender institute*" or "pupil referral*" or college* or "further education*" or "junior high").ti,ab. | |
| 14 | (pupil* or student* or teacher* or classroom* or class or classes or teaching assistant* or headteacher* or curricul*).ti,ab. | 681872 |
| 15 | (("personal social health" adj1 education*) or PSHE).ti,ab. | 15 |
| 16 | ("whole-school*" or wholeschool* or "whole school*").ti,ab. | 183 |
| 17 | ("year seven" or "year 7" or "year eight" or "year 8" or "year nine" or "year 9" or "year ten" or "year 10" or "year eleven" or "year 11" or "year twelve" or "year 12" or "year thirteen" or "year 13" or "key stage three" or "key stage 3" or "key stage four" or "key stage 4" or "grade six" or "grade 6" or "grade seven" or "grade 7" or "grade eight" or "grade 8" or "grade nine" or "grade 9" or "grade ten" or "grade 10" or "grade eleven" or "grade 11" or "grade twelve" or "grade 12" or "sixth grade*" or "6th grade*" or "seventh grade*" or "7th grade*" or "eighth grade*" or "8th grade*" or "ninth grade*" or "9th grade*" or "tenth grade*" or "10th grade*" or "eleventh grade*" or "11th grade*" or "twelfth grade*" or "12th grade*").ti,ab. | 14796 |
| 18 | or/6-17 | 972534 |
| 19 | 5 and 18 | 502 |
| 20 | Animals/ not (Animals/ and Humans/) | 4482264 |
| 21 | 19 not 20 | 493 |
| 22 | limit 21 to (letter or historical article or comment or editorial or news or case reports) | 8 |
| 23 | 21 not 22 | 485 |
| 24 | limit 23 to english language | 435 |
| 25 | limit 24 to yr="2008 -Current" | 298 |

## Age 5-11 years top up

### Sources searched to identify the evidence

| Database name | Date searched | Platform | Database segment or version | No. of records |
|---|---|---|---|---|
| Applied Social Science Index and Abstracts (ASSIA) | 14/12/18 | ProQuest | 1987 - current | 7 |
| Cochrane Central Register of Controlled Trials (CENTRAL) | 14/12/18 | Wiley | Cochrane Central Register of Controlled Trials Issue 12 of 12, December 2018 | 1 |
| Cochrane Database of Systematic Reviews (CDSR) | 14/12/18 | Wiley | Cochrane Database of Systematic Reviews Issue 12 of 12, December 2018 | 0 |
| Embase | 14/12/18 | Ovid | Embase 1974 to 2018 December 12 | 7 |
| Educational Resources Information Center (ERIC) | - | - | No Top Up Search required | - |
| Health Management Information Consortium (HMIC) | 14/12/18 | Ovid | HMIC Health Management Information Consortium 1979 to September 2018 | 5 |

| | | | | |
|---|---|---|---|---|
| MEDLINE | 14/12/18 | Ovid | Ovid MEDLINE(R) 1946 to December 12, 2018 | 13 |
| MEDLINE-in-Process (including Epub Ahead-of-Print) | 14/12/18 | Ovid | Ovid MEDLINE(R) Epub Ahead of Print December 12, 2018, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations December 12, 2018 | 1 |
| PsycINFO | 14/12/18 | Ovid | PsycINFO 1806 to December Week 1 2018 | 6 |
| Social Policy and Practice (SPP) | 14/12/18 | Ovid | Social Policy and Practice 201810 | 0 |
| Sociological Abstracts | 14/12/18 | ProQuest | 1952 - current | 4 |

### Database strategy for top up – as run in MEDLINE and adapted for other sources

Database(s): Ovid MEDLINE(R) 1946 to December 12, 2018

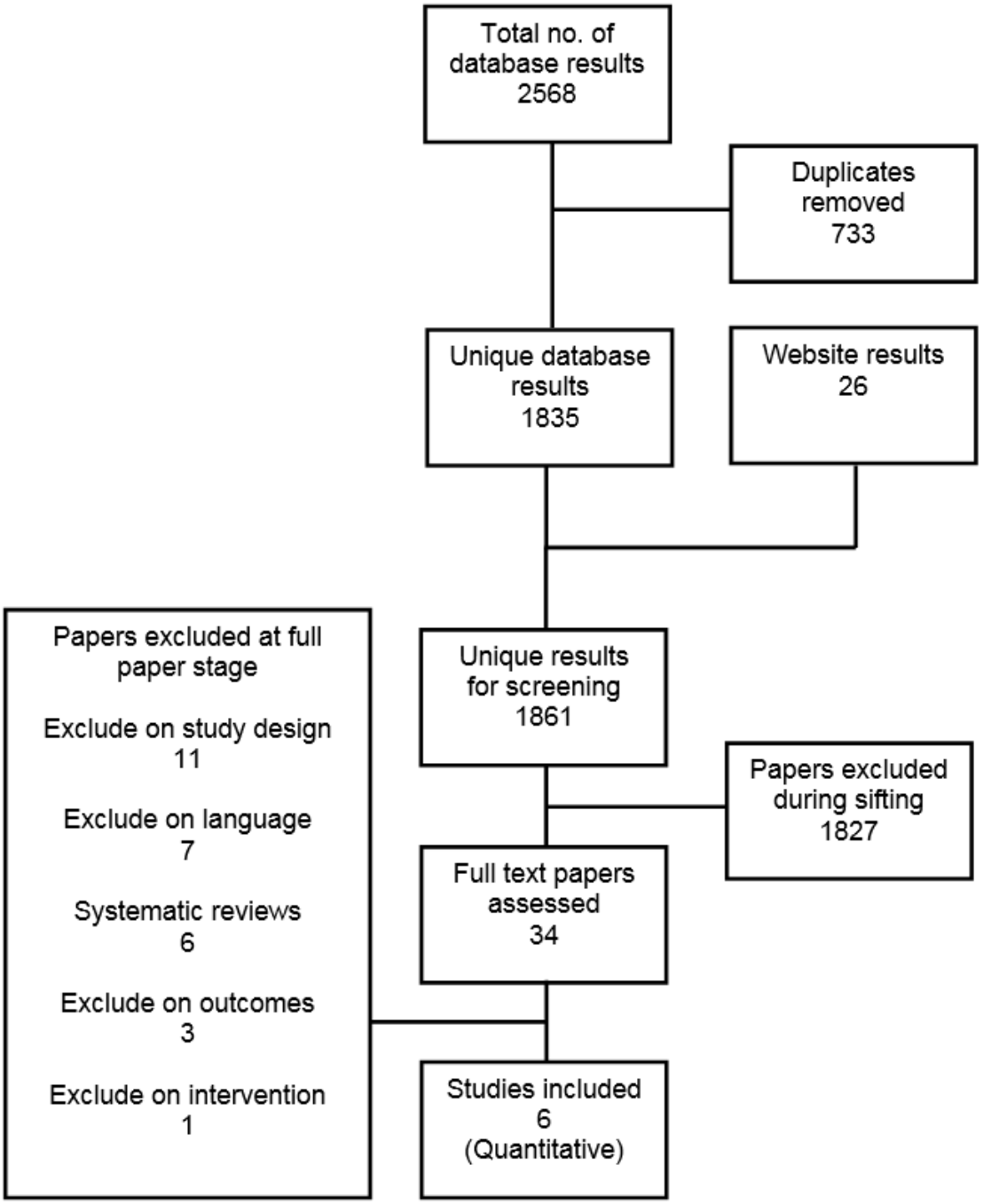
Search Strategy:

| # | Searches | Results |
|---|---|---|
| 1 | Smoke-Free Policy/ | 675 |
| 2 | ((smoking* or smoke* or tobacco* or nicotin* or cigar* or cigs) adj3 (incentive* or incentiviz* or incentivis* or reward* or prize* or voucher* or lotter* or raffle* or gift* or inducement* or motivat* or cash or money* or monetar* or finance* or financial* or competition* or contest*)).ti,ab. | 2941 |
| 3 | ((Smokefree* or smoke-free* or "smoke free") adj3 (incentive* or incentiviz* or incentivis* or reward* or prize* or voucher* or lotter* or raffle* or gift* or inducement* or motivat* or cash or money* or monetar* or finance* or financial* or policy* or policies*)).ti,ab. | 816 |
| 4 | ((Smokefree* or smoke-free* or smoke free*) and (competition* or contest*)).ti,ab. | 41 |
| 5 | or/1-4 | 4169 |
| 6 | ("reception year" or "reception grade*" or "year one" or "year 1" or "year two" or "year 2" or "year three" or "year 3" or "year four" or "year 4" or "year five" or "year 5" or "year six" or "year 6" or "key stage one" or "key stage 1" or "key stage two" or "key stage 2" or "grade one" or "grade 1" or "grade two" or "grade 2" or "grade three" or "grade 3" or "grade four" or "grade 4" or "grade five" or "grade 5" or "grade six" or "grade 6" or "first grade*" or "1st grade*" or "second grade*" or "2nd grade*" or "third grade*" or "3rd grade*" or "fourth grade*" or "4th grade*" or "fifth grade*" or "5th grade*" or "sixth grade*" or "6th grade*").ti,ab. | 83256 |
| 7 | 5 and 6 | 17 |
| 8 | Animals/ not (Animals/ and Humans/) | 4491681 |
| 9 | 7 not 8 | 17 |
| 10 | limit 9 to (letter or historical article or comment or editorial or news or case reports) | 0 |
| 11 | 9 not 10 | 17 |
| 12 | limit 11 to english language | 14 |
| 13 | limit 12 to yr="2008 -Current" | 13 |

### Key to search operators

| | |
|---|---|
| / | Medical Subject Heading (MeSH) term |
| .ti | Searches the title field |
| .ab | Searches the abstract field |
| * | Truncation symbol (searches all word endings after the stem) |
| adj*n* | Adjacency operator to retrieve records containing the terms within a specified number (*n*) of words of each other |

# Appendix C - Public Health evidence study selection



# Appendix D - Public health evidence tables

## Smokefree class competitions

### Crone, 2003

| | |
|---|---|
| **Bibliographic reference/s** | **Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. *J Epidemiol Community Health.* 57p675-680** |
| **Study name** | Not reported |
| **Registration** | Not reported |
| **Study type** | cluster randomised controlled trial (cRCT) |
| **Study dates** | October 1998 (follow up June 1999 and June 2000) |
| **Objective** | Effect of an antismoking intervention 'But I don't smoke' in adolescents in lower education. |
| **Country/ Setting** | Netherlands. |
| **Number of participants / clusters** | Number of clusters: 26 schools.<br>154 'first grade' classes (average age 13 years).<br>2562 participants<br><br>Intervention: 1444 participants (14 schools)<br>Control: 1118 participants (12 schools)<br><br>Power calculation done which indicated that 1400 students were needed in both the intervention and control group to find a difference of 5% in smoking increase: a power of 80% |
| **Attrition** | Intervention group:<br>June 1999- 30.5% drop out* (441/1444)<br>June 2000- 44.4% drop out* (446/1003)<br><br>Control group:<br>June 1999- 35.1% drop out* (393/1118)<br>June 2000- 44.2% drop out* (321/725)<br><br>Overall drop out in both groups - 63.2%* (1621/2562)<br>*percentages calculated by analyst |
| **Participant /community characteristics.** | |

| | Intervention | Control |
|---|---|---|
| Mean age (years) | 13 | |
| Female (%)* | 50.5 | 39.1 |
| Smoking at baseline (%) | 17.6 | 19.9 |
| Has never smoked (%) | 52.5 | 47.9 |
| Ethnicity Dutch (%) | 86.7 | 81.1 |
| Parents/immediate family smoking | Not reported | |

| | | |
|---|---|---|
| **Bibliographic reference/s** | **Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. *J Epidemiol Community Health.* 57p675-680** | |
| **Study name** | Not reported | |
| | *calculated by analyst<br>"Smoking" defined as 'all students who experiment with smoking or who smoke daily or weekly' | |
| **Method of allocation** | Unit of allocation: Cluster<br>Schools were randomly assigned by asking an independent person to toss a coin. | |
| **Inclusion criteria** | Schools that provided lower secondary education<br>Class agreement not to start smoking or to stop smoking for the next 5 months.<br>Classes that filled out three registration forms on smoking status at the beginning of, halfway through, and at the end of, the agreement period. | |
| **Exclusion criteria** | Not reported | |
| **Intervention** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | Not reported |
| | **Rationale/theory/Goal** | Not reported |
| | **Materials used** | Three lessons on knowledge, attitudes and social influence were given.<br>Two extra video lessons on smoking and social influence were available as an optional extra.<br>Final activity of the class was to make a photo expressing the idea of a non-smoking class |
| | **Procedures used** | Questionnaire. |
| | **Provider** | Schools.<br>Note that The National Institute against Smoking (Stivoro) and the National Institute on Mental Health and Addiction (Trimbos Institute) developed and conducted the intervention.<br>Stivoro- The National Institute against Smoking, and the researchers trained the intervention schools in the use of the intervention and in the procedure of the study activities. |
| | **Method of delivery** | Group (class) |
| | **Location** | School-based |
| | **Duration** | 1 hour |
| | **Intensity** | 6 sessions over 5 months |
| | **Tailoring/adaptation** | Not reported |
| | **Planned treatment fidelity** | Not reported |
| | **Actual treatment fidelity** | Not reported |
| | **Other details** | Role-playing and discussion of videos. |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. J Epidemiol Community Health. 57p675-680</td></tr>
<tr><td>Study name</td><td colspan="2">Not reported</td></tr>
<tr><td></td><td></td><td>There were competition prizes (ranging from &EUR 220 to &EUR 450) for six classes with less than 10% smokers and a photo best expressing a non-smoking class. Classes in which less than 10% of students were smoking after 5 months entered a competition to win prizes.</td></tr>
<tr><td>Comparison</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td></td><td>Brief Name</td><td>The drug prevention programme they normally gave to their students: seven schools gave the national drug education programme.</td></tr>
<tr><td></td><td>Other details</td><td>Control schools were given the option of using the intervention one year later.<br>No other details reported.</td></tr>
<tr><td>Follow up</td><td colspan="2">Intervention lasted 5 months<br>Follow up data collected at 8 months (June 1999) and 20 months (June 2000) (no results for 20 months follow up)</td></tr>
<tr><td>Data collection</td><td colspan="2">Anonymous questionnaires were administered immediately before and after intervention on demographics, smoking behaviour, attitudes, perceived social influences, self- efficacy and intention to remain a non-smoker.<br>Smokers defined as those experimenting with smoking or weekly/daily smokers.<br>Non-smokers defined in the paper include the categories: ‘has smoked but quit’ and ‘has experiment with smoking, but does not smoke anymore’ and ‘has never smoked</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">Results for outcome: Non-smokers taking up smoking at 8 months follow up
<table>
<tr><td></td><td>Intervention group n= 809</td><td>Control group n=518</td><td>aOR** (95% C.I)</td><td>aRR*** calculated by analyst</td></tr>
<tr><td colspan="4">Critical Outcome</td><td></td></tr>
<tr><td>Non-smokers* taking up smoking</td><td>78 (9.6)</td><td>74 (14.2)</td><td>0.61 (0.41 to 0.90)</td><td>0.65 (0.48 to 0.91)</td></tr>
</table>
*Non-smokers defined as people who had smoked but quit plus people who had experimented but don’t currently plus those who have never smoked.<br>**Adjusted for ethnicity, age, religion, and gender (all three at the class and individual levels), and adjusted for clustering.<br>***The control group prevalence used to calculate the aRR was 14.2% (percentage taking up smoking in control group).</td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td>Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. J Epidemiol Community Health. 57p675-680</td></tr>
<tr><td>Study name</td><td>Not reported</td></tr>
<tr><td></td><td>Results for outcome: Total smoking at 8 months follow-up
<table>
<tr><td></td><td>Intervention group n= 986</td><td>Control group n=683</td><td>aOR (95% C.I)**</td><td>aRR*** calculated by analyst</td></tr>
<tr><td colspan="4">Critical Outcome</td><td></td></tr>
<tr><td>Total number of smokers*</td><td>26 (2.6)</td><td>54 (7.9)</td><td>0.62 (0.43 to 0.90)</td><td>0.64 (0.45 to 0.91)</td></tr>
</table>
*Among total population (including both those who smoked and did not smoke at baseline)<br>
**Adjusted for ethnicity, age, religion, and gender (all three at the class and individual levels) and adjusted for clustering.<br>
***The control group prevalence used to calculate the aRR was 7.9% (percentage smoking in control group).</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td>Not reported</td></tr>
<tr><td>Statistical Analysis</td><td>Multilevel techniques to account for the clustering effect among students in classes and schools.<br><br>The analyses were adjusted for the background characteristics on which the intervention and control group significantly differed.<br><br>To assess the potential effect of selective drop out, the authors conducted an “intention to treat” analysis on the basis of three assumptions regarding drop outs (most of which indicated stability of results):<br>• All drop outs stopped smoking (or stayed non-smokers).<br>• All drop outs started smoking (or continued to smoke).<br>• No drop outs changed their smoking behaviour.</td></tr>
<tr><td>Risk of bias (ROB)<br>Overall ROB</td><td>Never smoking
<table>
<tr><th>Outcomes</th><th>Judgement</th><th>Comments</th></tr>
<tr><td>Bias from randomisation process</td><td>Low</td><td>Coin tossing by independent person<br>Not reported</td></tr>
<tr><td>Bias from recruitment</td><td>Low</td><td>No risk of bias</td></tr>
<tr><td>Bias due to deviations from intended interventions</td><td>Low</td><td>No information</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Bibliographic reference/s</td><td>Crone MR., Reijneveld SA., Willemsen MC., van Leerdam FJM., Spruijt RD., Hira Sing RA., 2003. Prevention of smoking in adolescents with lower education: a school based intervention study. J Epidemiol Community Health. 57p675-680</td></tr>
<tr><td>Study name</td><td>Not reported</td></tr>
<tr><td></td><td>
<table>
<tr><td>Bias due to missing outcome data</td><td>Some concerns</td><td>Overall attrition 63.2%</td></tr>
<tr><td>Bias in measurement of the outcome</td><td>Some concerns</td><td>Not multiple ways of reporting the outcome and no multiple analyses</td></tr>
<tr><td>Bias in selection of the reported result</td><td>Low</td><td></td></tr>
<tr><td colspan="2">Overall bias</td><td>Some concerns</td></tr>
</table>
Risk of bias as above for total smoking.<br><br>No data reported for the following outcomes:<ul><li>Knowledge of smoking harms</li><li>Attitude towards smoking</li><li>Adverse effects</li><li>HRQoL</li></ul></td></tr>
<tr><td>Source of funding</td><td>None reported</td></tr>
<tr><td>Comments</td><td>-Authors report that the effects are no longer significant at 1-year follow-up, but do not provide detailed results on this.<br>-Self-reporting of smoking behaviours may have been influenced by the possibility of prizes<br>-The setting may limit validity to the UK<br>-Socioeconomic analyses may depend on the indicators used and different indicators may give different results; socioeconomic indicators were self-reported<br>-The difference in effect between lower and higher socioeconomic groups may potentially have been caused by the intervention being implemented differently between these groups.</td></tr>
<tr><td>Additional references</td><td>None reported</td></tr>
</table>

**Hanewinkel, 2010**

| | |
|---|---|
| **Bibliographic reference/s** | **Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? *J Epidemiol Community Health* 64, 202-208.** |
| **Study name** | "Be Smart- Don't Start" |
| **Registration** | ISRCTN27091233 |
| **Study type** | Cluster randomised controlled trial (cRCT) |
| **Study dates** | Nov 2006-May 2007 |
| **Objective** | To test whether or not SFC participation was associated with bullying by peers or social isolation. |
| **Country/ Setting** | Germany |
| **Number of participants / clusters** | Intervention: 2,629 participants (53 schools, 137 classes)<br>Control: 1,825 participants (34 schools, 86 classes)<br><br>Power calculation not reported |
| **Attrition** | Intervention group: not reported<br><br>Control group: not reported<br><br>Attrition rate overall: 8.2% (retention rate reported in the paper was 91.8%, 3123/3440) |

**Participant /community characteristics.**

| | Intervention n=1903 (SP, UP, NP*) | Control n= 1,336 |
|---|---|---|
| Mean age (years) | 12.5 | 12.69 |
| Female (%) | 51.5 | 51.2 |
| Smoking at baseline (%): no smoking | 86.1 | 77.6 |
| Nationality (%): German | 97.6 | 95.6 |
| Family member/immediate family smoking | Not reported | |
| **Has been bullied during last few months n, (%)** p<0.05 | | |
| Never | 342 (45.5) | 654 (49.8) |
| **Ever bullied, n** (includes once or twice, twice or three times per month, about once per week, several times per week) | 1155 (54.5) | 716 (50.2) |
| **Has been isolated during last few months** p<0.01 | | |
| Never | 609 (81.4) | 1121 (84.8) |
| **Ever isolated, n** | 139 (18.5) | 202 (15.3) |

| | | |
|---|---|---|
| **Bibliographic reference/s** | **Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? *J Epidemiol Community Health* 64, 202-208.** | |
| **Study name** | "Be Smart- Don't Start" | |
| | (includes once or twice, twice or three times per month, about once per week, several times per week) | | |
| | *SP-Successful participation, UP-unsuccessful participation, NP-no participation | |
| **Method of allocation** | Schools were assigned randomly to the intervention or the control arm with stratification by type of school.<br>The allocating person was blind to the meaning of group number and the purpose of the study. | |
| **Inclusion criteria** | - The class decides to remain a non-smoking class for a period from November to April (6 months), and a contract is signed, committing classmates to stay smoke-free.<br>- At least 90% of students in class vote in favour of participation.<br>- Participating classes monitor their (non-)smoking behaviour on a weekly basis.<br><br>Nb. The definition of smoke-free means is that at least 90% of the class students remained smoke-free in the previous week. | |
| **Exclusion criteria** | Not reported | |
| **Intervention** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | 'Be Smart-don't start' |
| | **Rationale/theory/Goal** | To influence the social norms within the peer groups in a way that fosters non-smoking normative values |
| | **Materials used** | Not reported |
| | **Procedures used** | questionnaire |
| | **Provider** | teachers |
| | **Method of delivery** | Not reported |
| | **Location** | Not reported |
| | **Duration** | Not reported |
| | **Intensity** | Not reported |
| | **Tailoring/adaptation** | Not reported |
| | **Planned treatment fidelity** | Not reported |
| | **Actual treatment fidelity** | Not reported |
| | **Other details** | Classes that refrain from smoking may win a number of attractive prizes, the main prize being a class trip.<br>Website given to refer to: www.besmart.info |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? J Epidemiol Community Health 64, 202-208.</td></tr>
<tr><td>Study name</td><td colspan="2">“Be Smart- Don’t Start”</td></tr>
<tr><td rowspan="2">Comparison</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td>Brief Name</td><td>No detail reported</td></tr>
<tr><td>Follow up</td><td colspan="2">6 months</td></tr>
<tr><td>Data collection</td><td colspan="2">Data were collected through self-completed anonymous questionnaires, administered by teachers.<br>Blinding- To permit a linking of individual information on subsequent surveys, each questionnaire was labelled with a seven-digit individual code generated by the student, and the seven-digit code assured confidentiality, because it made the survey anonymous. Directly after completion of the survey, teachers placed the surveys into an envelope and sealed it in front of the class. Finally, students were assured that their individual information would not be seen by parents or school administrators.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">No critical outcomes reported</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="2">Results for outcome: Ever been bullied in last couple of months<br>Successful participation intervention group
<table>
<tr><td></td><td>Intervention group n= 755</td><td>Control group n= 1351</td><td>aOR** (95% C.I)</td><td>aRR*** calculated by analyst</td></tr>
<tr><td colspan="4">Critical Outcome</td><td></td></tr>
<tr><td>Total number of people been bullied*</td><td>418 (55.4%)</td><td>716 (53%)</td><td>0.93 (0.74, 1.15)</td><td>0.97 (0.89, 1.07)</td></tr>
</table>
*Among total population (including both those who smoked and did not smoke at baseline)<br>**Adjusted for age, sex, nationality, type of school, smoking status and having been bullied at baseline, and adjusted for clustering.<br>***The control group prevalence used to calculate the aRR was 53%.<br><br>Unsuccessful participation intervention group
<table>
<tr><td></td><td>Intervention group n= 388</td><td>Control group n= 1351</td><td>aOR** (95% C.I)</td><td>aRR*** calculated by analyst</td></tr>
<tr><td colspan="4">Critical Outcome</td><td></td></tr>
<tr><td>Total number of people been bullied*</td><td>220 (56.7%)</td><td>716 (53%)</td><td>0.96 (0.73, 1.27)</td><td>0.98 (0.85, 1.11)</td></tr>
</table>
*Among total population (including both those who smoked and did not smoke at baseline)</td></tr>
</table>

| | |
|---|---|
| **Bibliographic reference/s** | **Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? *J Epidemiol Community Health* 64, 202-208.** |
| **Study name** | "Be Smart- Don't Start" |

**Adjusted for age, sex, nationality, type of school, smoking status and having been bullied at baseline, and adjusted for clustering.

***The control group prevalence used to calculate the aRR was 53%.

***Results for outcome: Ever been isolated in last couple of months***

Successful participation intervention group

| | Intervention group n= 756 | Control group n= 1353 | aOR** (95% C.I) | **aRR*** calculated by analyst** |
|---|---|---|---|---|
| **Critical Outcome** | | | | |
| Total number of people been isolated* | 123 (16.3%) | 239 (17.7%) | 0.77 (0.59, 1.00) | **0.80 (0.64, 1.00)** |

*Among total population (including both those who smoked and did not smoke at baseline)

**Adjusted for age, sex, nationality, type of school, smoking status and having been isolated at baseline, and adjusted for clustering.

***The control group prevalence used to calculate the aRR was 17.7%.

Unsuccessful participation intervention group

| | Intervention group n= 389 | Control group n= 1353 | aOR** (95% C.I)* | **aRR*** calculated by analyst** |
|---|---|---|---|---|
| **Critical Outcome** | | | | |
| Total number of people been isolated* | 68 (17.5%) | 239 (17.7%) | 0.98 (0.71, 1.36) | **0.98 (0.75, 1.28)** |

*Among total population (including both those who smoked and did not smoke at baseline)

**Adjusted for age, sex, nationality, type of school, smoking status and having been isolated at baseline, and adjusted for clustering.

***The control group prevalence used to calculate the aRR was 17.7%.

Knowledge of smoking harms, attitudes towards smoking, HRQoL not reported

* SP (successful participation) includes those that completed both the intervention and the competition. UP (unsuccessful participation) includes those that completed the intervention but not the competition.

| | |
|---|---|
| **Statistical Analysis** | Adjusted for clustering: As data were grouped at the class level, class was used to generate clustered robust standard errors using the 'cluster' command in Stata's logistic regression platform. |

<table>
<tr><td>Bibliographic reference/s</td><td>Haneinkel R., Isensee B., Maruska K., Sargent JD., Morgenstern M, 2010. Denormalising smoking in the classroom: does it cause bullying? J Epidemiol Community Health 64, 202-208.</td></tr>
<tr><td>Study name</td><td>“Be Smart- Don’t Start”</td></tr>
<tr><td></td><td>Outcome: Has been bullied or has been isolated in last few months
<table>
<tr><th>Outcomes</th><th>Judgement</th><th>Comments</th></tr>
<tr><td>Bias from randomisation process</td><td>Low</td><td>Schools were assigned randomly to the intervention or the control arm, no further info</td></tr>
<tr><td>Bias from recruitment</td><td>Low</td><td>No risk of bias</td></tr>
<tr><td>Bias due to deviations from intended interventions</td><td>Low</td><td>The allocating person was blind to the meaning of group number and the purpose of the study.</td></tr>
<tr><td>Bias due to missing outcome data</td><td>Low</td><td>Overall attrition 8.2%</td></tr>
<tr><td>Bias in measurement of the outcome</td><td>Some concerns</td><td>Limited information to make judgement.</td></tr>
<tr><td>Bias in selection of the reported result</td><td>Low</td><td>Not multiple ways of reporting the outcome and no multiple analyses</td></tr>
<tr><td colspan="2">Overall bias</td><td>Some concerns</td></tr>
</table></td></tr>
<tr><td>Source of funding</td><td>Funded by German Cancer Aid. The implementation of the prevention programme was supported by Federal Centre for Health education, German heart foundation, German lung foundation and other charities and governmental bodies in Germany.</td></tr>
<tr><td>Comments</td><td>Limitations<br>-Self-reporting<br>-In terms of bullying outcome, the authors did not assess whether there was any bullying due to the smoking of a student but assessed bullying on a general level.</td></tr>
<tr><td>Additional references</td><td>None reported.</td></tr>
</table>

**Kairouz, 2009**

| | |
|---|---|
| **Bibliographic reference/s** | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** |
| **Study name** | Not reported |
| **Registration** | Not reported |
| **Study type** | Controlled cluster study |
| **Study dates** | Oct-Dec 2002 |
| **Objective** | Evaluate the impact of a smoke-free class competition in elementary schools in Quebec, Canada. |
| **Country/ Setting** | Canada |
| **Number of participants / clusters** | Total= 2056 participants*<br>Intervention= 27 schools, 843 participants<br>Control= 57 schools, 1213 participants<br>*calculated by analyst<br>Power information not reported |
| **Attrition** | Number of participants lost to follow up in intervention group: 416* (33%)<br>Number of participants lost to follow up in control group: 447* (27%)<br>*Calculated by analyst |

**Participant /community characteristics.**

| | Intervention n= 1262 | Control n=1657 | P value |
|---|---|---|---|
| Age (years) | Grade 6 students, age not reported, analyst age estimation 11-12 years old | | |
| Female % | 49* | 53* | |
| "Ever smoking" n (%) | Not reported | Not reported | |
| Ethnicity | Not reported | Not reported | |
| Parents/immediate family smokers: Number of friends/family members who smoke, mean (SD) | 0.7 (1.4) | 0.6 (1.3) | 0.22 |
| SES, using school deprivation index, mean** | 13.2 | 16.0 | <0.001 |
| Other baseline characteristics:<br>*People should not hang out with smokers n*(%)*<br><br>*Participant should not be friends with a smoker (%)* | <br><br>185 (22)<br><br>35 | <br><br>267 (22)<br><br>39 | |

| | | |
|---|---|---|
| **Bibliographic reference/s** | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** | |
| **Study name** | Not reported | |
| | *calculated by analyst<br>** school deprivation index incorporated data on mothers' level of education and the employment status of fathers. Higher scores are indicative of higher levels of deprivation. No further information given. | |
| **Method of allocation** | - All elementary schools in 3 city health regions invited to participate (number of schools not reported).<br>- 57 control schools from 2 different health regions matched to the intervention regions in terms of location, urbanisation and sociodemographic characteristics (although matching failed to ensure groups similar in terms of SES). | |
| **Inclusion criteria** | - At least 90% of students in each grade 6 class within an elementary school sign a confidential contract in which they commit to not smoking for a period of at least 6 months. | |
| **Exclusion criteria** | Not reported | |
| **Intervention** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | "Mission TNT.06" (SFC competition variant) |
| | **Rationale/theory/Goal** | Assess the effects of the program on smoking-related knowledge, attitudes, beliefs, self-efficacy and behaviour, and to anticipate if the program had unanticipated effects. |
| | **Materials used** | Didactic material available in print format or on the internet including a teacher's guide describing the program and listing the resources, and an illustrated booklet for students covering 4 themes |
| | **Procedures used** | Booklet and internet. Questionnaire.<br>4 themes:<br>1. The constituents of cigarette smoke<br>2. The effects of smoking on appearance, health, finances, and nicotine dependence<br>3. The effects of second-hand smoke<br>4. Myths about smoking (i.e. The role of cigarettes in stress management and weight control)<br>In addition, further information about smoking, a discussion forum for teachers and students, suggestions for local activities and a locale for posting class achievements were available on a dedicated website. |
| | **Provider** | Teachers |
| | **Method of delivery** | Group (class) |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. Tobacco Control, 18 p474-478</td></tr>
<tr><td>Study name</td><td colspan="2">Not reported</td></tr>
<tr><td rowspan="4"></td><td></td><td></td></tr>
<tr><td>Location</td><td>School-based</td></tr>
<tr><td>Duration</td><td>6 month programme</td></tr>
<tr><td>Other details</td><td>Teachers and students received participation incentives and participating classes were eligible for a half-day surprise activity (i.e. a hip hop dance with DJ) at school</td></tr>
<tr><td rowspan="2">Comparison</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td>Brief Name</td><td>No details reported.</td></tr>
<tr><td>Follow up</td><td colspan="2">10-14 months (Oct 2003-April 2004)</td></tr>
<tr><td>Data collection</td><td colspan="2">Self-administered questionnaires completed in class. At both baseline and follow-up, participants were asked about self-reported 'ever smoking' status defined as ever smoking a cigarette in their life even a puff. Also questions on knowledge, attitudes and beliefs about tobacco.<br><br>Blinding of data collectors not reported</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="2">Results for outcome: Non-smokers taking up smoking at 8 months follow up<br>Proportion of baseline non-smokers who initiated smoking during follow-up:
<table>
<tr><td></td><td>Intervention group n= 664</td><td>Control group n=915</td><td>aOR** (95% C.I)</td><td>aRR*** calculated by analyst</td></tr>
<tr><td colspan="5">Critical Outcome</td></tr>
<tr><td>Non-smokers* taking up smoking</td><td>93 (14)</td><td>165 (18)</td><td>0.8 (0.5 to 1.1)</td><td>0.83 (0.55 to 1.08)</td></tr>
</table>
*Among baseline non-smokers only<br>**Adjusted for age, gender, school location (urban, suburban, and rural) and a school deprivation index, and adjusted for clustering.<br>***The control group prevalence used to calculate the aRR was 18% (percentage smoking in control group).</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="2">Results for outcome: Belief that people should not hang out with smokers (isolation measure) at 10-14 month follow-up
<table>
<tr><td></td><td>Intervention group n= 843</td><td>Control group n=1213</td><td>RR** calculated by analyst</td><td>RR** adjusted for clustering</td></tr>
<tr><td colspan="5">Critical Outcome</td></tr>
<tr><td>Number children who believe</td><td>118 (14)</td><td>133 (11)</td><td>1.28 (1.01, 1.61)</td><td>1.28 (0.86, 1.90)</td></tr>
</table></td></tr>
</table>

| Bibliographic reference/s | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** |
|---|---|
| **Study name** | Not reported |

| | | | | |
|---|---|---|---|---|
| people should not hang out with smokers* | | | | |

*Among total population (including both those who smoked and did not smoke at baseline)

**Effect estimate not presented in the paper so RR calculated from raw data.

***. Effect estimate with standard error inflated to adjust for clustering. Unadjusted for confounders This is the result used in any analysis.

***Results for outcome: Belief that people should not be friends with smokers (isolation measure) at 10-14 month follow-up***

| | Intervention group n= 843 | Control group n=1213 | **RR** calculated by analyst** | **RR*** calculated by analyst** |
|---|---|---|---|---|
| **Critical Outcome** | | | | |
| Total number children who believe people should not be friends with smokers* | 236 (28) | 303 (25) | **1.12 (0.97, 1.30)** | **1.12 (0.90, 1.39)** |

*Among total population (including both those who smoked and did not smoke at baseline)

** Effect estimate not presented in the paper so RR calculated from raw data.

*** Effect estimate with standard error inflated to adjust for clustering. Unadjusted for confounders This is the result used in any analysis.

***Results for outcome: knowledge of negative effects of smoking (knowledge measure) at 10-14 month follow-up***

| | Intervention group n= 843 | Control group n=1213 | **RR** calculated by analyst** | **RR*** calculated by analyst** |
|---|---|---|---|---|
| **Critical Outcome** | | | | |
| Total number children who believe people should not hang out | 770 (91) | 1067 (88) | **1.04 (1.01, 1.07)** | **1.04 (0.98, 1.10)** |

| | |
|---|---|
| **Bibliographic reference/s** | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** |
| **Study name** | Not reported |

| | | | | |
|---|---|---|---|---|
| with smokers* | | | | |

*Among total population (including both those who smoked and did not smoke at baseline)

** Effect estimate not presented in the paper so RR calculated from raw data.

*** Effect estimate with standard error inflated to adjust for clustering. Unadjusted for confounders This is the result used in any analysis.

***Results for outcome: acceptability of tobacco products (attitude measure) at 10-14 month follow-up***

| | Intervention group n= 843 | Control group n=1213 | **RR** calculated by analyst** | **RR*** calculated by analyst** |
|---|---|---|---|---|
| **Critical Outcome** | | | | |
| Total number children who believe people should not hang out with smokers* | 770 (91) | 1031 (85) | **1.07 (1.04, 1.11)** | **1.07 (0.98, 1.17)** |

*Among total population (including both those who smoked and did not smoke at baseline)

** Effect estimate not presented in the paper so RR calculated from raw data.

*** Effect estimate with standard error inflated to adjust for clustering. Unadjusted for confounders This is the result used in any analysis. (from baseline, the intervention group saw a 3% decrease in those that found tobacco acceptable, and the control group saw a 5% decrease). **The paper reports that the group x time interaction after adjusting for age, gender, school location and school deprivation index was NOT significant [p = 0.62]).**

HRQoL not reported

| | |
|---|---|
| **Statistical Analysis** | Logistic regression<br>Adjusted for clustering - the generalised estimating equation (GEE) method to account for the nested structure of the data (i.e. Students within schools) |

| | | | |
|---|---|---|---|
| **Bibliographic reference/s** | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** | | |
| **Study name** | Not reported | | |
| **Risk of bias (ROB)**<br>**Overall ROB** | **Outcome** | **Judgement** | **Comments** |
| | ***Outcome: People should not hang out with smokers*** | | |
| | Pre-intervention: bias due to confounding | Serious | Number of friends/family members who smoke not adjusted for in the analyses |
| | Pre-intervention: bias in selection of participants into study | Moderate | Elementary schools in 3 city health regions were invited to participate. These were matched to the intervention regions in terms of location, urbanisation and sociodemographic characteristics.<br>All participants that were eligible were included. |
| | At intervention: Bias in classification of interventions | Moderate | Intervention status is well defined however at both baseline and follow-up, participants were asked about self-reported 'ever smoking' status defined as ever smoking a cigarette in their life even a puff and questions on knowledge, attitudes and beliefs about tobacco. Students self-reporting of smoking status may have been influenced by knowledge that they were in a competition for prizes.<br>Some of these questions required recall about retrospective behaviour. |
| | Post-intervention: bias due to deviations from intended interventions | Moderate | The implementation of the competition can vary between classes as provider will be different, therefore consider deviations from the intended intervention however no information given. No information given on intervention details for the control group.<br>Time spent on the competition was not reported or any other non-smoking activities that may have occurred alongside the competition. |
| | Post-intervention: bias due to missing data | Serious | Attrition issues present.<br>No. of participants (%) completing study intervention group: 843 (66.8%)<br>No. of participants (%) completing study control group: 1213 (73%)<br>No reasons given for the missing data and not addressed |
| | Post-intervention: bias in | Serious | Outcome was subjective (self-reported) and potentially influenced by the knowledge of the |

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| **Bibliographic reference/s** | **Kairouz S., O'Loughlin J., Lague J., 2009. Adverse Effects of a social contract smoking prevention program among children in Quebec, Canada. *Tobacco Control*, 18 p474-478** | | |
| **Study name** | Not reported | | |
| | measurement of outcomes | | intervention received by the participants. Blinding status not reported. |
| | Post-intervention: Bias in selection of the reported result | Moderate | Results were reported as outlined and there was no indication of a selection of the cohort for analysis and reporting on the basis of the results. |
| | **Overall Risk of Bias** | Serious | |
| | **Outcome: Participant should not be friends with a smoker (%), knowledge of smoking harms, attitudes towards smoking:** Results as above.<br>**Overall risk of bias:** Serious | | |
| **Source of funding** | Funded by the Deutsches Krebsforschungszentrum (German Cancer Research centre) and by a grant from the Stiftung Kindergesundheit (Child Health Foundation). | | |
| **Comments** | Limitations:<br>- Quasi experimental design therefore lack of randomisation<br>- Participants has transferred to secondary school between baseline and follow-up data collection | | |
| **Additional references** | None reported | | |

**Schulze, 2006**

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|---|---|
| **Bibliographic reference/s** | **Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. *Preventive Medicine*, 42p33-39** |
| **Study name** | Not reported |
| **Registration** | Not reported |
| **Study type** | Randomised controlled cluster trial |
| **Study dates** | 1998 |
| **Objective** | Effectiveness of "Smoke-Free Class Competition" for preventing young non-smokers from taking up smoking |
| **Country/ Setting** | Germany |
| **Number of participants / clusters** | Total= 4043<br>Intervention= 2163 (89 classes) before randomisation<br>Control= 1880 (83 classes) before randomisation<br><br>Analysable no of participants in intervention= 980<br>Analysable no of participants in control= 872 |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="2">Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. Preventive Medicine, 42p33-39</td></tr>
<tr><td>Study name</td><td colspan="2">Not reported</td></tr>
<tr><td></td><td colspan="2">No. of participants further reduced because of missing information on the reported smoking behaviour therefore-<br>Final no. of participants in intervention= 948<br>Final no. of participants in control= 756<br><br>Power information not reported</td></tr>
<tr><td>Attrition</td><td colspan="2">- No systematic differences between the intervention and the control group concerning attrition<br>- No. of participants completing study intervention group: 948<br>- No. of participants completing study control group: 756<br>- No. of participants (%) Overall attrition rate - 2191 (54)* - (due to temporary absence of some students during the baseline and/or the follow-up measurement and to miscoding.)<br>* percentage calculated by analyst</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="2"><table><tr><td></td><td>Intervention n=2163</td><td>Control n=1880</td></tr><tr><td>Age (years)</td><td colspan="2">11-15</td></tr><tr><td>Female %</td><td>51.4</td><td>50</td></tr><tr><td>Never Smokers n (%)*</td><td>1205 (55.7)</td><td>872 (46.4)</td></tr><tr><td>Ethnicity</td><td colspan="2">Not reported</td></tr><tr><td>Parents/Immediate family smoking</td><td colspan="2">Not reported</td></tr></table>*Percentage calculated by analyst</td></tr>
<tr><td>Method of allocation</td><td colspan="2">- Allocation: cluster<br>- Matched pairs of schools were formed and randomly assigned to intervention and control group<br>- Adjusted for sex, age and school-type<br>- There are no substantial changes in the gender, age and smoking distributions due to the attrition in intervention and control group. Also, the gender distribution of the control group does not differ significantly from that of the intervention group, but there are differences in the age structure between the groups.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="2">- School classes decide to be a non-smoking class for a period of 6 months<br>- The school classes monitor their (non) smoking behaviour and report it regularly to the organisations of the competition<br>- Less than 10% of its pupils are smoking</td></tr>
<tr><td>Exclusion criteria</td><td colspan="2">Not reported</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td>Details</td></tr>
<tr><td></td><td>Brief Name</td><td>“Smoke-Free Class Competition”</td></tr>
<tr><td></td><td>Rationale/theory/Goal</td><td>Prevent smoking onset for 11 to 15 year olds</td></tr>
</table>

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|---|---|---|
| **Bibliographic reference/s** | **Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. *Preventive Medicine*, 42p33-39** | |
| **Study name** | Not reported | |
| | **Materials used** | Information about the health effects of smoking, how to quit smoking, how to deal with peer pressure and the strategies of the tobacco industry. |
| | **Procedures used** | questionnaire |
| | **Provider** | teachers |
| | **Method of delivery** | not reported |
| | **Location** | School-based |
| | **Duration** | Not reported |
| | **Intensity** | Weekly |
| | **Tailoring/adaptation** | Not reported |
| | **Planned treatment fidelity** | Not reported |
| | **Actual treatment fidelity** | Not reported |
| | **Other details** | Those classes who remain non-smoking for a 6 month period take part in a national and an international draw to win a number of attractive prizes. Teachers carrying out intervention are invited to attend an information session before the start of the program. They also received brochures of the competition rules and suggestions for recommendations for measures to help prevent smoking among their pupils. |
| **Comparison** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | No detail reported |
| **Follow up** | 18 months | |
| **Data collection** | Questionnaire completed at both baseline and follow up. Asked about self-reported smoking.<br>The self-reported smoking status question was a follows:<br>*"Which applies to you: (a) I have never smoked; (b) I have already smoked, but I quit smoking or (c) I am smoking regularly".*<br>*Those giving answer (a) become the category of the never-smokers; answer (b) supplies the category of ex-smokers (which can be former regular smokers or those who have so far only experimented with cigarettes) and answer (c) yields the current smokers.*<br><br>Blinding of data collectors not reported | |
| **Critical outcomes measures and effect size. (time points)** | ***Results for outcome: Never smokers not taking up smoking at 18 months follow up*** | |

| | Intervention group n= 591 | Control group n=449 | aOR** (95% C.I) | aRR*** calculated by analyst | **aRR**** adjusted** |
|---|---|---|---|---|---|

| | |
|---|---|
| **Bibliographic reference/s** | **Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. *Preventive Medicine*, 42p33-39** |
| **Study name** | Not reported |
| | <table><tr><td></td><td></td><td></td><td></td><td></td><td>for clusters</td></tr><tr><td colspan="6">Critical Outcome</td></tr><tr><td>Never smokers still not smokers at follow-up*</td><td>367 (62.1%)</td><td>276 (61.5%)</td><td>1.02 (0.83, 1.24)<br>P= 0.88</td><td>1.0 (0.93,1.08)</td><td>1.0 (0.92, 1.09)</td></tr></table><br>*Among baseline non-smokers only<br>**Adjusted for sex, age and school-type.<br>***The control group prevalence used to calculate the aRR was 61.5% (percentage never-smokers not taking up smoking in control group).<br>**** Effect estimate with standard error inflated to adjust for clustering. This is the result used in any analysis.<br><br>Results were also presented for ex-smokers and smokers but these are outside of the scope of the guideline. |
| **Important outcomes measures and effect size. (time points)** | No important outcomes were reported |
| **Statistical Analysis** | Logistic regression used and adjusted for sex, age and school-type<br>Not adjusted for clustering |
| **Risk of bias (ROB)**<br>**Overall ROB** | **Never smokers not taking up smoking at 18 months follow up**<br><br><table><tr><th>Outcomes</th><th>Judgement</th><th>Comments</th></tr><tr><td>Bias from randomisation process</td><td>Low</td><td>Schools were randomly assigned but no further detail given.</td></tr><tr><td>Bias from recruitment</td><td>Low</td><td>Unlikely that selection of individual participants was affected by knowledge of the intervention.</td></tr><tr><td>Bias due to deviations from intended interventions</td><td>Low</td><td>No information reported</td></tr><tr><td>Bias due to missing outcome data</td><td>Some concerns</td><td>Overall attrition 54%</td></tr></table> |

| | |
|---|---|
| **Bibliographic reference/s** | **Schulze A., Mons U., Edler L., Potschke-Langer M.,2006. Lack of sustainable prevention effects of the Smoke-Free Class Competition on German students. *Preventive Medicine*, 42p33-39** |
| **Study name** | Not reported |
| | <table><tr><td>Bias in measurement of the outcome</td><td>Some concerns</td><td>Self-reported, blinding of outcome assessors not reported.</td></tr><tr><td>Bias in selection of the reported result</td><td>Low</td><td>Not multiple ways of reporting the outcome and no multiple analyses</td></tr><tr><td colspan="2">**Overall bias**</td><td>**Some concerns**</td></tr></table><br>No other outcomes were reported. |
| **Source of funding** | Funded by the Deutsches Krebsforschungszentrum (German Cancer Research centre) and by a grant from the Stiftung Kindergesundheit (Child Health Foundation). |
| **Comments** | Limitations:<br>- Systematic differences between the intervention group and control group in relation to age and smoking status at baseline<br>- Attrition bias (54% attrition rate)<br>- Self-reported smoking behaviour |
| **Additional references** | Not applicable |

**Stucki 2014**

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|---|---|
| **Bibliographic reference/s** | **Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7** |
| **Study name** | SFCC |
| **Registration** | NA |
| **Study type** | Controlled cluster study |
| **Study dates** | Oct 2010 to June 2011 (intervention from Nov 2010 to May 2011) |
| **Objective** | To investigate whether participation in SFCC reduced smoking prevalence and increased smoking-related knowledge. |
| **Country/ Setting** | Switzerland, Berne (German and French-speaking classes in urban and rural areas) |

<table>
<tr><td>Bibliographic reference/s</td><td>Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7</td></tr>
<tr><td>Study name</td><td>SFCC</td></tr>
<tr><td>Number of participants / clusters</td><td>Baseline:<br>Intervention: 625 students (34 classes (clusters)).<br>Control: 687 students (37 classes) (3 others were contacted but declined to participate).<br><br>Follow-up<br>Intervention: 595 (36 classes*)<br>Control: 440 (28 classes)<br><br>Minimal sample size determined but no details provided in paper.</td></tr>
<tr><td>Attrition</td><td>Intervention: 90/625 (14%)<br>Control: 154/687 (22%)<br><br>Slightly higher attrition in control group compared with intervention group. Significance not tested and drop-outs not evaluated.</td></tr>
<tr><td>Participant /community characteristics.</td><td>7th and 8th graders (Ages 12-14)<br><br>
<table>
<tr><td></td><td>PGs</td><td>PGd</td><td>Control</td><td>Significant difference compared with control</td></tr>
<tr><td>Mean age (SD)</td><td>13.1 (0.8)</td><td>13.7 (0.7)</td><td>13.2 (0.8)</td><td>PGs, PGd</td></tr>
<tr><td>Female % (n)</td><td>55.1 (280)</td><td>51.7 (45)</td><td>51.5 (226)</td><td>None</td></tr>
<tr><td>Smoking at baseline % (n)</td><td>6.5 (33)</td><td>20.7 (18)</td><td>14.1 (62)</td><td>PGs</td></tr>
<tr><td>Peer smoking % (n)</td><td>40.4 (204)</td><td>82.8 (72)</td><td>58.0 (251)</td><td>PGs, PGd</td></tr>
<tr><td>Parents/immediate family smoking</td><td colspan="3">Not reported</td><td>NA</td></tr>
</table>
PGs: classes which successfully completed the competition<br>PGd: classes which dropped out of the competition (due to relapsing or starting to smoke)<br>Combined in the rest of the analysis where possible into one intervention group.<br><br>No information on whether similar to population.</td></tr>
<tr><td>Method of allocation</td><td>Non-random: intervention schools chose to participate in the intervention. Control group was randomly selected from the class list of the Federal Statistical Office and matched according to the following criteria: a) all 7th or 8th grade classes, (b) class is located in the canton</td></tr>
</table>

| | | |
|---|---|---|
| **Bibliographic reference/s** | **Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7** | |
| **Study name** | SFCC | |
| | of Berne, and c) not participating in the SFC. Not matched on specific demographic characteristics. | |
| **Inclusion criteria** | 7th or 8th grade classes located in Berne canton. | |
| **Exclusion criteria** | None reported | |
| **Intervention** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | SFCC |
| | **Rationale/theory/Goal** | Positive reinforcement to prevent smoking uptake |
| | **Materials used** | Not reported |
| | **Procedures used** | questionnaire |
| | **Provider** | Various (schools providing for themselves) |
| | **Method of delivery** | Not reported |
| | **Location** | Berne, Switzerland |
| | **Duration** | Not reported |
| | **Intensity** | Not reported |
| | **Tailoring/adaptation** | Not reported |
| | **Planned treatment fidelity** | Not reported |
| | **Actual treatment fidelity** | 6 classes dropped out of the intervention group due to failing to successfully complete the competition. This group (PGd) is analysed separately in the paper but is included in the intervention group in NICE analysis. |
| | **Other details** | Not reported |
| **Comparison** | **TIDieR Checklist criteria** | **Details** |
| | **Brief Name** | No intervention (presumed usual classroom education) |
| | **Location** | Berne, Switzerland |
| | **Other details** | No other detail reported. |
| **Follow up** | Follow-up outcome measurements were collected 8 months after baseline measurements, and 7 months after initiation of the intervention.<br>Results presented are 8-month results. | |
| **Data collection** | Randomly selected subsample of participating and non-participating classes were invited to answer a questionnaire. Before the intervention and about 7 months later. Teachers were sent the questionnaires for administration. Students completed questionnaires anonymously during a lesson.<br>Blinding of assessment not mentioned. | |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="3">Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7</td></tr>
<tr><td>Study name</td><td colspan="3">SFCC</td></tr>
<tr><td></td><td colspan="3">• Definition of smoking was strict: Smoking status measured by prevalence of smoking in the past six months (“Have you smoked in the past six months, even if it was only one puff?”; although smoking during the previous month was also assessed, the authors considered six-month prevalence since smoking is still quite unusual in this age group).<br>• Smoking knowledge was evaluated with a 17-item quiz. Calculated by adding together correct answers.</td></tr>
<tr><td>Critical outcomes measures and effect size. (time points)</td><td colspan="3">Smoking in past 6 months at 8 month follow-up<br><br>
<table>
<tr><td></td><td>Intervention group n = 595</td><td>Control group n= 440</td><td>aOR** (95% C.I)</td><td>aRR***, calculated by analyst</td></tr>
<tr><td colspan="4">Critical Outcome</td><td></td></tr>
<tr><td>Any smoking in the past month*</td><td>64 (10.8%)</td><td>67 (15.2%)</td><td>0.9 (0.6, 1.3)</td><td>0.91 (0.64, 1.24)</td></tr>
</table>
*Among whole group, both smokers and non-smokers<br>
**Adjusted for baseline smoking, and adjusted for clustering.<br>
***The control group prevalence used to calculate the aRR was 15.2% (percentage smoking in control group).<br><br>
Smoking in past 6 months (Peer-smoking vs those with no smoking peers)<br>
Participants split by those who had class peers who smoked and those who didn’t.<br>
Smoking peers vs no smoking peers: OR 3.7 (2.4 to 5.6) (not converted to RR as no prevalence data calculable).</td></tr>
<tr><td>Important outcomes measures and effect size. (time points)</td><td colspan="3">Knowledge outcome data not calculable.</td></tr>
<tr><td>Statistical Analysis</td><td colspan="3">Adjusted for clustering: Since the SFC was applied to entire school classes, multilevel modelling was used with classes as a main level in which adolescents are nested.</td></tr>
<tr><td>Risk of bias (ROB) ROBINS-I tool</td><td>Outcome</td><td>Judgement</td><td>Comments</td></tr>
<tr><td></td><td>Pre-intervention: bias due to confounding</td><td>Moderate</td><td>Results adjusted for baseline smoking only. Significant differences in age and smoking at baseline between I and C groups. No measure for levels of family smoking.</td></tr>
</table>

| | | | |
|---|---|---|---|
| **Bibliographic reference/s** | **Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7** | | |
| **Study name** | SFCC | | |
| | Pre-intervention: bias in selection of participants into study | Serious | Participant classes selected themselves into the intervention population by choosing to run the intervention. Selection into the study was related to intervention and outcome. |
| | At intervention: Bias in classification of interventions | Moderate | Intervention is group level. Fairly standard intervention although limited information given on detail of intervention. |
| | Post-intervention: bias due to deviations from intended interventions | No information | No information given on adherence |
| | Post-intervention: bias due to missing data | Moderate | Fairly low levels of attrition which are slightly different between I and C group. No explanation for or evaluation of the difference but unlikely to affect the outcome. |
| | Post-intervention: bias in measurement of outcomes | Serious | The outcome is self-reported and is likely to be affected by knowledge by the participants of their intervention status. No information about blinding of assessors, which could have influenced the results. |
| | Post-intervention: Bias in selection of the reported result | Moderate | Outcomes are clearly reported according to the aims of the study – knowledge not reported separately but the study does not state that it intends to do this. |
| | **Overall Risk of Bias** | **Serious** | |
| **Source of funding** | Swiss Association for Smoking Prevention | | |
| **Comments** | • Classes were not randomised to intervention vs control – this could have resulted in higher engagement with anti-smoking related activities in the intervention group.<br>• Data is based on self-report which is subject to desirability bias. | | |

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|---|---|
| **Bibliographic reference/s** | **Stucki Stephanie, Kuntsche Emmanuel, Archimi Aurelie, and Kuntsche Sandra (2014) Does smoking within an individual's peer group affect intervention effectiveness? An evaluation of the Smoke-Free Class Competition among Swiss adolescents. Preventive medicine 65, 52-7** |
| **Study name** | SFCC |
| | • Definition of smoking was very strict, classifying more children as smoking compared with other studies.<br>• Potential contamination: On account of the sampling procedure, it was possible that some classes in the study sample came from the same school (the 64 classes participating in the study came from 56 schools).<br>• *Three classes originally classed as control group independently ran the SFCC intervention and so were classed instead as intervention group at follow-up. |
| **Additional references** | None |

**Wiborg, 2002**

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|---|---|
| **Bibliographic reference/s** | **Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. *Preventive Medicine* 35, 241-249.** |
| **Study name** | "Be Smart-Don't Start" |
| **Registration** | Not reported |
| **Study type** | Controlled cluster trial |
| **Study dates** | November 1998 (pre-test) -April 1999 (post-test)<br>November 1999 (follow-up) |
| **Objective** | Effectiveness of the smoke-free class competition |
| **Country/ Setting** | Germany (Hamburg and Berlin) |
| **Number of participants / clusters** | Total= 2142 participants (131 classes)<br>Intervention group that successfully completed intervention and competition: 1076 (64 classes)<br>Intervention group that successfully completed intervention but dropped out of the competition: 419 (25 classes)<br>Control: 647 participants (42 classes)<br><br>Power calculation not reported |
| **Attrition** | Intervention group: 54/64 classes did not return questionnaire at pre-test<br>Control group: 14/70 classes did not return questionnaire at pre-test<br>42/70 classes did not return questionnaire at second and third measurements<br>Overall attrition: 2230/4372 participants (51%) |

<table>
<tr><td>Bibliographic reference/s</td><td colspan="3">Wiborg G., Haneinkel R, 2002. Effectiveness of the “Smoke-Free Class Competition” in Delaying the Onset of Smoking in Adolesence. Preventive Medicine 35, 241-249.</td></tr>
<tr><td>Study name</td><td colspan="3">“Be Smart-Don’t Start”</td></tr>
<tr><td>Participant /community characteristics.</td><td colspan="3"><table>
<tr><td></td><td>Intervention n=1495 (89 classes)</td><td>Control n= 647 (42 classes)</td></tr>
<tr><td>Mean age (years)</td><td>12.94</td><td>12.89</td></tr>
<tr><td>Female (%)</td><td>53.4</td><td>49.6</td></tr>
<tr><td>Smoking at baseline n, (%): Non- Smokers*</td><td colspan="2">1,721 (80.3)</td></tr>
<tr><td>Ethnicity</td><td colspan="2">Not reported</td></tr>
<tr><td>Parent/immediate family smokers</td><td colspan="2">Not reported</td></tr>
</table>*non-smokers were defined as those who did not smoke in the past 4 weeks</td></tr>
<tr><td>Method of allocation</td><td colspan="3">Classes registered for the competition for the intervention group. The control group was recruited from classes that did not participate in the competition and were invited to join.<br>Data assessment was carried out anonymously, only assessing a code for the class and a personal code for the pupil.<br><br>Pupils in the intervention group were not informed that the study was related to the competition and were informed when they asked that the study did not have any influence on their chances of winning a prize.</td></tr>
<tr><td>Inclusion criteria</td><td colspan="3">- The class decides to remain a non-smoking class for a period from November to April (6 months), and a contract is signed, committing classmates to stay smoke-free.<br>- At least 90% of students in class vote in favour of participation.<br>- Participating classes monitor their (non-)smoking behaviour on a weekly basis, by placing a sticker on the contract each week they stayed smoke-free.<br>- For each month that the class succeeded, they sent a postcard to the organisers of the competition confirming further participation in the program.<br>Nb. The definition of smoke-free means is that at least 90% of the class students remained smoke-free in the previous week.</td></tr>
<tr><td>Exclusion criteria</td><td colspan="3">Not reported</td></tr>
<tr><td>Intervention</td><td>TIDieR Checklist criteria</td><td colspan="2">Details</td></tr>
<tr><td></td><td>Brief Name</td><td colspan="2">‘Be Smart-don’t start’</td></tr>
<tr><td></td><td>Rationale/theory/Goal</td><td colspan="2">Effectiveness of the smoke-free class competition on all participants and the effect of non-smokers in particular.</td></tr>
<tr><td></td><td>Materials used</td><td colspan="2">Teachers received a brochure containing information on the theoretical background of the program as well as the rules of the competition and advice on how to deal with possibly occurring problems during the</td></tr>
</table>

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|---|---|---|
| **Bibliographic reference/s** | **Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. *Preventive Medicine* 35, 241-249.** | |
| **Study name** | "Be Smart-Don't Start" | |
| | | program, such as smoking in pupils.<br>During the competition, 2 newsletters with general information about the competition were sent to all participating classes. |
| | **Procedures used** | Questionnaire |
| | **Provider** | Teacher |
| | **Method of delivery** | Teachers were provided with a detailed instruction leaflet informing them how to let the pupils fill in the questionnaire and to place them into an envelope in front of the pupils, to seal it, and to send it to the research team. |
| | **Location** | Not reported |
| | **Duration** | Not reported |
| | **Intensity** | Not reported |
| | **Tailoring/adaptation** | Not reported |
| | **Planned treatment fidelity** | Not reported |
| | **Actual treatment fidelity** | Not reported |
| | **Other details** | Prior to survey administration, pupils were asked to have their parents sign and return a letter providing written permission for participation in the study. |
| **Comparison** | **TIDieR Checklist criteria** | **Details** |
| | **Procedures used** | Questionnaire but did not receive a specific intervention |
| | **Location** | Hanover city, Germany. It is comparable to Hamburg and Berlin in socioeconomic and cultural aspects. |
| | **Other details** | No other detail reported |
| **Follow up** | 6 months and 1 year | |
| **Data collection** | Data were collected through self-completed anonymous questionnaires, administered by teachers.<br>Data assessment was carried out anonymously, only assessing a code for the class and a personal code for the pupil.<br>Questionnaire placed in sealed envelope in front of pupils and sent to research team.<br>The survey was separated from the competition.<br>Pupils in intervention group were not informed that the study was related to the competition and were informed when they asked that the study did not have any influence on their chances to win a prize. | |

| | |
|---|---|
| **Bibliographic reference/s** | **Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. *Preventive Medicine* 35, 241-249.** |
| **Study name** | "Be Smart-Don't Start" |
| | The whole procedure was examined and permitted under the data protection official. |
| **Critical outcomes measures and effect size. (time points)** | ***Smoking in past 4 weeks at 6 month follow-up*** |

| | Intervention group n = not reported | Control group N = not reported | aOR (95% C.I)** | Inverted aOR** (95% CI) | **aRR*** calculated by analyst** | **aRR adjusted for clustering** |
|---|---|---|---|---|---|---|
| **Critical Outcome** | | | | | | |
| Non-smokers smoking in the past 4 weeks* | 7.8% | 13.9% | 1.98 (1.42-2.76) p<0.001 | 0.51 (0.36, 0.70) | **0.55 (0.40, 0.73)** | Cannot adjust as no numbers in each group reported |

aOR was inverted because the aOR reported by the paper compares the control risk with the intervention risk, rather than the other way around. This was inverted in order to combine statistically with other studies.

The control group had an increased risk of non-smokers smoking in the past 4 weeks compared with the intervention group, at 6 month follow-up.

*Among baseline non-smokers only

**Adjusted for age, sex and baseline smoking, not adjusted for clustering.

***The control group prevalence used to calculate the aRR was 13.9% (percentage smoking in control group).

***Smoking in past 4 weeks at 12 month follow-up***

| | Intervention group n = not reported | Control group n = not reported | aOR (95% C.I)** | Inverted aOR (95% CI) | **aRR*** calculated by analyst** | **aRR adjusted for clustering** |
|---|---|---|---|---|---|---|
| **Critical Outcome** | | | | | | |
| Non-smokers smoking in the past 4 weeks* | 17% | 21.3% | 1.36 (1.04-1.76) p<0.05 | 0.74 (0.57, 0.96) | **0.78 (0.63, 0.97)** | Cannot adjust as no numbers in each group reported |

aOR was inverted because the aOR reported by the paper compares the control risk with the intervention risk, rather than the other way around. This was inverted in order to combine statistically with other studies.

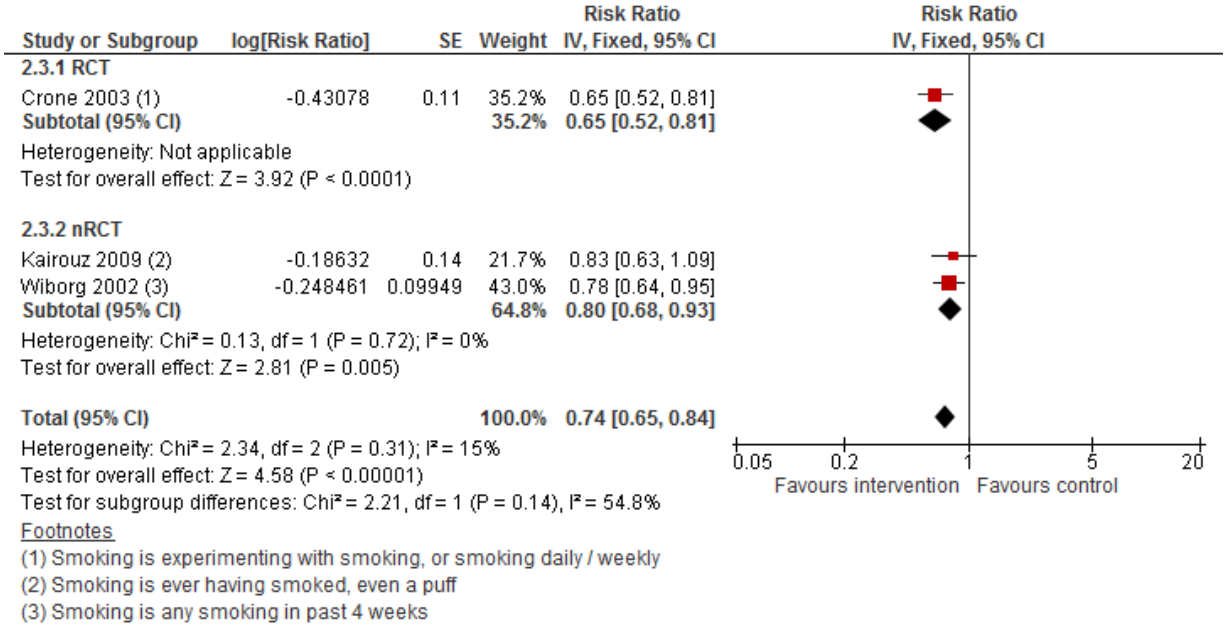
| | | | |
|---|---|---|---|
| **Bibliographic reference/s** | **Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. *Preventive Medicine* 35, 241-249.** | | |
| **Study name** | "Be Smart-Don't Start" | | |
| | The control group retained a higher risk of non-smokers smoking in the past 4 weeks compared with the intervention group, at 6 month follow-up.<br>*Among baseline non-smokers only<br>**Adjusted for age, sex and baseline smoking.<br>***The control group prevalence used to calculate the aRR was 21.3% (percentage smoking in control group). | | |
| **Important outcomes measures and effect size. (time points)** | No important outcomes reported | | |
| **Statistical Analysis** | Adjusting for clustering: Not reported so assume not adjusted.<br>Logistic regression adjusted for age, sex and smoking status. | | |
| **Risk of bias (ROB) ROBINS-I tool** | **Outcome** | **Judgement** | **Comments** |
| | Pre-intervention: bias due to confounding | Serious | No information reported on demographic factors such as immediate family being smokers. |
| | Pre-intervention: bias in selection of participants into study | Moderate | Potential for student self-selection as the intervention group consisted of classes that decided to participate in the intervention therefore possible that prevalence of smoking was lower in this population to begin with. |
| | At intervention: Bias in classification of interventions | Moderate | Intervention well defined. However assignment of intervention status (non-smoker) were determined retrospectively. |
| | Post-intervention: bias due to deviations from intended interventions | Moderate | Data collection and assessment was carried out anonymously, only assessing a code for the class and a personal code for the pupil.<br>The implementation of the competition can vary between classes as providers vary, but no further information given.<br>Time spent on the competition was not reported or any other non- |

| | | | |
|---|---|---|---|
| **Bibliographic reference/s** | **Wiborg G., Haneinkel R, 2002. Effectiveness of the "Smoke-Free Class Competition" in Delaying the Onset of Smoking in Adolesence. *Preventive Medicine* 35, 241-249.** | | |
| **Study name** | "Be Smart-Don't Start" | | |
| | | | smoking activities that may have occurred alongside the competition. |
| | Post-intervention: bias due to missing data | Moderate | Attrition issues present. High level of overall attrition: 2230/4372 (51%) participants completed all 3 surveys. |
| | Post-intervention: bias in measurement of outcomes | Serious | Outcome was subjective (self-reported). Assessors not reported as being blinded.<br>Pupils in the intervention group were not informed that the study was related to the competition and were informed when they asked that the study did not have any influence on their chances of winning a prize. |
| | Post-intervention: Bias in selection of the reported result | Moderate | Results were reported as outlined and there was no indication of a selection of the cohort for analysis and reporting on the basis of the results. |
| | **Overall Risk of Bias** | Serious | |
| **Source of funding** | Funded by the European Commission within the program "Europe against Cancer" | | |
| **Comments** | Limitations:<br>- Classes have great flexibility in carrying out the competition therefore the implementation varies<br>- Time spent on the competitions was not assessed or whether further non-smoking activities were initiated during the same time period<br>- Potential for student self-selection as the intervention group consisted of classes that decided to participate in the intervention therefore possible that prevalence of smoking was lower in this population to begin with<br>- Self-reported smoking status was not biochemically validated | | |
| **Additional references** | None | | |

# Appendix E - Forest plots

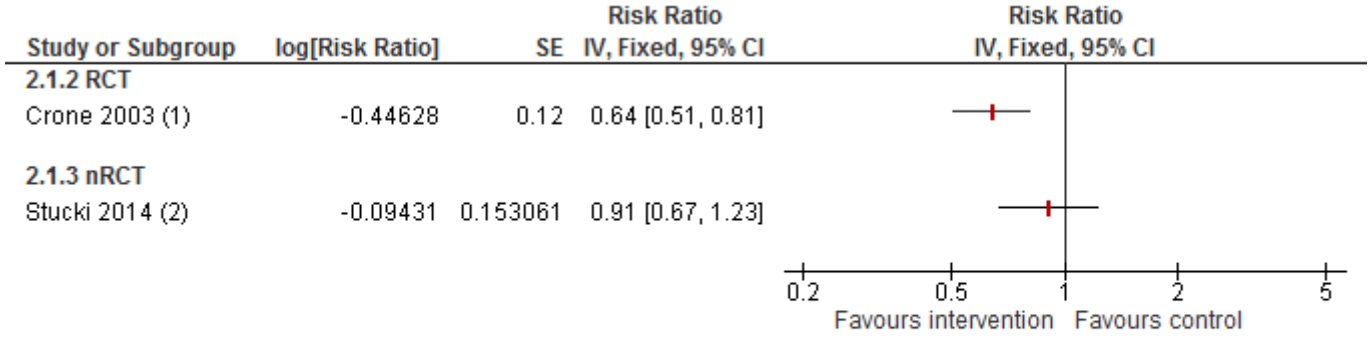
### Grade profile 1: Smokefree class competition vs control. Non-smokers taking up smoking (8-12 month follow-up)

The randomised and non-randomised studies were stratified. The study design interaction was not significant (P = 0.14) so the overall combined result was used.




### GRADE profile 3: Smokefree class competition vs control. Total smoking among baseline smokers and non-smokers combined

The randomised and non-randomised studies were stratified. The study design interaction was significant (P = 0.0009) so results were presented separately for each design.




Footnotes

(1) Smoking is experimenting with smoking, or smoking daily / weekly

(2) Smoking is any smoking in past 6 months, even if only a puff

# Appendix F - GRADE tables

### Profile 1: Non-smokers taking up smoking (Critical)

| Quality assessment | | | | | | | No of patients | | Effect | | Confidence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No of studies | Design | Risk of bias | Inconsistency | Indirectness | Imprecision | Other considerations | SFCC | Control | Relative (95% CI) | Absolute | |
| **Non-smokers taking up smoking (follow-up 6-8 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 3<br><br>Crone 2003<br><br>Kairouz 2009<br><br>Wiborg 2002 | 1 randomised, 2 controlled cluster studies | very serious[1] | no serious inconsistency[2] | no serious indirectness | no serious imprecision[3] | none | 171/1473 (11.6%) | 165/915 (18%) | RR 0.74 (0.65 to 0.84) | 47 fewer per 1000 (from 29 fewer to 63 fewer) | ⊕⊕OO LOW |

[1] Two of the three studies were observational (61.7% of meta-analysis weight). Both outcomes from the non-randomised studies were at serious risk of bias. None of the studies controlled for family smoking. Result is self-reported and susceptible to desirability bias.
[2] I squared is 15%
[3] Wiborg could not be adjusted for clustering and therefore is likely to have artificially narrow confidence intervals. The extent to which this impacts the meta-analysis is uncertain.

### Profile 2: Non-smokers not taking up smoking (Critical)

| Quality assessment | | | | | | | No of patients | | Effect | | Confidence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No of studies | Design | Risk of bias | Inconsistency | Indirectness | Imprecision | Other considerations | SFCC | Control | Relative (95% CI) | Absolute | |
| **Non-smokers not taking up smoking (follow-up mean 18 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1<br><br>Schultze 2006 | randomised trial | serious[1] | NA | no serious indirectness | serious[2] | none | 367/591 (62.1%) | 276/449 (61.5%) | RR 1.0 (0.92 to 1.09) | 6 more per 1000 (from 74 fewer to 86 more) | ⊕⊕OO LOW |

[1] Not all relevant confounders adjusted for (including family smoking), high attrition and self-selection into the intervention group. Outcome measure is self-reported.
[2] Confidence Interval (CI) overlaps the MID. Result is consistent with increased or decreased risk of not smoking compared with the control group.

## Profile 3: Total smoking (among baseline smokers and non-smokers) (Critical)

| Quality assessment | | | | | | | No of patients | | Effect | | Confidence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **SFCC** | **Control** | **Relative (95% CI)** | **Absolute** | |
| **Total smoking (follow-up mean 8 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br><br>Crone 2003 | randomised trial | serious[1] | NA | serious indirectness[2] | no serious imprecision | none | 26/986 (2.6%) | 54/683 (7.9%) | RR 0.64 (0.45 to 0.91) | 28 fewer per 1000 (from 7 fewer to 43 fewer) | ⊕⊕OO LOW |
| **Total smoking (follow-up mean 8 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br><br>Stucki 2014 | Controlled cluster study | serious[3] | NA | serious indirectness[2] | serious[4] | none | 64/595 (10.8%) | 67/440 (15.2%) | RR 0.91 (0.64 to 1.24) | 14 fewer per 1000 (from 55 fewer to 37 more) | ⊕OOO VERY LOW |

[1] High attrition (63.2%) and self-reported outcome measure.
[2] The outcome includes smokers in addition to non-smokers and so is indirect.
[3] Not all relevant confounders adjusted for (including family smoking), and self-selection into the intervention group. Outcome measure is self-reported.
[4] Confidence Interval (CI) overlaps the MID. Result is consistent with increased or decreased risk of smoking compared with the control group.

**Profile 4: Bullying, isolation and other adverse events (Critical)**

| Quality assessment | | | | | | | No of patients | | Effect | | Confidence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No of studies | Design | Risk of bias | Inconsistency | Indirectness | Imprecision | Other considerations | SFCC | Control | Relative (95% CI) | Absolute | |
| **Belief that people should not hang out with smokers (isolation) (follow-up 10-14 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br>Kairouz 2009 | Controlled cluster study | serious[1] | NA | no serious indirectness | very serious[2] | none | 118/843 (14%) | 133/1213 (11%) | RR 1.28 (0.86 to 1.90) | 31 more per 1000 (from 1 more to 67 more) | ⊕OOO VERY LOW |
| **Belief that people should not be friends with smokers (isolation) (follow-up 10-14 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br>Kairouz 2009 | Controlled cluster study | serious[1] | NA | no serious indirectness | very serious[2] | none | 236/843 (28%) | 303/1213 (25%) | RR 1.12 (0.90 to 1.39) | 30 more per 1000 (from 7 fewer to 75 more) | ⊕OOO VERY LOW |
| **Ever been bullied in last couple of months (successful participation intervention*) (follow-up mean 6 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br>Hanewinkel 2010 | randomised trial | no serious risk of bias[3] | NA | no serious indirectness | very serious[4] | none | 418/755 (55.4%) | 716/1351 (53%) | RR 0.97 (0.89 to 1.07) | 16 fewer per 1000 (from 58 fewer to 37 more) | ⊕⊕OO LOW |
| **Ever been bullied in last couple of months (unsuccessful participation intervention*) (follow-up mean 6 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br>Hanewinkel 2010 | randomised trial | no serious risk of bias[3] | NA | no serious indirectness | very serious[4] | none | 220/388 (56.7%) | 716/1351 (53%) | RR 0.96 (0.85 to 1.11) | 21 fewer per 1000 (from 79 fewer to 58 more) | ⊕⊕OO LOW |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ever been isolated in last couple of months (successful participation intervention*) (follow-up mean 6 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br><br>Hanewinkel 2010 | randomised trial | no serious risk of bias[3] | NA | no serious indirectness | serious[5] | none | 123/756 (16.3%) | 239/1353 (17.7%) | RR 0.80 (0.64 to 1.00) | 35 fewer per 1000 (from 64 fewer to 0 more) | ⊕⊕⊕O MODERATE |
| **Ever been isolated in last couple of months (unsuccessful participation intervention*) (follow-up mean 6 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br><br>Hanewinkel 2010 | randomised trial | no serious risk of bias[3] | NA | no serious indirectness | very serious[6] | none | 68/389 (17.5%) | 239/1353 (17.7%) | RR 0.98 (0.75 to 1.28) | 4 fewer per 1000 (from 44 fewer to 49 more) | ⊕⊕OO LOW |

*Successful participation includes those that completed both the intervention and the competition. Unsuccessful participation is those that completed the intervention but not the competition.

[1] Not all relevant confounders adjusted for (including family smoking).
[2] Confidence Interval (CI) overlaps both MIDs
[3] Low attrition and adjustment for most confounders.
[4] Confidence interval (CI) overlaps both MIDs (0.95 and 1.05). Result is consistent with a meaningful increase or a meaningful decrease in bullying.
[5] Confidence interval (CI) overlaps one MID. Result is consistent with a meaningful decrease in isolation or no meaningful effect.
[6] Confidence interval (CI) overlaps both MIDs (0.95 and 1.05). Result is consistent with a meaningful increase or a meaningful decrease in isolation.

## Profile 5: Knowledge and attitudes (Important)

| Quality assessment | | | | | | | No of patients | | Effect | | Confidence |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **No of studies** | **Design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** | **SFCC** | **Control** | **Relative (95% CI)** | **Absolute** | |
| **Having increased knowledge of negative effects of smoking on a quiz (follow-up 10-14 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |

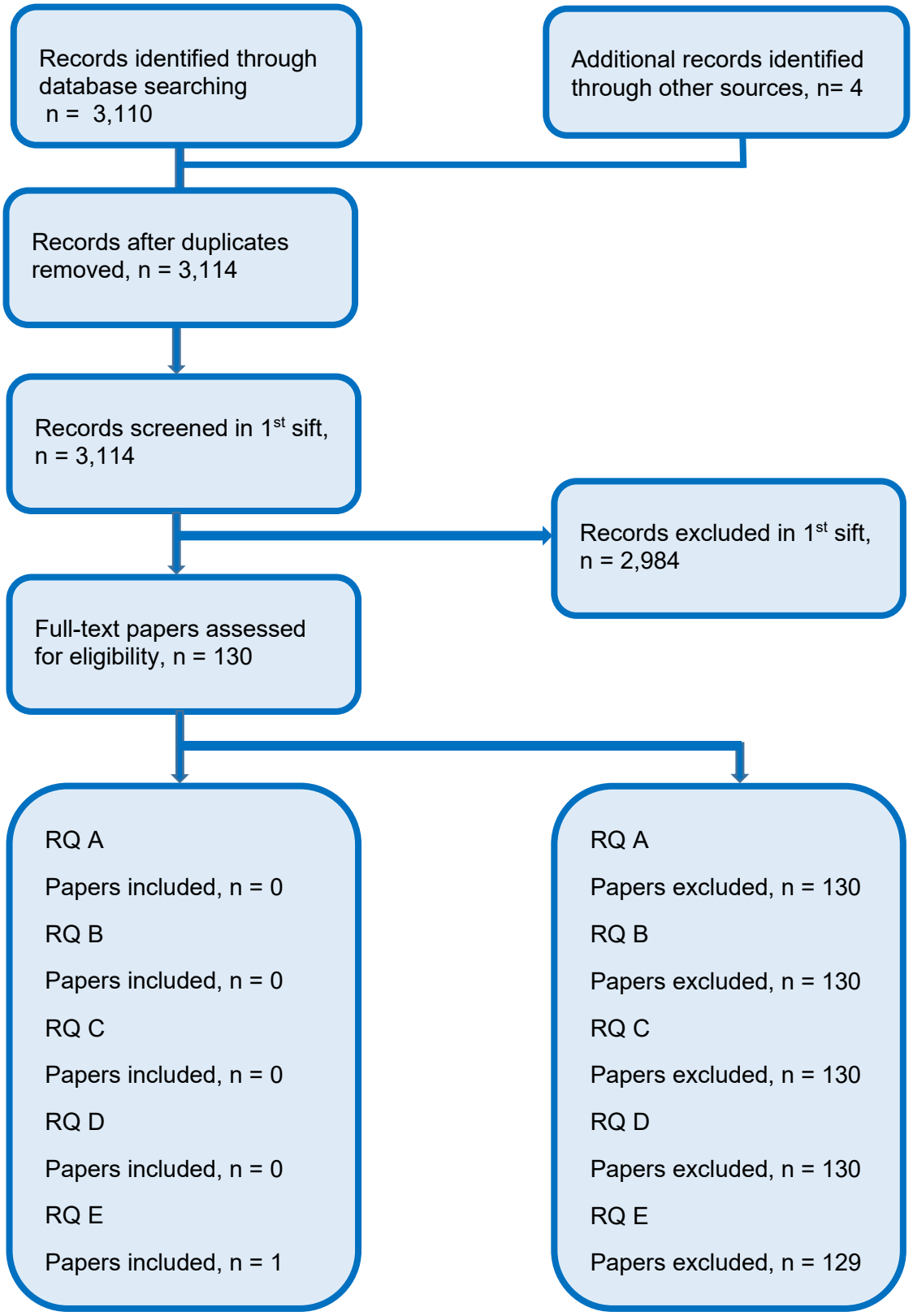
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1<br><br>Kairouz 2009 | Controlled cluster study | serious[1] | NA | no serious indirectness | serious[2] | none | 770/843 (91.3%) | 1067/1213 (88%) | RR 1.04 (0.98 to 1.10) | 35 more per 1000 (from 9 more to 62 more) | ⊕⊕OO LOW |
| **Agreeing that tobacco is not an acceptable product (follow-up 10-14 months; assessed with: Self-report questionnaire)** | | | | | | | | | | | |
| 1<br><br>Kairouz 2009 | Controlled cluster study | serious[1] | NA | no serious indirectness | serious[2] | none | 770/843 (91.3%) | 1031/1213 (85%) | RR 1.07 (0.98 to 1.17) | 59 more per 1000 (from 34 more to 93 more) | ⊕⊕OO LOW |

[1] Not all relevant confounders adjusted for (including family smoking).
[2] Confidence interval (CI) overlaps one MID. Result is consistent with a meaningful decrease in increase in knowledge or acceptability, or no meaningful effect.

# Appendix G - Economic evidence study selection

The following flowchart shows the record selection process for review question E.i.

**Figure 1: Flow chart of economic evidence study selection for the guideline**



# Appendix H - Economic evidence tables

| Study | Hoeflmayr 2008 | | | |
|---|---|---|---|---|
| **Study details** | **Population & interventions** | **Costs** | **Health outcomes** | **Cost-effectiveness** |
| **Hoeflmayr 2008 (Germany)**<br><br>**Economic analysis:**<br>Cost-benefit analysis (CBA)<br><br>**Study design:**<br>Economic evaluation using data directly from a trial. Whilst not described, the model would appear to be a simple decision tree or cost calculator.<br>**Approach to analysis:**<br>Economic evaluation taking results from a trial where the intervention was not randomised but the control group was. Estimated total costs of the programme for a student cohort in a given | **Population:**<br>Smoke Free Class Competition (SFC) was rolled out to 150,566 11-14 year old German students (in 5,791 classes). The evaluation was on a sample of 2,142 students (131 classes) split between students in Berlin and Hamburg (who received the intervention) and in Hannover (who did not receive the intervention).<br>**Cohort settings:**<br>Students aged 11-14<br>Tre<br><br>**Intervention 1:**<br>SFC is a school-based smoking prevention | There were 150,566 participants in the school year 2001/2002<br><br>SFC<br>Overall total: €5,871,694<br>Total direct costs: €772,056,<br>Total indirect costs (school productivity costs): €5,099,638<br><br>Cost per participant<br>Direct costs: €5.13 per student<br>Total costs: €39.00<br>The cost per participant (indirect cost) was not reported but has been calculated as €33.87.<br><br>**Cost savings** | **Students prevented becoming established smokers**<br>Estimated at being a reduction in 2.04% fewer students becoming established smokers due to SFC | **Net benefit**<br>SFC competition<br>Direct costs and benefits only: €5,589,126<br>Benefit cost ratio of 8.2<br>Direct, indirect costs and benefits: €15,000,308<br>Benefit cost/ratio of 3.6<br><br>**Analysis of uncertainty**<br>Sensitivity analyses was performed using different discount rates (0%, 3% and 10%; 5% had been used in the baseline analysis), smoking cessation rates (10% variance), each of the alternative progression rates to established smoking from the published studies rather than the average, percentages of most extreme variances in the number of smokers prevented in Wang et al, alternative ages of initiation of costs associated with smoking and indirect cost termination, inclusion of programme agencies marginal activities and various other analyses around cost assumptions such as underestimation of costs by 10%. |

| Study | Hoeflmayr 2008 | | | |
|---|---|---|---|---|
| **Study details** | **Population & interventions** | **Costs** | **Health outcomes** | **Cost-effectiveness** |
| year and the total potential monetary benefit from the reduction in rates of students becoming established smokers suggested by the evaluation of the programme in combination with smoking progression models and smoking cessation rates.<br>**Perspective:** Societal<br>**Time horizon:** Appears to be lifetime but not stated<br>**Treatment effect duration:** Not explicitly reported, but assumed to be lifetime<br>**Discounting:** 5% in base case | programme. It reinforces non-smoking behaviour with rewards/prizes for non-smokers who stay smoke free. The goal is to make non-smoking the norm. [a]<br><br>**Intervention 2:**<br>Comparator: did not receive SFC | From stopping an individual becoming an established smoker, per student<br>Direct cost: €2,068<br>Indirect cost: €4,718<br>Total cost: €6,786<br><br>**Currency & cost year:** Euro (€), cost year not stated<br><br>**Cost components incorporated:**<br><br>Direct costs: Personnel expenses (management and programme development, programme operations, IT/website, administration), travel expenses, materials (print products, packaging, postage, prizes) and programme administration (facilities, overheads, depreciation). | | The model was most sensitive to discount rates (total costs per smoker increasing 871% with 0% discount rate and decreasing 85.3% with 10% discount rate). A threshold analysis was performed that showed that benefits would have to decrease by 88% and 72%, or costs increase by 724% and 255% to change the overall result. It is assumed that these refer to direct and total costs respectively, but this is not clear. In deterministic and scenario analysis, only a discount rate of 10% resulted in the programme costs exceeding the benefits. Full probabilistic sensitivity analysis (PSA) was also performed with 10,000 iterations, with a resulting mean net benefit of €5,769,124 (standard deviation: €545,083). |

| Study | Hoeflmayr 2008 | | | |
|---|---|---|---|---|
| **Study details** | **Population & interventions** | **Costs** | **Health outcomes** | **Cost-effectiveness** |
| | | Indirect costs: School productivity based upon time spent by teachers as well as school administration and infrastructure in administering, preparing and delivering the programme<br><br>Direct cost of an established smoker: Health related costs of smoking related disease<br><br>Indirect cost of an established smoker: labour productivity based on human capital method | | |
| **Data sources** | | | | |
| **Health outcomes:** Combination of trial data, smoking progression and smoking cessation models. **Quality-of-life weights:** Not applicable. **Cost sources:** Costs of SFC from operating agency (including local and regional health education services) through a survey with a separate survey for classroom direct and indirect (productivity costs) with schools and teachers delivering SFC. | | | | |
| **Comments** | | | | |
| **Source of funding:** The SFC is funded by the European Commission, German Cancer Aid, Federal Centre for Health Education and the German Heart and Lung Foundations. Funding source for the evaluation was not provided. **Limitations:** Author-recognised limitations: Outcomes were only followed for 6 months after programme completion; Smoking progression had to be modelled and could not be measured directly; Methods for costs of smoking are crude including use of gross rather than net smoking costs; Gross rather than net smoking costs were applied; Different time periods for cost and outcome | | | | |

| Study | Hoeflmayr 2008 | | | |
|---|---|---|---|---|
| Study details | Population & interventions | Costs | Health outcomes | Cost-effectiveness |
| evaluation was applied. Other limitations: How smoking status is confirmed is not clear, it seems likely that it was individual confirmation, as opposed to e.g. breath tests **Other:** None | | | | |
| **Overall applicability:** Partially applicable | | **Overall quality:** Potentially serious limitations | | |
| *Abbreviations: CBA: Cost-benefit analysis*; *PSA: probabilistic sensitivity analysis; SFC: Smoke Free Class Competition* | | | | |
| *(a)* The three general rules of the SFC programme are: 1. Classes make the decision to be nonsmoking class for 6 months (from autumn to spring); 2. The pupils themselves and their teachers monitor the smoking status of the pupils and report on it regularly; 3. Regular smoking is not accepted. Classes that refrain from smoking can win a number of attractive prizes, with the main prize being a trip to another European country. | | | | |

# Appendix I – Health economic evidence profiles

Health economic profiles are included in the main report.

# Appendix J – Health economic analysis

Economic modelling was not prioritised for this review question.

# Appendix K – Excluded studies

| Study Citation | Reason for excluding |
|---|---|
| Dobbins M, DeCorby K, Manske S, and Goldblatt E (2008) Effective practices for school-based tobacco use prevention. Preventive Medicine 46(4), 289-297 | Exclude on intervention: did not include SFCC |
| Etter J F, and Bouvier P (2006) Some doubts about one of the largest smoking prevention programmes in Europe, the smokefree class competition. Journal of Epidemiology and Community Health 60(9), 757-759 | Exclude on study design: narrative review |
| Hanewinkel R (2007) "Be smart - Don't start". Results of a non-smoking competition in Germany 1997-2007. Gesundheitswesen 69(1), 38-44 | Exclude on language |
| Hanewinkel R, and Wiborg G (2003) Diffusion of the non-smoking campaign "be smart - Don't start" between 1997 and 2003 in Germany. Gesundheitswesen 65(4), 250-254 | Exclude on language |
| Hanewinkel R, and Wiborg G (2003) School-based smoking prevention: Results of a prospective controlled trial. Sucht: Zeitschrift fur Wissenschaft und Praxis 49(6), 333-41 | Exclude on language |
| Hanewinkel R, Isensee B, and Morgenstern M (2018) Long-term effects of a school-based prevention program. Sucht 64(1), 29-40 | Exclude on language |
| Hanewinkel R, Wiborg G, Abdennbi K, Ariza C, Bollars C, Bowker S, Clemente M P, El Fehri , V , Florek E, Hruba D, Jensson V, Lepp K, Lotrean L, Nebot M, Neuberger M, Ojala K, Pilali M, Prost-Heinisch M P, Ramala K, Spruijt R, Stastny P, Tamang E, Touraine S, Veryga A, and Vartiainen E (2007) European smokefree class competition: a measure to decrease smoking in youth. Journal of Epidemiology and Community Health 61(8), 750-750 | Exclude on language |
| Hanewinkel R, Wiborg G, Isensee B, Nebot M, and Vartiainen E (2006) "Smoke-free class competition": Far-reaching conclusions based on weak data. Preventive Medicine 43(2), 150-151 | Exclude on study design: letter |
| Hanewinkel R, Wiborg G, Paavola M, and Vartiainen E (1998) European smoke-free class competition. Tobacco Control 7(3), 326-326 | Exclude on study design: letter |
| Hrubá D, Zachovalová V, Matejová H, and Danková I (2007) "Our class does not smoke"; The Czech version of the "Smoke-Free Class Competition" programme.. Cent Eur J Public Health 15(4), 163-166. | Exclude on study design: implementation |
| Isensee B, and Hanewinkel R (2018) School-based tobacco prevention: the "Be Smart - Don't Start" program. Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz 61(11), 1446-1452 | Exclude on language |
| Isensee Barbara, and Hanewinkel Reiner (2012) Meta-analysis on the effects of the smoke-free class competition on smoking prevention in adolescents. European addiction research 18(3), 110-5 | Exclude on study design: systematic review, limited data on included studies, references checked |
| Johnston Vanessa, Liberato Selma, and Thomas David (2012) Incentives for preventing smoking in children and adolescents. The Cochrane database of systematic reviews 10, CD008645 | Exclude on intervention: systematic review with different inclusion, references checked |
| MacArthur G J, Harrison S, Caldwell D M, Hickman M, and Campbell R (2016) Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11-21years: a systematic review and meta-analysis. Addiction 111(3), 391-407 | Exclude on intervention: not SFCC |

| | |
|---|---|
| Mercken, L., Moore, L., Crone, M., R., et al (2012) The effectiveness of school-based smoking prevention interventions among low- and high-SES European teenagers. *Health Education Research,* 27(3) p459-469. | Exclude on intervention: not SFCC |
| Potschke-Langer M, Edler L, and Mons U (2006) "Smoke-free class competition": A reply to the initiators of the program. Preventive Medicine 43(2), 151-153 | Exclude on evidence: letter |
| Pottgen S, Samkange-Zeeb F, Brand T, Steenbock B, and Pischke C R (2016) Effectiveness of School-based Interventions to Prevent and/or Reduce Substance Use among Primary and Secondary School Pupils: A Review of Reviews. Gesundheitswesen 78(4), 230-236 | Exclude on language |
| Schmid H (2006) Smokefree class competition in Switzerland: Does it work with negative peer pressure?. Psychology & Health 21, 176-177 | Exclude on evidence: abstract |
| Schulze A, Mons U, Edler L, and Potschke-Langer M (2006) Lack of sustainable prevention effect of the "Smoke-Free Class Competition" on German pupils. Preventive Medicine 42(1), 33-39 | Exclude on evidence: about prevention |
| Svoen N, and Schei E (1999) Adolescent smoking prevention – primary health care in cooperation with local schools: A controlled intervention study. Scand J Prim Health Care 17, 54-58 | Exclude on intervention: not SFCC |
| Tamang E, Pilati G, Latini R, and Pettino A (2003) Smoke Free Class Competition. Tabaccologia 3, 13-17 | Exclude on language |
| Thomas R E, Baker P R. A, and Thomas B C (2016) Family-Based Interventions in Preventing Children and Adolescents from Using Tobacco: A Systematic Review and Meta-Analysis. Academic Pediatrics 16(5), 419-429 | Exclude on intervention: not SFCC |
| Thomas R E, McLellan J, and Perera R (2015) Effectiveness of school-based smoking prevention curricula: systematic review and meta-analysis. Bmj Open 5(3), | Exclude on intervention: not SFCC |
| Thomas R, and Perera R (2006) School-based programmes for preventing smoking. Cochrane Database of Systematic Reviews (3), | Exclude on date |
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## Economic studies

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# Appendix L - Research recommendations

No research recommendations have been made for review E.