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Interventions to prevent obesity in children aged 5 to 11 years old (Review)

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[Intervention Review]

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

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ABSTRACT

Background

Prevention of obesity in children is an international public health priority given the prevalence of the condition (and its significant impact on health, development and well-being). Interventions that aim to prevent obesity involve behavioural change strategies that promote healthy eating or 'activity' levels (physical activity, sedentary behaviour and/or sleep) or both, and work by reducing energy intake and/or increasing energy expenditure, respectively. There is uncertainty over which approaches are more effective and numerous new studies have been published over the last five years, since the previous version of this Cochrane review.

Objectives

To assess the effects of interventions that aim to prevent obesity in children by modifying dietary intake or ‘activity’ levels, or a combination of both, on changes in BMI, zBMI score and serious adverse events.

Search methods

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

Selection criteria

Randomised controlled trials in children (mean age 5 years and above but less than 12 years), comparing diet or 'activity' interventions (or both) to prevent obesity with no intervention, usual care, or with another eligible intervention, in any setting. Studies had to measure outcomes at a minimum of 12 weeks post baseline. We excluded interventions designed primarily to improve sporting performance.

Data collection and analysis

We used standard Cochrane methods. Our outcomes were body mass index (BMI), zBMI score and serious adverse events, assessed at short- (12 weeks to < 9 months from baseline), medium- (9 months to < 15 months) and long-term (≥ 15 months) follow-up. We used GRADE to assess the certainty of the evidence for each outcome.

Main results

This review includes 172 studies (189,707 participants); 149 studies (160,267 participants) were included in meta-analyses. One hundred forty-six studies were based in high-income countries. The main setting for intervention delivery was schools (111 studies), followed by the community (15 studies), the home (eight studies) and a clinical setting (seven studies); one intervention was conducted by telehealth and 31 studies were conducted in more than one setting. Eighty-six interventions were implemented for less than nine months; the shortest was conducted over one visit and the longest over four years. Non-industry funding was declared by 132 studies; 24 studies were funded in part or wholly by industry.

Dietary interventions versus control

Dietary interventions, compared with control, may have little to no effect on BMI at short-term follow-up (mean difference (MD) 0, 95% confidence interval (CI) -0.10 to 0.10; 5 studies, 2107 participants; low-certainty evidence) and at medium-term follow-up (MD -0.01, 95% CI -0.15 to 0.12; 9 studies, 6815 participants; low-certainty evidence) or zBMI at long-term follow-up (MD -0.05, 95% CI -0.10 to 0.01; 7 studies, 5285 participants; low-certainty evidence). Dietary interventions, compared with control, probably have little to no effect on BMI at long-term follow-up (MD -0.17, 95% CI -0.48 to 0.13; 2 studies, 945 participants; moderate-certainty evidence) and zBMI at short- or medium-term follow-up (MD -0.06, 95% CI -0.13 to 0.01; 8 studies, 3695 participants; MD -0.04, 95% CI -0.10 to 0.02; 9 studies, 7048 participants; moderate-certainty evidence).

Five studies (1913 participants; very low-certainty evidence) reported data on serious adverse events: one reported serious adverse events (e.g. allergy, behavioural problems and abdominal discomfort) that may have occurred as a result of the intervention; four reported no effect.

Activity interventions versus control

Activity interventions, compared with control, may have little to no effect on BMI and zBMI at short-term or long-term follow-up (BMI short-term: MD -0.02, 95% CI -0.17 to 0.13; 14 studies, 4069 participants; zBMI short-term: MD -0.02, 95% CI -0.07 to 0.02; 6 studies, 3580 participants; low-certainty evidence; BMI long-term: MD -0.07, 95% CI -0.24 to 0.10; 8 studies, 8302 participants; zBMI long-term: MD -0.02, 95% CI -0.09 to 0.04; 6 studies, 6940 participants; low-certainty evidence). Activity interventions likely result in a slight reduction of BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI -0.18 to -0.05; 16 studies, 21,286 participants; zBMI: MD -0.05, 95% CI -0.09 to -0.02; 13 studies, 20,600 participants; moderate-certainty evidence).

Eleven studies (21,278 participants; low-certainty evidence) reported data on serious adverse events; one study reported two minor ankle sprains and one study reported the incident rate of adverse events (e.g. musculoskeletal injuries) that may have occurred as a result of the intervention; nine studies reported no effect.

Dietary and activity interventions versus control

Dietary and activity interventions, compared with control, may result in a slight reduction in BMI and zBMI at short-term follow-up (BMI: MD -0.11, 95% CI -0.21 to -0.01; 27 studies, 16,066 participants; zBMI: MD -0.03, 95% CI -0.06 to 0.00; 26 studies, 12,784 participants; low-certainty evidence) and likely result in a reduction of BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI -0.21 to 0.00; 21 studies, 17,547 participants; zBMI: MD -0.05, 95% CI -0.07 to -0.02; 24 studies, 20,998 participants; moderate-certainty evidence). Dietary and activity interventions compared with control may result in little to no difference in BMI and zBMI at long-term follow-up (BMI: MD 0.03, 95% CI -0.11 to 0.16; 16 studies, 22,098 participants; zBMI: MD -0.02, 95% CI -0.06 to 0.01; 22 studies, 23,594 participants; low-certainty evidence).

Nineteen studies (27,882 participants; low-certainty evidence) reported data on serious adverse events: four studies reported occurrence of serious adverse events (e.g. injuries, low levels of extreme dieting behaviour); 15 studies reported no effect.

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

Authors' conclusions

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

PLAIN LANGUAGE SUMMARY

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

Key messages

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

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

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

Why is preventing obesity in children important?

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

What did we want to find out?

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

What did we do?

We searched many scientific databases to find studies that looked at ways of preventing obesity in children. We included studies aimed at children aged 5 to 11 years. We did not include studies only aimed at children who were already overweight or were already living with obesity. However, we included studies in which children who were overweight or living with obesity were included in the analysis. We only included studies if the methods they used were aimed at changing children's diet, or their level of activity (i.e. increasing physical activity or reducing inactive time), or both. We looked only for studies that randomly placed people into groups receiving different strategies (which may include changing nothing). We assessed the rigour of the studies to get a sense of how confident we were in their results. We grouped studies together for analysis depending on whether they aimed to improve diet, activity, or both.

What did we find?

We found 172 studies that involved 189,707 children. One hundred forty-six studies were based in high-income countries (e.g. the USA and in Europe). In 111 studies, the strategies were tried in schools, though 15 were based in the community, eight in the home and seven in clinical settings; one intervention was conducted by telehealth and 31 studies were conducted in more than one setting. Eighty-six strategies were implemented for less than nine months, with the shortest being conducted over one visit and the longest over four years. Non-industry funding was declared by 132 studies; 24 studies were funded in part or wholly by industry (e.g. food suppliers, pharmaceutical industry and private healthcare services).

Our statistical analyses included results from 149 studies of 160,267 children. We found that children who were helped with a strategy to change their activity levels alone or in combination with a strategy to change their diet may have their BMI reduced, compared with children who were not given any strategy. This means that these children may have been able to minimise their excess weight gain by a small amount which, for public health, is important. In contrast, children who were helped with a strategy to change their diet only did not have their BMI reduced.

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

What are the limitations of the evidence?

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

Four main factors reduced our confidence in the evidence.

1. Results were very inconsistent across the different studies.

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

3. There were not enough studies reporting particular types of outcomes for a particular duration of follow-up to be certain about the results for some comparisons, and also certain settings (e.g. community settings) were under-represented.

4. Results from some studies were not reported in a way such that we could include them in our analyses (e.g. without any detail of the difference between the strategies examined) and this may have an impact on the results of our analyses.

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

How up-to-date is this evidence?

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

SUMMARY OF FINDINGS

Summary of findings 1. Dietary interventions versus control

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

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With dietary interventions (mean difference)			
BMI short-term (12 weeks from baseline to < 9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0 points (0.1 points lower to 0.1 points higher)	2107 (5 studies)	++-- Low[a]	Dietary interventions may have little to no effect on BMI at short-term follow-up
BMI medium-term (9 months to < 15 months)	Average BMI = 16.23	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.01 points lower (0.15 points lower to 0.12 points higher)	6815 (9 studies)	++-- Low[b]	Dietary interventions may have little to no effect on BMI at medium-term follow-up
BMI long-term (> 15 months)	Average BMI = 16.48	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.17 points lower (0.48 points lower to 0.13 points higher)	945 (2 studies)	+++- Moderate[c]	Dietary interventions compared with control probably have little to no effect on BMI at long-term follow-up
zBMI short-term (12 weeks from baseline to < 9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at short-term follow-up in the intervention group was, on average, 0.06 points lower (0.13 points lower to 0.01 points higher)	3695 (8 studies)	+++- Moderate[d]	Dietary interventions compared with control probably have little to no effect on zBMI at short-term follow-up
zBMI medium-term (9 months to < 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.04 points lower (0.1 points lower to 0.02 points higher)	7048 (9 studies)	+++- Moderate[d]	Dietary interventions compared with control probably have little to no effect on zBMI at medium-term follow-up
zBMI long-term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies	The mean zBMI score at long-term follow-up in the intervention group was, on	5285 (7 studies)	++-- Low[f]	Dietary interventions may have little to no

	ranges from -0.23 to 1.6 with median 0.71	average, 0.05 points lower (0.1 points lower to 0.01 points higher)			effect on zBMI at long-term follow-up
Serious adverse events	One study reported serious adverse events that may have occurred as a result of the intervention. Children were provided with 1 can per day of a noncaloric, artificially sweetened, non-carbonated beverage or a sugar-containing non-carbonated beverage. The reported severe adverse events included headache (none in intervention, 1% of the participants in the control group), allergy (1% in both the intervention and control group), behavioural problems (1% in the intervention and 0.5% in the control group) and abdominal discomfort (2% in both the intervention and the control group). Adverse events were reported by 21 non-completer participants as a reason to stop drinking the beverages and by 7 children who completed the study. The other 4 studies that reported on serious adverse event did not record any.		1913 (5 studies)**	+--- Very low[g]	Dietary interventions, compared with control, may increase the number of severe adverse events but the evidence is very uncertain

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short-term; ~ 6 months), 9 (medium-term; ~ 12 months) and 9.5 (long-term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls (available at https://www.cdc.gov/growthcharts/cdc_charts.htm); the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.
**Criteria for judging certainty in the evidence are reported in Appendix 1.
***Number of randomised participants.

EXPLANATIONS

[a]Downgraded one level due to imprecision (evidence from 2107 participants); one level due to publication bias (results from one study are not reported and no information regarding the direction of the effect is reported; results that are ineligible for inclusion in the meta-analysis from one study show no evidence of effect of the intervention; results that are ineligible for inclusion in the meta-analysis from one study suggest a beneficial effect of the intervention. Meta-analysis of results shows no evidence of effect of the intervention; the proportion of missing data is very large (52%) and there is potential for missing results to impact on the synthesised effect estimate).

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

[c]Downgraded one level due to imprecision (evidence from 945 participants).

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

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

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

[g]Downgraded one level due to imprecision (evidence is from 1913 participants); one level due to inconsistency (one study reported a negative effect of the intervention, four studies reported no effect); and one level due publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Abbreviations

BMI: body mass index (kg/m^2); CDC: Centers for Disease Control and Prevention; CI: confidence interval; zBMI: body mass index standardised for age and sex.

Summary of findings 2. Activity interventions versus control

Patient or population: children aged 5 to 11 years
Setting: all settings (school, home, school + home, others)

Intervention: activity interventions
Comparison: control (no active interventions)

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With activity interventions (mean difference)			
BMI short-term (12 weeks from baseline to < 9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.02 points lower (0.17 points lower to 0.13 points higher)	4069 (14 studies)	++-- Low[a]	Activity interventions compared with control may have little to no effect on BMI at short-term follow-up
BMI medium-term (9 months to < 15 months)	Average BMI = 16.23	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.11 points lower (0.18 points lower to 0.05 points lower)	21,286 (16 studies)	+++- Moderate[b]	Activity interventions compared with control likely result in a slight reduction in BMI at medium-term follow-up
BMI long-term (> 15 months)	Average BMI = 16.48	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.07 points lower (0.24 points lower to 0.1 points higher)	8302 (8 studies)	++-- Low[c]	Activity interventions compared with control may have little to no effect on BMI at long-term follow-up
zBMI short-term (12 weeks from baseline to < 9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at short-term follow-up in the intervention group was, on average, 0.02 points lower (0.07 points lower to 0.02 points higher)	3580 (6 studies)	++-- Low[d]	Activity interventions compared with control may have little to no effect on zBMI at short-term follow-up
zBMI medium-term (9 months to < 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.05 points lower (0.09 points lower to 0.02 points lower)	20,600 (13 studies)	+++- Moderate[e]	Activity interventions compared with control likely result in a slight reduction in zBMI at medium-term follow-up
zBMI long-term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at long-term follow-up in the intervention group was, on average, 0.02 points lower (0.09 points lower to 0.04 points higher)	6940 (6 studies)	++-- Low[f]	Activity interventions compared with control may have little to no effect on zBMI at long-term follow-up
Serious adverse events	One study reported that dizziness during baseline venipuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of		21,278 (11 studies)**	++--	Activity interventions, compared with control,

	the study. No other adverse events were reported by students during the health examinations. Two minor ankle sprains occurred during the sessions of the programme (9 months incidence risk: 0.4 %). One study reported that the incident rate of adverse events (e.g. musculoskeletal injuries) was 0.03 in Year 1 (20 mild; 3 moderate; 1 severe), 0.02 in Year 2 (4 mild; 6 moderate; 2 severe) and 0.01 in Year 3 (5 mild; 2 severe). The other 9 studies that reported on serious adverse events did not record any.		Low[g]	may increase the number of severe adverse events

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short-term; ~ 6 months), 9 (medium-term; ~ 12 months) and 9.5 (long-term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls (available at https://www.cdc.gov/growthcharts/cdc_charts.htm); the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.
**Criteria for judging certainty in the evidence are reported in Appendix 1.
***Number of randomised participants.

EXPLANATIONS

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

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

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

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

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

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

[g]Downgraded one level due to inconsistency (two studies reported a negative effect of the intervention, nine studies reported no effect) and one level due to publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Abbreviations

BMI: body mass index (kg/m^2); CDC: Centers for Disease Control and Prevention; CI: confidence interval; zBMI: body mass index standardised for age and sex.

Summary of findings 3. Dietary and activity interventions versus control

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

Outcomes	Illustrative comparative risks (95% CI)		N of participants (studies)	Certainty of the evidence (GRADE**)	Comments
	Without intervention*	With dietary and activity interventions (mean difference)			

BMI short-term (12 weeks from baseline to < 9 months)	Average BMI = 16	The mean BMI score at short-term follow-up in the intervention group was, on average, 0.11 points lower (0.21 points lower to 0.01 points lower)	16,066 (27 studies)	++-- Low[a]	Dietary and activity interventions compared with control may result in a slight reduction in BMI at short-term follow-up
BMI medium-term (9 months to < 15 months)	Average BMI = 16.23	The mean BMI score at medium-term follow-up in the intervention group was, on average, 0.11 points lower (0.21 points lower to 0 points)	17,547 (21 studies)	+++- Moderate[b]	Dietary and activity interventions compared with control likely result in a reduction in BMI at medium-term follow-up
BMI long-term (> 15 months)	Average BMI = 16.48	The mean BMI score at long-term follow-up in the intervention group was, on average, 0.03 points higher (0.11 points lower to 0.16 points higher)	22,098 (16 studies)	++-- Low[c]	Dietary and activity interventions compared with control may result in little to no difference in BMI at long-term follow-up
zBMI short-term (12 weeks from baseline to < 9 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at short-term follow-up in the intervention group was, on average, 0.03 points lower (0.06 points lower to 0 points)	12,784 (26 studies)	++-- Low[d]	Dietary and activity interventions compared with control may result in a slight reduction in zBMI at short-term follow-up
zBMI medium-term (9 months to < 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at medium-term follow-up in the intervention group was, on average, 0.05 points lower (0.07 points lower to 0.02 points lower)	20,998 (24 studies)	+++- Moderate[e]	Dietary and activity interventions compared with control likely result in a reduction in zBMI at medium-term follow-up
zBMI long-term (> 15 months)	Average zBMI in the general population is 0 by definition. zBMI in all included studies ranges from -0.23 to 1.6 with median 0.71	The mean zBMI score at long-term follow-up in the intervention group was, on average, 0.02 points lower (0.06 points lower to 0.01 points higher)	23,594 (22 studies)	++-- Low[f]	Dietary and activity interventions compared with control may result in little to no difference in zBMI at long-term follow-up
Serious adverse events	Four studies reported the occurrence of serious adverse events. In one study, few adverse events and injuries were reported amongst the participants. Injuries were reported by 2 girls (11%) in the comparison group, and 1 girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by 1 girl		27,882 (19 studies)	++-- Low[g]	Dietary and activity interventions compared with control may increase the number of severe

					(5.5%) in the comparison group, and 2 girls (9.5%) in the parent-targeted group. The authors reported that none of the above adverse events were judged by the co-ordinating centre to be related to study participation, but the centre deemed 2 of the injuries to be possibly related to participation in the intervention. They also reported that an elevated cholesterol value was reported for 1 participant and notification was made to the family. In one study, all-cause mortality was reported for 0.9% of the participants in the intervention group, but it is not reported whether this was related to the intervention received; no other serious adverse events were reported. In two studies, low levels of extreme dieting behaviour were observed in both the intervention and control groups. The other 15 studies that reported on serious adverse events did not record any.	adverse events

*The median BMI without the intervention is the 50th percentile values of BMI in children aged 8.5 (short-term; ~ 6 months), 9 (medium-term; ~ 12 months) and 9.5 (long-term; ~18 months) years derived from the CDC 2000 growth charts for boys and girls (available at https://www.cdc.gov/growthcharts/cdc_charts.htm); the median zBMI without intervention is calculated from the zBMI of participants in the control group of all included studies measured at follow-up.
**Criteria for judging certainty in the evidence are reported in Appendix 1.
***Number of randomised participants.

EXPLANATIONS

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

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

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

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

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

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

[g]Downgraded one level due to inconsistency (four studies reported a negative effect of the intervention, 15 studies reported no effect) and one level due to publication bias (there is potential for missing evidence as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only).

Abbreviations

BMI: body mass index (kg/m^2); CDC: Centers for Disease Control and Prevention; CI: confidence interval; zBMI: body mass index standardised for age and sex.

BACKGROUND

Population levels of overweight and obesity are a growing, major challenge throughout the world (Global Atlas on Childhood Obesity 2013; Global Obesity Observatory; WHO 2022; World Obesity Atlas 2023). The causes of this are complex: a 2007 foresight report from the UK government mapped over 100 interconnected factors, all of which contribute to the population prevalence of obesity (Government Office for Science 2007). These factors include macroeconomic drivers, biological factors, food supply and production, media, health care, built environment, transport and recreation, technology, early life experiences and education. These factors can operate differently in different people, and partially explain inequalities in childhood obesity. A good example is the relative cost of healthy food such as fruits and vegetables, which may be prohibitive for families on a low income (Power 2021).

Obesity prevalence is inextricably linked to the degree of relative social inequality. In high-income countries, a significant association has been observed between obesity and lower socioeconomic status (Ballon 2018; NHS Digital 2020). In the UK, body mass trends during childhood were associated with local area deprivation in a large UK cohort, even when controlling for family socioeconomic circumstances (Staatz 2021). In a study of children aged six to nine years living in 24 countries in the World Health Organization (WHO) European region, an inverse relationship between the prevalence of childhood overweight/obesity and parental education was found in high-income countries, whereas the opposite relationship was observed in most of the middle-income countries (Buoncristiano 2021). In low-income countries the relationship is variable, and there appears to be a shifting of the obesity burden across socioeconomic groups and different patterns by gender (Jiwani 2019; Monteiro 2004).

It is therefore critical that, in preventing obesity, we are also reducing the associated gap in health inequalities, ensuring that interventions do not inadvertently lead to more favourable outcomes in those with a more socioeconomically advantaged position in society. McNulty 2019 suggests that the preferred way of addressing health inequalities is to target the population health disparity exclusively. Where interventions are universal in nature (i.e. target the whole population), then it is important to assess whether their effectiveness varies by level of deprivation/disadvantage. Equally, there is a need to understand how to minimise obesity in more affluent groups in low-income countries. The available knowledge base includes limited evidence on which we can develop a platform for obesity prevention action and select appropriate public health interventions, whether for the whole population or for those at greatest risk of obesity (Hillier-Brown 2014).

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

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

There is evidence that downstream interventions are more likely to result in intervention-generated inequalities (Adams 2016; Hillier-Brown 2014; McGill 2015). Importantly, the most successful approach to tackling childhood obesity is to develop and implement both upstream and downstream interventions. Experts have noted, in relation to Chapter 2 of the Childhood Obesity Plan for England, that the main focus of interventions relies on self-regulation at an individual level (downstream interventions), and that an equal focus on upstream interventions is also required if a step change in tackling childhood obesity is to be realised (Griffin 2021; Knai 2018). There is also evidence that the successful implementation of a whole-school approach, such as that used in the Nutrition-Friendly Schools Initiative (WHO 2021b), is a key factor in the effectiveness of interventions to promote healthy eating for children aged 5 to 11 years. However, careful consideration should be given to how school culture can and needs to be shifted, working with schools to tailor the approach and circumnavigate staff capacity issues, and building relationships within and outside the school gates to enhance sustainability (Daly-Smith 2020; Tibbitts 2021).

Description of the condition

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

2018). Obesity in childhood can be difficult to reverse through interventions (Al-Khudairy 2017; Mead 2017).

Children with obesity have poorer psychological well-being and elevated levels of cardio-metabolic risk factors (Sommer 2018). Obesity comorbidities, including high blood pressure, high blood cholesterol and insulin insensitivity, are being observed at an increasingly early age (Freedman 1999). Childhood obesity may also cause musculoskeletal problems, obstructive sleep apnoea, asthma and a number of psychological issues (NHS 2014; Papoutsakis 2013; Paulis 2014; Rankin 2016). Childhood obesity is associated with type 2 diabetes and heart disease in adulthood and middle-age mortality (PHE 2022; Umer 2017). Obesity itself tracks through to adulthood (Simmonds 2016), strengthening the case for primary prevention. Adult obesity is associated with increased risks for heart disease, stroke, metabolic syndrome, type 2 diabetes and some cancers (Bhaskaran 2014; Yatsuya 2010).

Estimates of the economic impacts of obesity (adult and child) as a percentage of gross domestic product (GDP) range from 0.13% in Thailand (Pitayatienanan 2014) to 9.3% in the USA (Waters 2018). However, the methods used to estimate these costs vary between studies, and most studies use a health system perspective rather than a societal perspective. Recently, Okunogbe 2021 estimated current and future national economic impacts of obesity across a sample of heterogeneous contexts globally. They estimated that obesity cost between 0.8% and 2.4% of GDP in 2019 in the eight countries in their study (Australia, Brazil, India, Mexico, Saudi Arabia, South Africa, Spain and Thailand). Their projections revealed an increasing trend in obesity costs as a percentage of GDP over time, estimated to reach 2.4% of GDP in Spain and up to 4.9% in Thailand by 2060. They concluded that the economic impacts of obesity are substantial and reach a similar magnitude in low-income and middle-income countries as in high-income contexts. A separate projection for England reports that halving childhood obesity by 2030 could save the National Health Service GBP 37 billion and wider society GBP 202 billion (Hochlaf 2020).

Children aged 5 to 11 years attend primary schools in most countries. Primary school years are a key period for weight gain and are seen as a key setting for obesity prevention (NICE 2014). Most children have long-term and in-depth contact with primary schools (Clarke 2017; WHO 2021a), so they present key opportunities to undertake and observe obesity prevention behaviours. The school environment, policies, curriculum, extracurricular activities and personnel have the potential to influence children's lifestyle behaviours positively and play an important role in instilling these behaviours. However, the other environments (in real life and virtual environments) in which children live and play also provide opportunities for intervention. Growth trajectories in early life are important determinants of later adiposity. Rapid weight gain in early childhood is associated with obesity in adolescence. Also, earlier age at adiposity rebound (the lowest body mass index (BMI) reached between 4 and 7 years of age), is associated with increased adolescent and adult BMI (Lister 2023).

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

Overweight and obesity are terms used to describe an excess of adiposity (or fatness) above the ideal for good health. Obesity results from a sustained positive energy imbalance, and a variety of genetic, behavioural, cultural, environmental and economic factors have been implicated in its development (reviewed in Lobstein 2004). The interplay of these factors is complex and has been the focus of considerable research. The relationship between BMI change and BMI at baseline applies across the range of ages and for boys and girls, which together increases the variability of BMI at baseline, but much less so BMI change. Conversely, zBMI is already adjusted for age and sex, and hence the variability in baseline zBMI is much smaller. There is a positive correlation between zBMI at baseline and zBMI change, whereby higher zBMI at baseline is associated with a smaller reduction in zBMI change. This same correlation is masked with BMI, where the age-sex variability, which is broadly uncorrelated with BMI change, introduces noise and weakens the correlation between baseline and change, in the classic form of regression to the mean. The relationship between BMI and age is non-linear, and it may differ in shape between the sexes. Thus, BMI change is adjusted for BMI at baseline, age and sex introduce complex age- and sex-related patterns to the residuals, whereas zBMI is adjusted for age and sex using separate non-linear curves. For this reason, the age and sex coefficients for BMI change and zBMI change are very likely to differ in form, and one should prefer the zBMI model to the BMI model. However, in other respects, the two models are very similar, particularly in terms of the significance or non-significance of other covariates (Reilly 2010). Current expert opinion supports the use of BMI cut-off points to determine weight status (as healthy weight, overweight or obese) for children, and several standardised BMI (zBMI) cut-offs have been developed that account for the child's age and gender (Adab 2018; Bell 2018). Population monitoring of overweight and obesity is best done through use of BMI, but this measure has limitations at an individual level and, in children, zBMI is deemed to be more useful. Despite this, there is no consistent application of this methodology by experts and a variety of percentile-based methods are also used, which can make it difficult to compare randomised controlled trials (RCTs) that have used different measures and weight outcomes.

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

Description of the intervention

This review examines interventions aimed at preventing obesity, either as the primary aim of the intervention or one of the key aims of the intervention. Only those interventions that clearly aim to change and improve individual-level behaviours for dietary

intake, 'activity' levels (physical activity, sedentary behaviour and/or sleep), or both, are included in this review. For the avoidance of doubt, interventions that primarily aim to improve individual-level behaviours for fitness and sporting ability, and those that aim to promote a healthy weight by assessing the BMI of the child and then informing their parents that their child is overweight or obese, are not included in this review.

In terms of settings, included interventions may be implemented in any setting, including schools, the home, the community and healthcare settings, and any combination of these settings. We included interventions with a minimum of 12 weeks follow-up outcome data.

How the intervention might work

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

The safest and most reliable way to ensure an ideal energy balance in growing children is for the child to eat a healthy diet (low in fat and sugar) and be physically active. Most countries have age-specific recommendations for daily food and drink intakes, and physical activity levels. Most interventions that include a diet component promote a low fat or low sugar intake, or both, for example, by replacing sugary drinks with water and high fat snacks with fruit and vegetables. Examples relevant for children include replacing sugar-containing beverages with noncaloric, artificially sweetened beverages (de Ruyter 2012) or water (Sichieri 2008; Stettler 2015), changes in the content of school packed lunch (Barnes 2021) or replacement of packed lunch with school meals rich in fruit and vegetables (Damsgaard 2014). Furthermore, intervention promoting healthy nutrition has included family involvement in Community Supported Agriculture (Seguin-Fawler 2021), building school gardens (Davis 2021), school-based game play (Viggiano 2018) or telehealth dietitian consultation for families (Chai 2019).

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

The role of parents in the effectiveness of interventions that aim to prevent childhood obesity, especially for primary school-aged children, has been highlighted by Okely and Hammersley (Okely 2018), who suggest that *"a reason for the failure of interventions might be the challenge of getting traction in the environment that has arguably the greatest effect on a child's diet and physical activity —the home"*.

Why it is important to do this review

Governments internationally are being urged to take action to prevent childhood obesity and to address the underlying determinants of the condition. To provide decision makers with high-quality research evidence to inform their planning and resource allocation, this review aims to provide an update of the evidence from RCTs designed to prevent childhood obesity.

Previous work has highlighted that the current evidence base focuses mainly on individual-level interventions that are assessed via an RCT. Where possible, the totality of the evidence base should also capture studies that evaluate the effectiveness of upstream interventions (Nobles 2021), mindful of the fact that these types of interventions are not commonly assessed via an RCT because of the design challenges at scale.

There has been considerable growth in the number of studies in this field over the last five to 10 years. Importantly, many of the relatively recent studies we have identified have reported data on inequalities and new evidence that could affect the recommendations.

The burden of children with obesity was exacerbated in most countries during the COVID-19 pandemic. Indications in a number of countries show that the rising levels of childhood obesity (www.worldobesity.org/) also increased health inequalities. In some countries, particularly low-income countries, the double burden of malnutrition (obesity and undernutrition) has risen sharply during the pandemic (IFPRI 2020; Zemrani 2021). Those responsible for public health in all regions of the world, countries and local communities, are planning (and then implementing) their COVID-recovery strategies. As such, our public health policymakers' needs for cost-effective interventions to prevent childhood obesity that are scalable and feasible are more urgent than ever before. These interventions should then feed into a broader strategy that includes upstream interventions.

OBJECTIVES

Primary objectives

To assess the effects of interventions that aim to prevent obesity in children by modifying dietary intake or 'activity' levels, or a combination of both, on changes in BMI, zBMI score and serious adverse events.

- To evaluate the effects of interventions that aim to modify dietary intake on changes in zBMI score, BMI and serious adverse events among children.
- To evaluate the effects of interventions that aim to modify physical activity, sedentary behaviour, sleep, play and/or

structured exercise (collectively referred to as 'movement behaviours' in the literature and, simply, as 'activity' in this review) on changes in zBMI score, BMI and serious adverse events among children.

- To evaluate the effects of interventions that aim to modify both dietary intake and activity on changes in zBMI score, BMI and serious adverse events among children.
- To compare the effects of interventions that aim to modify dietary intake with those that aim to modify activity on changes in zBMI score, BMI and serious adverse events among children.

Secondary objectives

To collect information on factors related to health inequity and about the costs of interventions.

- To collect information to explore if, how and why the effectiveness of interventions on zBMI/BMI varies depending on factors related to health inequity, using the PROGRESS factors (O'Neill 2014).
  - **P**lace of residence
  - **R**ace/ethnicity/culture/language
  - **O**ccupation
  - **G**ender/sex
  - **R**eligion
  - **E**ducation
  - **S**ocioeconomic status
  - **S**ocial capital
- To collect information about the costs of interventions to enable use of the review as a source of information to inform economic analyses.

METHODS

Criteria for considering studies for this review

Types of studies

We included studies that:

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

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

Types of participants

We included children with a mean age of 5 years and above, but less than 12 years, at baseline. We applied this rule if an age-based subset of children from a trial including a wide range of ages was reported separately and fulfilled this criterion.

We considered studies to include eligible children if they met any one of the following criteria:

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

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

We excluded:

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

Types of interventions

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

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

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

- Digital interventions that are accessed by children on their smartphones that use interactive games to educate on the nutritional value of certain food types.

We excluded studies of:

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

Setting

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

Comparators

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

Types of outcome measures

Primary outcomes

Our primary outcomes are:

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

Studies were eligible for inclusion if BMI, zBMI or BMI percentile were measured at baseline and at a minimum of 12 weeks from baseline.

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

We included zBMI, BMI and BMI percentile results taken from either measured or self-reported weight and height data. To address the impact of using self-reported data, we conducted a sensitivity analysis (see Sensitivity analysis). Serious adverse events were assessed as number of cases in each study.

Time points

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

Secondary outcomes

There are no secondary outcomes.

Search methods for identification of studies

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

Electronic searches

For this review, studies were obtained from several different electronic searches, including updated searches from collaborators, an appended search of CENTRAL on the Cochrane Library and the inclusion of educational databases and grey literature (Appendix 2), as described below.

Hodder update searches

Searches were conducted for an interim (non-Cochrane) update of the Brown 2019 review (Hodder 2022). The Hodder 2022 review sought records published from 2018 (the date of the last full search for Brown 2019) up to 23 March 2021, and also screened the records listed as ongoing and awaiting classification studies in Brown 2019. Details of the search strategies and methods of selection of studies can be found in Hodder 2022. They included searches of the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO and trial registries.

New databases and grey literature searches

Database searches (September 2021)

We searched the following databases to update previous searches as mentioned above (see section 2.1 in Appendix 2):

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

In addition, in September 2021 we searched the following education databases from 1990 onwards, to extend our reach compared with previous versions of the Brown 2019 and Hodder 2022 reviews (see section 2.2 in Appendix 2):

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

The appended search of CENTRAL (see sections 2.3 and 2.4 in Appendix 2) included search terms for interventions around the following topics of: marketing; beverages and sweetening agents; food labelling; school meals; after/out-of-school activities; parental interventions; public health; electronic apps and web-based interventions (backdated to 1990 onwards). The decision to limit the appended search to CENTRAL only was pragmatic, as Cochrane's Centralised Search Service (CSS) uses a highly efficient search strategy to capture reports of RCTs from MEDLINE and Embase (for inclusion in CENTRAL) (Noel-Storr 2020). Also, our full rolling search (run across all databases, all years to date) includes several generic 'prevention' search strings, to capture any type of intervention.

International trial registers (September 2021)

We searched the international trial registers (ClinicalTrials.gov) and the WHO International Clinical Trials Registry Platform, search portal (ICTRP) via CENTRAL on the Cochrane Library (searched 26 September 2021; see sections 2.3 and 2.4 in Appendix 2).

Grey literature (February to March 2022)

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

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

Retractions and corrigenda (April 2022)

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

Search updates (February 2023)

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

Searches of the education databases were manually updated on 7 October 2022.

In databases where it was possible and appropriate, study design filters for randomised trials were used; in MEDLINE we used a modified version of the Cochrane Highly Sensitive Search Strategy for identifying randomised trials in MEDLINE: sensitivity- and precision-maximising version (2008 revision) (Lefebvre 2021).

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

Searching other resources

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

Data collection and analysis

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

Selection of studies

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

Data extraction and management

We modified a data collection form for study characteristics and outcome data that was used in the Brown 2019 Cochrane review of interventions to prevent obesity in children. Two review authors (FS, ET) piloted the form, then a pair of authors (from ET, FS, TM, SP, JS, CS, YG, FH, LW) extracted study characteristics and numerical data independently and in duplicate. Any disagreement was resolved through a process of discussion and, when necessary, the involvement of a third author. For studies requiring translation, we used Google Translate. One author (YG) translated studies written in Chinese. We extracted the study characteristics listed in Appendix 3.

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

Furthermore, for studies that only report outcome data as proportion of individuals with overweight/obesity (i.e. not BMI, zBMI or BMI percentile), we used the proportions to estimate mean zBMI. The estimation procedure assumes that zBMI in each study sample follows a normal distribution. We describe the methods in detail in section 4.2.1.3 of Appendix 4.

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

Assessment of risk of bias in included studies

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

We assessed risk of bias for the effect of assignment to the intervention at baseline (i.e. the 'intention-to-treat' (ITT) effect) for zBMI, BMI and BMI percentile at short-, medium- and long-term follow-up, and only for specific results that contributed to meta-analyses. For studies with multiple intervention arms, we assessed risk of bias for each specific pairwise comparison contributing to meta-analyses.

For studies identified through new searches, two authors independently used the RoB 2 tool to carry out the assessments (from ET, FS, JPTH, JS, TM). Results included in either the Brown 2019 Cochrane review or the Hodder 2022 review were assessed for risk of bias by two authors independently using the original Cochrane risk of bias tool (RoB 1) (Higgins 2011). We transformed these RoB 1 assessments into RoB 2 assessments as follows. One author (ET or FS) first completed an independent RoB 2 assessment (blind to the RoB 1 assessment). She then compared this with the previous RoB 1 assessment. Differences or uncertainties were resolved through discussion with a second review author (FS or ET) and, where necessary, by involving a third author (JPTH, JS or TM). Supporting statements for each domain judgement are reported in the Risk of bias (tables) and detailed answers to signalling questions for all outcomes are available in Figshare (doi.org/10.6084/m9.figshare.23899959).

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

Measures of treatment effect

We measured intervention effects on BMI, zBMI and BMI percentile using an unstandardised mean difference (MD) between intervention groups and computed 95% confidence intervals. Most studies reported arm-level data rather than contrast-level data. Where contrast-level data were reported, they often arose from models that were either not fully explained or involved a high level of covariate adjustment. For these reasons, we used the arm-level data (in preference to contrast-level data) to calculate mean differences in the change of zBMI/BMI/BMI percentile from baseline to post-intervention. In accordance with our prioritisation of arm-level data, we calculated mean differences from (in order of preference) (i) post-intervention means adjusted for baseline values, (ii) mean change from baseline reported in the study (change scores), (iii) change from baseline calculated from unadjusted baseline and post-intervention means. In the absence of arm-level data, we used contrast-level data if it could be interpreted as a measure of mean difference in outcome change. We provide details of these calculations in section 4.1 of Appendix 4. For serious adverse events, we intended to measure intervention effects using risk ratios where possible. For all outcomes, we sought results that most closely followed ITT principles.

Unit of analysis issues

We examined each cluster-RCT to determine whether the analysis accounted for clustering. For results that were not adjusted for clustering, we created an approximate analysis by inflating the standard error of the estimated intervention effect according to an estimated 'design effect' (Higgins 2019a). This required an estimate of the intra-cluster correlation coefficient (ICC), describing the relative variability within and between clusters. For studies that did not report an ICC, we used an external estimate based on other cluster-RCTs in the review. Given the values of ICC reported in these other trials, we chose a value of ICC = 0.02 for trials with clusters at the classroom and school level. We performed a sensitivity analysis with ICCs of 0 and 0.04. We chose not to adjust for clustering at the family level as cluster sizes were very small. We provide details of the cluster adjustment methods and choice of ICC in section 4.1.3 of Appendix 4.

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

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

Dealing with missing data

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

Assessment of heterogeneity

We assessed clinical diversity across studies by inspecting the included studies for variability in participants, intervention and setting, and methodological diversity of studies by inspecting studies for variability in risk of bias. We used the I^2 statistic to quantify the degree of inconsistency across results, supplemented by a P value from a test of homogeneity to measure the strength of evidence of statistical heterogeneity and interpreted these in line with the *Cochrane Handbook* (Deeks 2019). For each meta-analysis, we report the results of the heterogeneity assessments (I^2 and P value) alongside the measure of treatment effect.

Assessment of reporting biases

We assessed risk of bias arising from (non)reporting bias and selective reporting bias using a preliminary version of the ROB-ME (Risk of bias due to Missing Evidence) tool (Page 2020), which is based on the framework described in the *Cochrane Handbook* (Page 2019). For meta-analyses with more than 10 studies, this included examination of contour-enhanced funnel plots and the Egger test for funnel plot asymmetry (Egger 1997).

Data synthesis

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

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

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

Synthesis if data cannot be combined with meta-analysis

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

Serious adverse events

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

Subgroup analysis and investigation of heterogeneity

We explored heterogeneity in the primary analyses by performing the following pre-planned subgroup analyses for BMI, zBMI and BMI percentile at short-, medium- and long-term follow-ups according to study-level characteristics and participant-level characteristics:

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

We selected 'main setting of the intervention' for subgroup analysis because public health policymakers and commissioners need to understand where best (given their limited financial resources) to target the implementation of the interventions to prevent childhood obesity (e.g. schools or the community). We selected 'Income status of country' to provide information on the relative effectiveness of the interventions between countries of different income status given that the effect of interventions developed in high-income countries may (or may not) translate well to low-income countries due to contextual factors such as stark differences in opportunities for healthy eating and physical activity. 'Socioeconomic status' was selected given the wealth of evidence that suggests that some public health interventions can result in intervention-generated inequalities (Lorenc 2013). Finally, we selected 'duration of intervention' to assess the point (short, medium, long) at which the interventions resulted in the greatest effect size, to support public health policymakers in their decision regarding the best length of interventions to commission.

We also planned subgroup analyses according to sex; however, not enough studies presented subgroup analyses by sex.

Tests for subgroup differences were based on standard heterogeneity tests as described in Chapter 10, section 10.11.3.1 of the *Cochrane Handbook* (Deeks 2019). A P value ≤ 0.05 was used to indicate a likely difference between subgroups.

Sensitivity analysis

We performed sensitivity analyses to examine the robustness of our findings to inclusion of (i) results assessed as being at high risk of bias; and (ii) results where the outcome (BMI/zBMI/BMI percentile) has been self-reported, by repeating analyses with such results omitted. We investigated the impact of imputing ICCs in cluster-RCTs, as described in the section Unit of analysis issues.

Summary of findings and assessment of the certainty of the evidence

We prepared summary of findings tables for each of our main comparisons (i.e. dietary intervention versus control, activity interventions versus control and dietary and activity interventions versus control) using RevMan Web (RevMan Web 2022). Each summary of findings table summarises the size and certainty of effects of the interventions for BMI and zBMI at short-, medium- and long-term follow-up, and serious adverse events. We based our assessments of certainty on the five GRADE considerations (overall risk of bias, consistency of effect, imprecision, indirectness and

publication bias) and the criteria that we have used are reported in Appendix 1. We followed the methods described in the *Cochrane Handbook* (Schünemann 2019).

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

RESULTS

Description of studies

Results of the search

The study selection process is summarised in the PRISMA flowchart reported in Figure 1.

Figure 1. Study selection process. **Source from included studies, ongoing studies and studies awaiting classification.

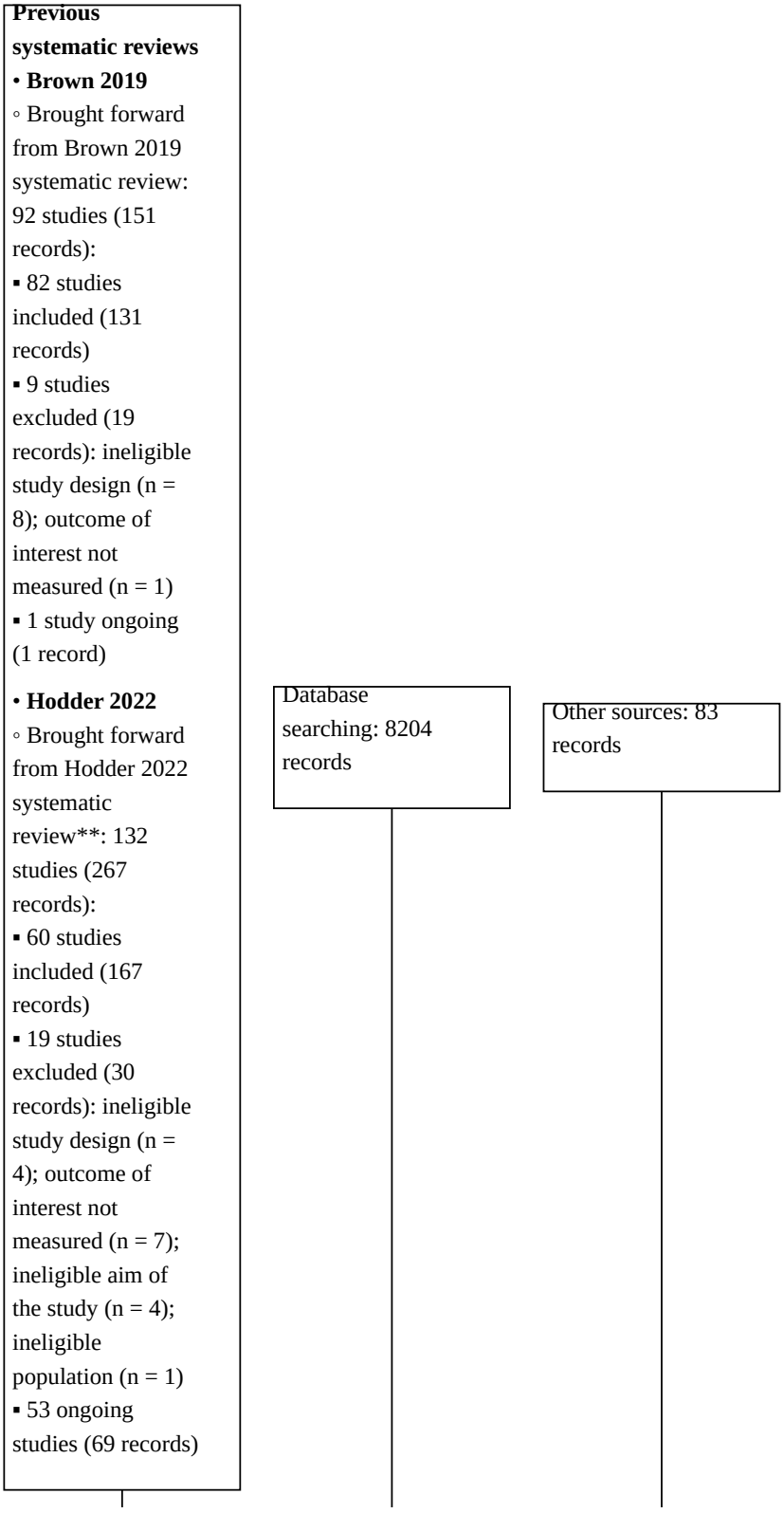


Figure 1. (Continued)

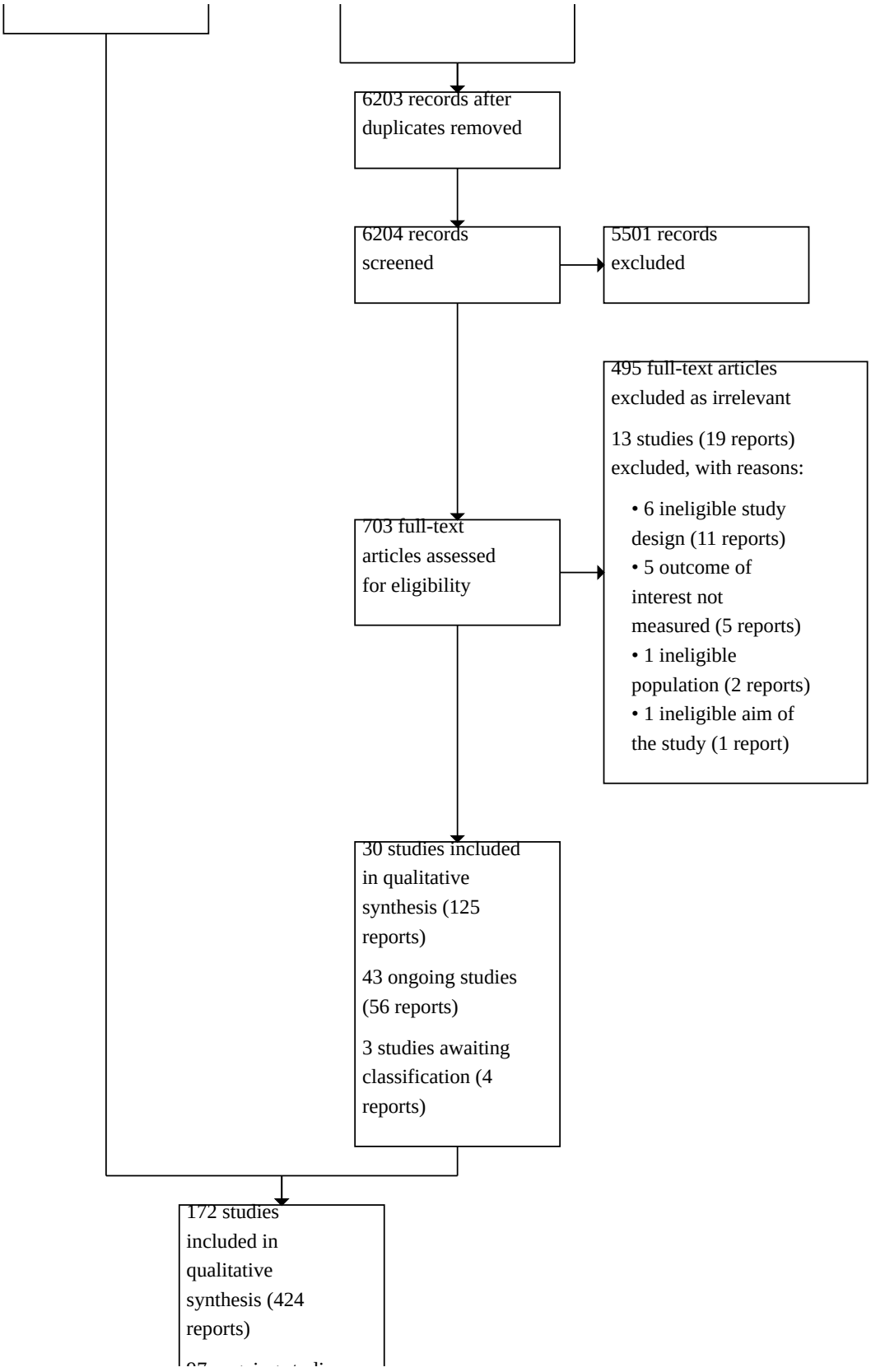
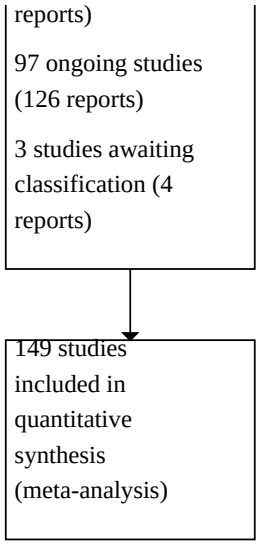


Figure 1. (Continued)



From the studies included in the previous version of this review (Brown 2019), we identified 92 age-relevant studies. Of these, we included 82, excluded nine (which did not meet methodological eligibility criteria) and identified one ongoing study. From the update searches from Hodder 2022, we identified 132 age-relevant studies. We included 60 of these, excluded 19 and identified 53 ongoing studies.

From our new searches, we identified 8204 records from our electronic searches and 82 from searching other sources. After deduplication, two review authors screened 6203 records by title and abstract and excluded 5501. We assessed 702 full-text reports and excluded 495 as irrelevant; 68 (42 studies) are listed in Characteristics of excluded studies. We included 30 studies, listed three as awaiting classification and identified 43 as ongoing. We combined these with the studies included in the previous version, such that this review includes 172 studies, and identified three studies as awaiting classification and 97 ongoing studies.

Included studies

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

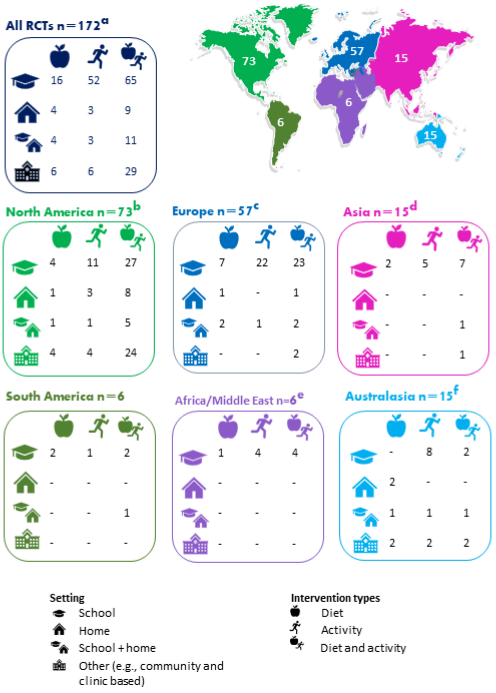
Study design

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

Study setting

Details of the study setting in the included studies can be found in Characteristics of included studies. Most studies were conducted in North America (n = 73, 42%), with most of these in the USA (n = 65; 38%); the remainder were conducted in Europe (n = 57, 33%), with 15 being conducted in the United Kingdom (9%); Australasia (n = 15, 9%); Asia (n = 15, 9%); South America (n = 6, 3%); the Middle East and North Africa (n = 6, 3%) (Figure 2). Based on the World Bank classification of countries by income, most studies were conducted in high-income countries (n = 146; 85%), 23 studies (13%) in upper-middle income countries, and three studies (2%) were conducted in lower-middle-income countries.

Figure 2. Distribution of studies by location, type of intervention and setting. [a]Total n = 172 RCTs (n = 208 active intervention arms) were conducted worldwide; eight RCTs included treatment arms for more than one intervention type; 17 RCTs included more than one treatment arm for the same intervention type. [b]Totaln = 73 RCTs (n = 93 active intervention arms) were conducted in North America; five RCTs included treatment arms for more than one intervention type (Ickovics 2019; Robinson 2003; Robinson 2010; Stettler 2015; van de Berg 2020); 11 RCTs included more than one treatment arm for the same intervention type (Beech 2003; Branscum 2013; Crespo 2012; Epstein 2001; Hannon 2018; Muzaffar 2019; Razani 2018; Safdie 2013; Tanskey 2017; Topham 2021; Williamson 2012). [c]Totaln = 57 RCTs (n = 61 active intervention arms) were conducted in Europe; one RCT included treatment arms for more than one intervention type (Warren 2003); two RCTS included more than one treatment arm for the same intervention type (Paineau 2008; Tessier 2008). [d]Totaln = 15 RCTs (n = 16 active intervention arms) were conducted in Asia; one RCT included treatment arms for more than one intervention type (Meng 2013 (Beijing)). [e]Totaln = 6 RCTs (n = 9 active intervention arms) were conducted in Africa and the Middle East; one RCT included more than one treatment arm for the same intervention type (Muller 2019). [f]Totaln = 15 RCTs (n = 21 active intervention arms) were conducted in Australasia; one RCT included treatment arms for more than one intervention type (Barnes 2021). Three RCTs included more than one treatment arm for the same intervention type (Chai 2019; Salmon 2008; Salmon 2022). Abbreviations: RCT: randomised controlled trial



Participants

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

In most of the studies, the participants were a mix of genders (150 studies; 87%); 13 (8%) studies were conducted only in girls, and three (2%) only in boys, and in six studies (3%) there was no information. Fifty-five studies (32%) specifically target disadvantaged children and/or families in a particular setting (e.g. school/community/area) or a school or community within a disadvantaged area. In most studies (n = 159, 92 %), participants were selected from the general population. In 13 studies (8%) participants from a specific subset of the population were selected: six studies only recruited participants at risk of developing overweight or obesity (based on their baseline weight status, or for having a parent that was with overweight or obesity); one study recruited participants among Hispanic immigrant families (study set in the USA); one study recruited children with at least one parent born in another country or children that were spoken to in a different language from that spoken in their home country in the first three years of life; one study recruited children from two different sociocultural and linguistic regions in Switzerland with a high proportion of migrant population; one study recruited participants at risk of chronic disease; one study recruited children considered as sedentary and moderate active; one study recruited healthy children aged 4 to 6 years, daily consumers of ≥ 1 serving of whole-fat dairy, with > 70% of their dairy consumed or prepared at home. In 76 studies (44%), children with physical disabilities were excluded and in 58 studies (34%), children with mental disabilities were excluded.

Interventions

Details of the interventions in the included studies can be found in Characteristics of included studies and Table 2.

Theory

In 90 studies (52%), the intervention was reported to be based on one or more theories, the most common being the Social Cognitive Theory (n = 49, 28%) and the Social Ecologic Model (n = 18, 10%).

Type of intervention and comparison

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

Most studies (n = 164, 95%) compared a dietary, activity and/or a combined dietary and activity intervention with a control group (dietary versus control: n = 28, 17%; activity versus control: n = 50, 30.5%; dietary and activity versus control: n = 96, 58.5%; Figure 2). Note that some of the multi-arm studies conducted more than one comparison. One of the three-arm studies compared both a dietary intervention and an activity intervention with a control group. The other three-arm study compared both a dietary and activity intervention and a dietary intervention with a control group. All of the four-arm studies compared dietary intervention, activity intervention and dietary and an activity intervention with a control group. Eight studies reported head-to-head comparisons: six compared an activity intervention with a dietary and activity intervention; five compared an activity intervention with a dietary intervention, and five compared a dietary intervention with a dietary and activity intervention. In six studies, the comparison was between two versions of the same type of intervention: four compared two combined dietary and activity interventions, and two compared two activity interventions.

Duration

The majority of the interventions were implemented for less than nine months (n = 86, 50%), 47 interventions (27%) were implemented for a period between nine and less than 15 months and 39 interventions (23%) were implemented for 15 or more months. Note that in one multi-arm study, two arms received the intervention for nine months and one arm received it for five to six months (Barnes 2021). In this case, the intervention duration was coded as short. The shortest intervention was a 5- to 10-minute counselling session during an initial dental visit and the longest was conducted for four years.

Setting

In most studies, interventions were conducted in schools (n = 111, 64.5%); others were conducted in the community (n = 15, 9%), in the home (n = 8, 5%), in a clinical setting (n = 6, 3.5%) or by telehealth (n = 1, 0.6%). Some studies reported interventions that were conducted in more than one setting (n = 31, 18%). In 14 studies (98%), the interventions were exclusively or substantially online/digital interventions. Three interventions (2%) were delivered as telehealth (entirely or in combination with another setting). For the purpose of meta-analyses, we classified studies into the following subgroups according to the main setting of the intervention (i.e. the setting where most of the intervention was carried out): school (n = 115, 67%), home (n = 13, 8%), school + home (n = 11, 6%), other (n = 33, 19%) (Figure 2).

Amongst the 28 studies in which dietary interventions were implemented, in six (21%) the intervention included a home activity (note that in three of these the intervention was partially set at home); in six studies (21%) the intervention was experienced by the children individually, in 15 studies (54%) it was experienced as a group and in seven studies (25%) it was experienced both individually and as a group. In only two studies (7%) the intervention was delivered electronically (either exclusively or significantly) and in four studies (14%) there was a minor component that was delivered electronically.

Amongst the 54 studies in which dietary interventions were implemented, in 10 (19%) the intervention included a home activity (note that in only three of these the intervention was partially set at home); in four studies (7%) the intervention was experienced by the children individually, in 40 studies (74%) it was experienced as a group and in 10 studies (19%) it was experienced both individually and as a group. In only two studies (4%) the intervention was delivered electronically (either exclusively or significantly) and in three studies (6%) there was a minor component that was delivered electronically.

Amongst the 100 studies in which combined dietary and activity interventions were implemented, in over half (57, 57%) the intervention included a home activity (note that only in 15 of these the intervention was set at home, either exclusively or partially); in 13 studies (13%) the intervention was experienced by the children individually, in 50 studies (50%) it was experienced as a group and in 37 studies (37%) it was experienced both individually and as a group. In only 10 studies (10%) the intervention was delivered electronically (either exclusively or significantly) and in nine studies (9%) there was a minor component that was delivered electronically.

Complexity and mechanism

Amongst the 28 studies in which dietary interventions were implemented, most of the studies (16, 57%) delivered multicomponent interventions (i.e. included three or more components). In 13 studies (46%) the intervention had an explicit component of modifying the child's behaviour, in 21 studies (75%) the intervention had an explicit component that provided education or information for the child, in 21 studies (75%) the intervention had an explicit component aiming to change the social environment of the child and in 10 studies (36%) the intervention had an explicit component aiming to change the physical environment of the child.

Amongst the 54 studies in which dietary interventions were implemented, only less than half of the studies (21, 39%) delivered multicomponent interventions. In 44 studies (81%) the intervention had an explicit component of modifying the child's behaviour, in 17 studies (31%) the intervention had an explicit component that provided education or information for the child, in 29 studies (54%) the intervention had an explicit component aiming to change the social environment of the child and in 20 studies (37%) the intervention had an explicit component aiming to change the physical environment of the child.

Amongst the 100 studies in which combined dietary and activity interventions were implemented, the majority of the studies (84, 84%) delivered multicomponent interventions. In most of the studies (77, 77%) the intervention had an explicit component of modifying the child's behaviour, in 91 studies (91%) the intervention had an explicit component that provided education or information for the child, in 86 studies (86%) the intervention had an explicit component aiming to change the social environment of the child and in only 32 studies (32%) the intervention had an explicit component aiming to change the physical environment of the child.

Comparators

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

Outcomes

Details of all outcomes reported in the included studies can be found in Characteristics of included studies and Table 1; Table 2; Table 3; Table 4; Table 5. The most common measures of adiposity reported were BMI (n = 109, 63%), zBMI (n = 96, 56%) and BMI percentile (n = 26, 15%). Some studies reported only the proportion of children who were with overweight or obesity (n = 11, 6%) and one study (1%) reported only the proportion of children who were with obesity Three studies (2%) reported adiposity data in other formats that were not eligible for inclusion in the meta-analyses. Thirty-six studies (21%) reported data on serious adverse events (Table 3), seven (4%) reported data on observed serious adverse events (e.g. injuries and other illness) that were related to participation in the study and one study reported one mortality case, however it is not reported whether this was related to the intervention.

Funding sources

Details of funding sources reported in the included studies can be found in Characteristics of included studies. The majority of the studies declared non-industry funding such as funding from not-for-profit charitable organisations and government institutes (n = 132, 77%). Twenty studies (12%) described mixed funding from both industry and not-for-profit organisations, four studies (2%) were funded wholly by industry, two studies (1%) declared that no funding was received and 14 studies (8%) did not report any details on funding. Mixed- and industry-funded studies received sponsorship from food suppliers (n = 13), pharmaceutical industry (n = 6), private healthcare services (n = 3), coal industry (n = 1), the manufacturer of the intervention video games (n = 1), a home improvement retail corporation (n = 1) and the manufacturer of the stand-up desks used in the study (n = 1). Sixty-two studies (36%) declared that both research and writing of the trial reports had been done independently from the funders. Two studies (1%) reported evidence that writing and research may not have been independent from the funding: one study reported that several of the authors were employed by the sponsor to create the programme or to conduct the research or consulted with the institute on the design or analysis; one other study reported that one of the sponsors participated in the study design.

Implementation factors

Economic information

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

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

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

Equity and disadvantage – PROGRESS characteristics

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

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

It is important to note here that the preferred way of addressing health disparities/inequalities, as suggested by McNulty 2019, is to target the population at risk of disparity exclusively, e.g. by intervening in a school or community with significant health disparities/inequalities. In this type of population, all adolescents in the study would be at high risk for a health disparity. In this Cochrane review, we did not consider studies where the entire sample was at risk of health disparity, we considered only those with subgroup analysis based on disparity. Further analysis of these individual studies, for example using the approach suggested by McNulty et al, would provide a more comprehensive assessment of the impact of such interventions on health disparities/inequalities.

Studies awaiting classification and ongoing

Three of the identified studies are awaiting classification and details are reported in Characteristics of studies awaiting classification. In one study, it was unclear whether the mean age of the participants was over five years, and thus eligible for inclusion in our review, and we were unable to obtain such information from the authors (Larruy-Garcia 2022). One study awaits translation (Widhalm 2022). One study was identified from searching other sources while the review was under peer-review revision (Kornilaki 2022). This study contains data that are eligible for inclusion in meta-analyses, and it will be incorporated in future updates. We identified 97 potential ongoing studies (126 records) from trial registers, conference abstracts and published protocols and papers, and details are reported in Characteristics of ongoing studies. The papers of these studies, which include BMI outcomes, when published if currently ongoing, will need to be reviewed to assess whether they fully meet the inclusion criteria of this review, before being included in future updates.

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

The type of intervention was dietary in 22 studies (23%), activity in 14 (14%) and dietary and activity in 54 studies (56%); four studies (4%) had multiple arms and reported on more than one type of intervention, and in three studies the type of intervention is unclear. In 16 of the ongoing studies (16%), the interventions were mainly online/digital interventions, which is a higher percentage compared with the included studies (n = 14, 8%). The main setting of these studies was school in 49 studies, home in 12 studies and community (some in primary care, church and after-school clubs) in 31 studies. The setting was mixed in five studies.

We note that many of the ongoing studies listed here were expected to complete data collection over two years ago, and some of these were conducted over 10 years ago. From the information in their trial registration and/or protocols, they intended to report (primary or secondary outcomes) on change in BMI (or other weight status) and for some of these studies, results of other outcomes or process evaluations have been published. We understand that the COVID pandemic may have impacted on planned intervention delivery and data collection, and on the authors' capacity to write up study findings for publication.

Excluded studies

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

than three per group); six studies due to outcome of interest not being measured (Braun 2016; Braun 2019; NCT00061165 2003; NCT03469752 2018; NCT03479658 2018; NCT03885115 2019); one study due to ineligible population (NCT01845480 2013; the study targeted children living with overweight and obesity); one study due to ineligible aim of the intervention (i.e. to improve parents' recognition of their child's weight status) (Parkinson 2015).

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

Risk of bias in included studies

Traffic light plots of the RoB 2 assessments (domain-level judgements and overall) for each individual result are reported alongside each study result in the relevant forest plots and in the Risk of bias (tables). Since each of the 149 studies may have contributed to more than one meta-analysis, we assessed the risk of bias in 264 results. Overall, we judged 13 results (5%) as 'Low' risk of bias, 147 (56%) as 'Some concerns' and 105 (39%) as 'High' risk of bias. Most judgements of high risk of bias were due to missing outcome data (n = 67, 25%) and randomisation (and time of recruitment in cluster-RCTs; n = 55, 21%). Supporting statements for each domain judgement are reported in the Risk of bias (tables) and detailed answers to signalling questions for all outcomes are available in Figshare (doi.org/10.6084/m9.figshare.23899959).

Results of our assessments using the preliminary ROB-ME tool for risk of bias due to missing evidence are presented in Table 7. We judged 39 meta-analyses as 'Some concerns' due to potential for missing studies that are likely to have eligible results (traditional publication bias). Twenty-eight of these meta-analyses had no missing results in the included studies; in 11 meta-analyses, results were missing from the included studies, but we judged that the synthesised effect estimate would be unlikely to be impacted by missing results. We judged four meta-analyses at 'High' risk of bias due to results being missing from the included studies that had the potential to impact on the synthesised effect estimate.

Effects of interventions

See: **Summary of findings 1** Dietary interventions versus control; **Summary of findings 2** Activity interventions versus control; **Summary of findings 3** Dietary and activity interventions versus control

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

Overview of evidence

We present the results by comparison, and within that by outcome, and within that by time point (short-, medium- or long-term as defined in the Types of outcome measures section in the Methods). Of the 172 studies included in this review, 149 studies (87%) were included in meta-analyses. Among these, 98 reported BMI, 90 reported zBMI, 22 reported BMI percentile and 10 reported the proportion of children living with obesity or overweight (from which we derived zBMI if the sample size was over 100). For each outcome, we provide a summary forest plot presenting the results for all comparisons and all three time points. Forest plots displaying results of individual studies can be found in each comparison section. We focus on findings for average effects across studies within each subset. Importantly, heterogeneity was generally high across the analyses. We present findings from our pre-specified subgroup analyses and note that heterogeneity was generally not well explained by subgrouping factors.

Details of the 23 included studies not contributing to meta-analyses, and reasons why they did not contribute, are reported in Table 6. In three studies (2%), the results were reported narratively and in 11 studies (6%), the results reported were not usable for inclusion in the meta-analyses. We present findings from these studies alongside the meta-analysis results. In a further two studies (1%), outcomes were measured at follow-up, but results are not reported, and in two studies (1%), measurement of the outcome(s) at eligible follow-up(s) was planned (e.g. listed in the trial registry and/or study protocol) but results are not reported (and we found no evidence that it was measured). In five studies (3%), the comparison was not eligible for inclusion in the meta-analysis (i.e. the comparison was between two versions of the same type of intervention). In addition to the excluded studies, we also report that evidence was missing for some time points from seven included studies (4%).

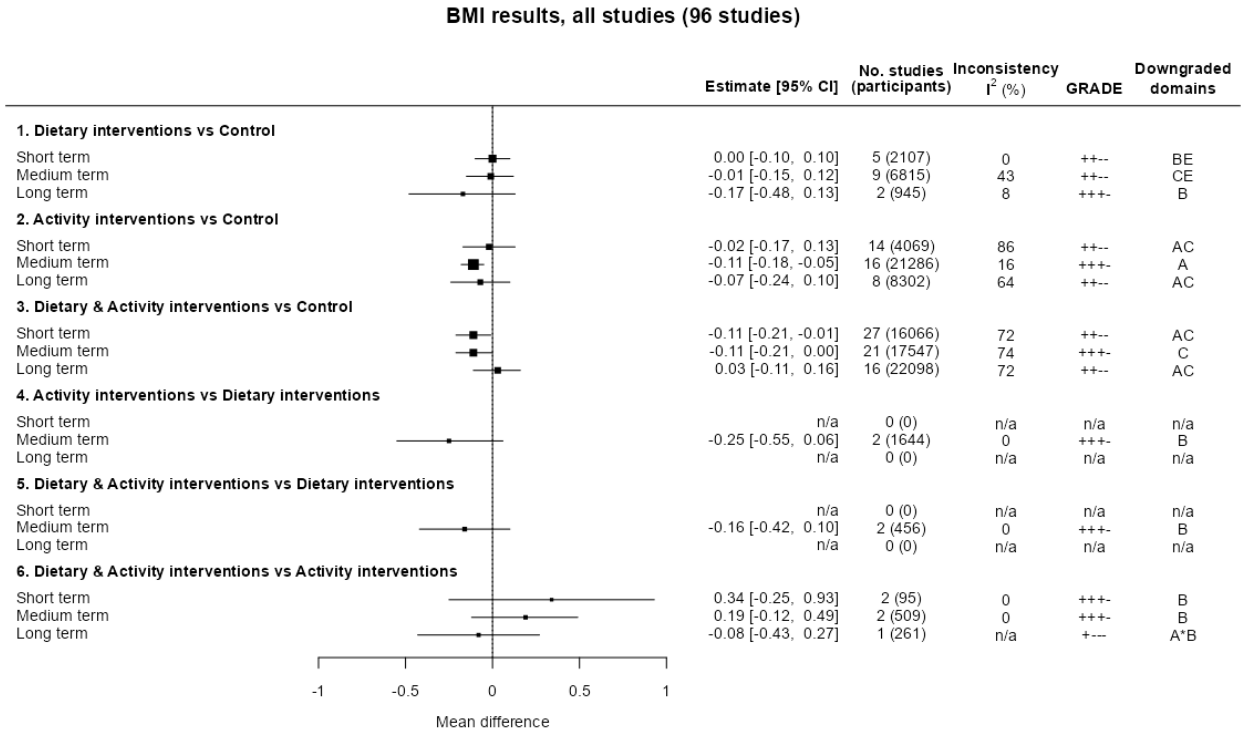
Dietary interventions versus control

We found 28 studies (42,473 participants) that compared dietary interventions versus control and of these 24 studies (20,410 participants) were included in meta-analyses.

BMI

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

Figure 3. Summary of meta-analysis results for BMI. Certainty of the evidence (GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low. GRADE domains: A = risk of bias; B = imprecision; C = inconsistency; D = indirectness; E = publication bias. *Downgraded two levels. *Abbreviations* BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus



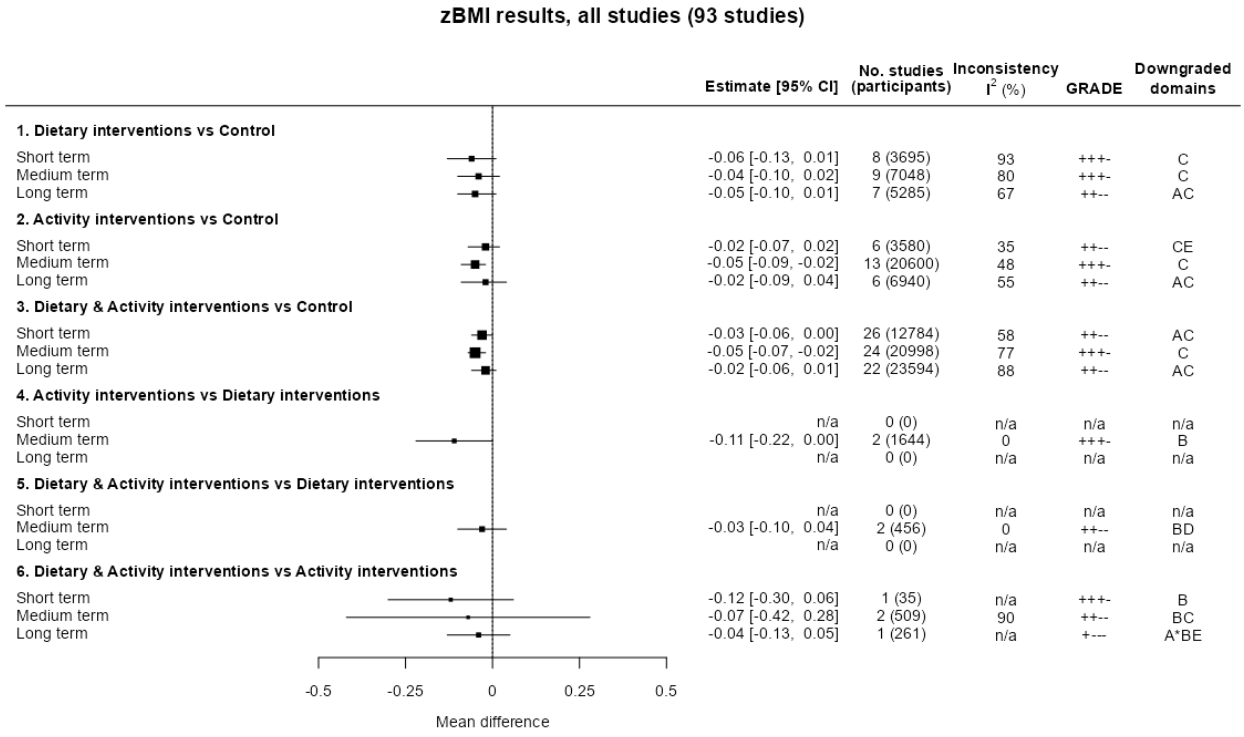
Narrative data

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

zBMI

Meta-analyses results for zBMI are reported in Figure 4. We found that dietary interventions compared with control, probably have little to no effect on zBMI at short-term follow-up (MD -0.06, 95% CI -0.13 to 0.01; I^2 = 93%; P < 0.00001; 8 studies, 3695 participants; moderate-certainty evidence; Analysis 1.4) or medium-term follow-up (MD -0.04, 95% CI -0.10 to 0.02; I^2 = 80%; P < 0.00001; 9 studies, 7048 participants; moderate-certainty evidence; Analysis 1.5). Furthermore, the evidence suggests that dietary interventions compared with control may have little to no effect on zBMI at long-term follow-up (MD -0.05, 95% CI -0.10 to 0.01; I^2 = 67%; P = 0.006; 7 studies, 5285 participants; low-certainty evidence; Analysis 1.6). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6).

Figure 4. Summary of meta-analysis results for zBMI. Certainty of the evidence (GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low. GRADE domains: A = risk of bias; B = imprecision; C = inconsistency; D = indirectness; E = publication bias. *Downgraded two levels. *Abbreviations* CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index



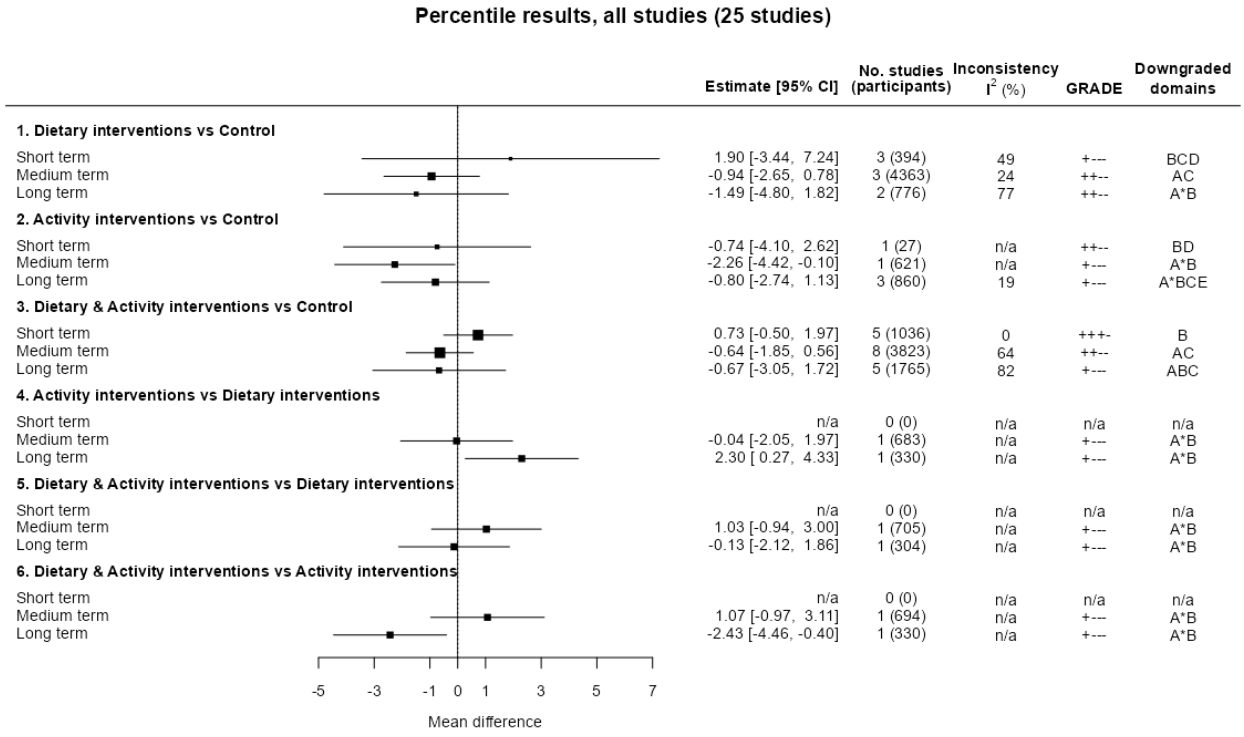
Narrative data

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

BMI percentile

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

Figure 5. Summary of meta-analyses results for BMI percentile. Certainty of the evidence (GRADE): ++++ = high; +++- = moderate; ++-- = low; +--- = very low. GRADE domains: A = risk of bias; B = imprecision; C = inconsistency; D = indirectness; E = publication bias. *Downgraded two levels. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus



Serious adverse events

Details of serious adverse events are reported in Table 3. Five studies (1913 participants) reported data on serious adverse events (very low-certainty evidence; de Ruyter 2012; Fulkerson 2015; Ickovics 2019; NCT00224887 2005; Nicholl 2021), and of these only one study reported serious adverse events that may have occurred as a result of the intervention (de Ruyter 2012). Children were provided with one can per day of a noncaloric, artificially sweetened, non-carbonated beverage or a sugar-containing non-carbonated beverage. The reported severe adverse events included headache (none in intervention, 1% of the participants in the control group), allergy (1% in both the intervention and control group), behavioural problems (1% in the intervention and 0.5% in the control group) and abdominal discomfort (2% in both the intervention and the control group). Adverse events were reported by 21 non-completers as a reason to stop drinking the beverages and by seven children who completed the study. In the other four studies that reported data on serious adverse events, none were recorded (Ickovics 2019; NCT00224887 2005; Nicholl 2021).

Activity interventions versus control

We found 50 studies (44,020 participants) that compared activity interventions versus control and of these 43 studies (42,615 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. The evidence suggests that activity interventions on average, compared with control, may have little to no effect on BMI at short-term follow-up (MD -0.02, 95% CI -0.17 to 0.13; I^2 = 86%; P < 0.00001; 14 studies, 4069 participants; low-certainty evidence; Analysis 2.1) or at long-term follow-up (MD -0.07, 95% CI -0.24 to 0.10; I^2 = 64%; P = 0.007; 8 studies, 8302 participants; low-certainty evidence; Analysis 2.3). In contrast, activity interventions likely result in a slight reduction of BMI at medium-term follow-up (MD -0.11, 95% CI -0.18 to -0.05; I^2 = 16%; P = 0.27; 16 studies, 21,286 participants; moderate-certainty evidence; Analysis 2.2). Of the 16 studies included in the meta-analysis, six were at high risk of bias. Sensitivity analysis removing studies at high risk of bias did not materially change the results of the meta-analyses (Appendix 6), and funnel plots of BMI results at short- and medium-term follow-up did not show evidence of small-study effects (Appendix 7).

Narrative data

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

zBMI

Meta-analyses results for zBMI are reported in Figure 4. The findings reflect those for BMI. The evidence suggests that activity interventions, when compared with control, may have little to no effect on zBMI at short-term follow-up (MD -0.02, 95% CI -0.07 to 0.02; I^2 = 35%; P = 0.17; 6 studies, 3580 participants; low-certainty evidence; Analysis 2.4) or long-term follow-up (MD -0.02, 95% CI -0.09 to 0.04; I^2 = 55%; P = 0.05; 6 studies, 6940 participants; low-certainty evidence; Analysis 2.6). In contrast, we found that activity interventions, when compared with control, likely result in a slight reduction in zBMI at medium-term follow-up (MD -0.05, 95% CI -0.09 to -0.02; I^2 = 48%; P = 0.03; 13 studies, 20,600 participants; moderate-certainty evidence; Analysis 2.5). Of the 13 studies included in the meta-analysis, five were at high risk of bias. Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analyses (Appendix 6), and a funnel plot of zBMI at medium-term follow-up did not show evidence of small-study effects (Appendix 7).

Narrative data

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

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. The evidence suggests that activity interventions, when compared with control, do not reduce BMI percentile at short-term follow-up (MD -0.74, 95% CI -4.1 to 2.62; 1 study, 27 participants; low-certainty evidence; Analysis 2.7). Furthermore, we found that activity interventions do not reduce BMI percentile at long-term follow-up (MD -0.8, 95% CI -2.74 to 1.13; I^2 = 19%; P = 0.29; 3 studies, 860 participants; very low-certainty evidence; Analysis 2.9), but the evidence is very uncertain. In contrast, we found that activity interventions, when compared with control, may reduce BMI percentile at medium-term follow-up, but the evidence is very uncertain (MD -2.26, 95% CI -4.42 to -0.10; 1 study, 621 participants; very low-certainty evidence; Analysis 2.8). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analysis (Appendix 6).

Narrative data

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

Serious adverse events

Details of serious adverse events are reported in Table 3. Eleven studies (21,278 participants) reported data on serious adverse events (low-certainty evidence; Breheny 2020; Ickovics 2019; Jones 2015; Ketelhut 2022; Martinez-Vizcaino 2014; Martinez-Vizcaino 2020; Martinez-Vizcaino 2022; Muller 2019; Wang 2018; Wendel 2016; Yin 2012). Of these, two studies reported the occurrence of serious adverse events: Martinez-Vizcaino 2014 reported that dizziness during baseline venipuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of the study. No other adverse events were reported by students during the health examinations. Two minor ankle sprains occurred during the sessions of the programme (nine months incidence risk: 0.4 %). Yin 2012 reported that the incident rate of adverse events (e.g. musculoskeletal injuries) was 0.03 in Year 1 (20 mild; 3 moderate; 1 severe); 0.02 in Year 2 (4 mild; 6 moderate; 2 severe); and 0.01 in Year 3 (5 mild; 2 severe). In the other nine studies that reported data on serious adverse events, none were recorded (Breheny 2020; Ickovics 2019; Jones 2015; Ketelhut 2022; Martinez-Vizcaino 2020; Martinez-Vizcaino 2022; Muller 2019; Wang 2018; Wendel 2016).

Dietary and activity interventions versus control

We found 96 studies (109,268 participants) that compared combined dietary activity interventions versus control and, of these, 88 studies (104,663 participants) were included in meta-analyses.

BMI

Meta-analyses results for BMI are reported in Figure 3. We found that dietary and activity interventions on average, when compared with control, may result in a slight reduction in BMI at short-term follow-up (MD -0.11, 95% CI -0.21 to -0.01; I^2 = 72%; P < 0.00001; 27 studies, 16,066 participants; low-certainty evidence; Analysis 3.1). Of the 27 studies included in the meta-analysis, 12 were at high risk of bias. We also found that dietary and activity interventions, compared with control, likely result in a reduction of BMI at medium-term follow-up (MD -0.11, 95% CI -0.21 to 0.00; I^2 = 74%; P < 0.00001; 21 studies, 17,547 participants; moderate-certainty evidence; Analysis 3.2). Of the 21 studies included, six were at high risk of bias. In contrast, the evidence suggests that dietary and activity interventions on average, compared with control, may result in little to no difference in BMI at long-term follow-up (MD 0.03, 95% CI -0.11 to 0.16; I^2 = 72%; P < 0.00001; 16 studies, 22,098 participants; low-certainty evidence; Analysis 3.3). Sensitivity analysis removing studies at high risk of bias resulted in loss of evidence for a beneficial effect on BMI in the short term (MD -0.07, 95% CI -0.21 to 0.07; 15 studies, 8788 participants) and medium term (MD -0.07, 95% CI -0.19 to 0.06; 15 studies, 14,183 participants), but did not change the overall results of the meta-analysis for BMI measured at the long-term follow-up (Appendix 6). Funnel plots did not show evidence of small-study effects at any of the follow-up times (Appendix 7).

Narrative data

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

zBMI

Meta-analyses results for zBMI are reported in Figure 4. The evidence suggests that dietary and activity interventions, when compared with control, result in a slight reduction in zBMI at short-term follow-up (MD -0.03, 95% CI -0.06 to 0.00; I^2 = 58%; P = 0.0001; 26 studies, 12,784 participants; low-certainty evidence; Analysis 3.4). Furthermore, dietary and activity interventions likely result in reduction of zBMI at medium-term follow-up (MD -0.05, 95% CI -0.07 to -0.02; I^2 = 77%; P < 0.00001; 24 studies, 20,998 participants; moderate-certainty evidence; Analysis 3.5). Of the 24 studies included in the meta-analysis, six were at high risk of bias. In contrast, the evidence suggests that dietary and activity interventions, when compared with control, may result in little to no difference in zBMI at long-term follow-up (MD -0.02, 95% CI -0.06 to 0.01; I^2 = 88%; P < 0.00001; 22 studies, 23,594 participants; low-certainty evidence; Analysis 3.6). Sensitivity analysis removing studies at high risk of bias did not change the overall results of the meta-analysis (Appendix 6), and funnel plots did not show evidence of small-study effects based on visual inspection and tests for asymmetry (Appendix 7).

Narrative data

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

BMI percentile

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

Serious adverse events

Details of serious adverse events are reported in Table 3. Nineteen studies (27,882 participants) reported data on serious adverse events (low-certainty evidence; Adab 2018; Beech 2003; Caballero 2003; Carlin 2021; Fulkerson 2022; Gortmaker 1999; Griffin 2019; HEALTHY Study Group 2010; Ickovics 2019; Kubik 2021; Li 2019; Liu 2019; Marcus 2009; NCT02067728 2014; Puder 2011; Ramirez-Rivera 2021; Sahota 2019; Williamson 2012; Xu 2015). Of these, four studies reported the occurrence of serious adverse events. In Beech 2003, few adverse events and injuries were reported among the pilot study participants in Memphis. During the 12-week intervention, injuries were reported by two girls (11%) in the comparison group, and one girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by one girl (5.5%) in the comparison group, and two girls (9.5%) in the parent-targeted group. The authors reported that none of the above adverse events were judged by the co-ordinating centre to be related to study participation, but the centre deemed two of the injuries to be possibly related to participation in the intervention. They also reported that an elevated cholesterol value was reported for one participant and notification was made to the

family. In Fulkerson 2022, all-cause mortality was reported for 0.9% of the participants in the intervention group, but it is not reported whether this was related to the intervention received (reported in the trial registration results section); no other serious adverse events were reported. In Gortmaker 1999 and HEALTHY Study Group 2010, low levels of extreme dieting behaviour were observed in both the intervention and control groups. In the other 15 studies that reported data on serious adverse events, none were recorded (Adab 2018; Caballero 2003; Carlin 2021; Griffin 2019; Ickovics 2019; Kubik 2021; Li 2019; Liu 2019; Marcus 2009; NCT02067728 2014; Puder 2011; Ramirez-Rivera 2021; Sahota 2019; Williamson 2012; Xu 2015).

Activity interventions versus dietary interventions

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

BMI

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

zBMI

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

Narrative data

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

BMI percentile

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

Serious adverse events

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

Dietary and activity interventions versus dietary interventions

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

BMI

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

zBMI

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

Narrative data

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

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found that dietary and activity interventions when compared with dietary interventions have little to no effect on BMI percentile at medium-term follow-up (MD 1.03, 95% CI -0.94 to 3.00; 1 study, 705 participants; very low-certainty evidence; Analysis 5.3) and do not reduce BMI percentile at long-term follow-up (MD -0.13, 95% CI -2.12 to 1.86; 1 study, 304 participants; very low-certainty evidence; Analysis 5.4), but the evidence is very uncertain. We found no studies reporting BMI percentile at short-term follow-up.

Serious adverse events

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

Dietary and activity interventions versus activity interventions

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

BMI

Meta-analyses results for BMI are reported in Figure 3. We found that dietary and activity interventions, when compared with activity interventions, likely do not reduce BMI at short-term follow-up (MD 0.34, 95% CI -0.25 to 0.93; I^2 = 0%; P = 0.7; 2 studies, 95 participants; moderate-certainty evidence; Analysis 6.1) or medium-term follow-up (MD 0.19, 95% CI -0.12 to 0.49; I^2 = 0%; P = 0.96; 2 studies, 509 participants; moderate-certainty evidence; Analysis 6.2). Furthermore, we found that dietary and activity interventions, when compared with activity interventions, have little to no effect on BMI at long-term follow-up, but the evidence is very uncertain (MD -0.08, 95% CI -0.43 to 0.27; 1 study, 261 participants; very low-certainty evidence; Analysis 6.3).

zBMI

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

Narrative data

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

BMI percentile

Meta-analyses results for BMI percentile are reported in Figure 5. We found that dietary and activity interventions, when compared with activity interventions, have little to no effect on BMI percentile at medium-term follow-up (MD 1.07, 95% CI -0.97 to 3.11; 1 study, 694 participants; very low-certainty evidence; Analysis 6.7), but the evidence is very uncertain. In contrast, we found that dietary and activity interventions, when compared with activity interventions, may reduce BMI percentile at long-term follow-up, but the evidence is very uncertain (MD -2.43, 95% CI -4.46 to -0.4; 1 study, 330 participants; very low-certainty evidence; Analysis 6.8). We found no studies reporting BMI percentile at short-term follow-up.

Serious adverse events

Details of serious adverse events are reported in Table 3. Three studies (1078 participants) reported data on severe adverse events (Ickovics 2019; Robinson 2003; Robinson 2010). Of these, in only one study injuries were reported by two girls (7.4%) in the treatment group, and three girls (9.1%) in the active control group (Robinson 2003). Other adverse events (problems requiring a visit to a medical care provider) were reported by four girls (14.8%) in the treatment group, and six girls (18.2%) in the active control group. One injury in the treatment group was judged to be related to participation in the study (a broken finger). All other injuries and other adverse events in both groups were judged to be unrelated to study participation. In the other two studies that reported data on serious adverse events, none were recorded (Ickovics 2019; Robinson 2010).

Dietary interventions versus dietary interventions

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

Activity intervention versus activity intervention

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

BMI

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

We found no studies reporting zBMI or BMI percentile.

Serious adverse events

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

Dietary and activity intervention versus dietary and activity intervention

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

zBMI

One study, Epstein 2001, measured zBMI at short- and medium-term follow-up. The study compared two interventions that included the same physical activity component, however for the dietary component, one intervention aimed at increasing fruit and vegetable intake and the other one aimed at reducing fat and sugar intake. The authors reported that the percentage of children that were overweight was stable over time, suggesting that there was no beneficial effect of either intervention.

BMI percentile

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

of the intervention was observed in the children in the mothers-only group. Muzaffar 2019 compared a peer-led dietary and activity intervention with the same intervention that was adult-led. The authors reported no effects of the peer-led dietary and activity intervention, compared with the adult-led intervention, on BMI percentile at short- and medium-term follow-up.

We found no studies reporting data on BMI or serious adverse events.

Subgroup analyses

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

Subgrouping by these factors did not provide an explanation for the heterogeneity observed amongst the studies. Although for some tests there was evidence of differences in effect between subgroups (Appendix 8), these mainly arose from subgroups containing single studies, and they reflected the heterogeneity pervasive amongst the studies.

Sensitivity analysis: different ICCs

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

DISCUSSION

Summary of main results

This review includes 172 studies (189,707 participants) of interventions for the prevention of obesity in children aged from 5 to 11 years. The majority of the studies compared an intervention involving strategies to improve both dietary intake and 'activity' levels with a control group. Interventions were mostly delivered at school, with some being delivered at home, in the community or within a primary care setting. Most interventions were implemented for less than nine months, with the shortest intervention conducted over one session and the longest over four years. Over half of the interventions were based on one or more theories of behaviour change, the most common being social cognitive theory.

Meta-analyses of results from 149 studies (160,267 participants) were included in this review.

We found that dietary interventions, compared with control, may have little to no effect on BMI at short- and medium-term follow-up and on zBMI at long-term follow-up (low-certainty evidence). We also found that dietary interventions, compared with control, probably have little to no effect on BMI at long-term follow-up and on zBMI at short- and medium-term follow-up (moderate-certainty evidence). Five studies reported data on serious adverse events; one study reported serious adverse events (e.g. allergy, behavioural problems and abdominal discomfort) that may have occurred as a result of the intervention; four studies reported no effect (very low-certainty evidence; Summary of findings 1).

Activity interventions, compared with control, may have little to no effect on BMI and on zBMI at short- and long-term follow-up (low-certainty evidence). However, activity interventions, compared with control, likely result in a slight reduction of BMI and zBMI at medium-term follow-up (moderate-certainty evidence). Eleven studies reported data on serious adverse events; one study reported two minor ankle sprains and one study reported the incident rate of adverse events (e.g. musculoskeletal injuries) that may have occurred as a result of the intervention; nine studies reported no effect (low-certainty evidence; Summary of findings 2).

The largest amount of evidence (i.e. number of studies) was available for interventions that combined dietary and activity intervention components compared with control. We found that these interventions, compared with control, may result in a slight reduction in BMI and zBMI at short-term follow-up (low-certainty evidence) and likely result in a reduction of BMI and zBMI at medium-term follow-up (moderate-certainty evidence). However, dietary and activity interventions, compared with control may result in little to no difference in BMI and zBMI at long-term follow-up (low-certainty evidence). Nineteen studies reported data on serious adverse events; four studies reported the occurrence of serious adverse events (e.g. injuries, low levels of extreme dieting behaviour); 15 studies reported no effect (low-certainty evidence; Summary of findings 3).

Fifty-five studies specifically targeted individuals or communities of low socioeconomic status (also known as disadvantaged or underserved). As highlighted by McNulty 2019, the preferred way of addressing health disparities is to target the population of health disparity exclusively. Of note, although these 55 studies were included in our analysis exploring differences in the impact of an intervention between individuals of low versus mixed socioeconomic status, their findings could not contribute to our learning because, usually, all participants were considered of low socioeconomic status.

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

Overall completeness and applicability of evidence

Most studies were undertaken in general populations of high-income countries. We identified 23 studies from upper-middle-income countries and three from a lower-middle-income country. The reasons why fewer trials of public health interventions that focus on non-communicable diseases, such as those that aim to prevent obesity in children, are conducted in low- and middle-income countries, include the cost of these trials and also the difference in research capacity, infrastructure, culture and priorities. In most of the studies, the participants were a mix of genders (150 studies); 13 studies were conducted only in girls and three only in boys. Fifty-five studies specifically

targeted disadvantaged children (or families) in a particular setting (e.g. school/community/area) or specifically targeted a school or community within a disadvantaged area. While the majority of studies were conducted among the general population, 13 studies targeted children considered 'at risk' of obesity based on their (or their parents) weight status, activity and dietary behaviours, or ethnic background. Given that public health policymakers require evidence of the impact of interventions to prevent obesity in children who are in the greatest need (disadvantaged, underserved), they can be reasonably confident of the completeness and applicability of the evidence reviewed here. Most interventions identified were school-based.

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

A lack of completeness of evidence was identified for certain individuals within our society (population), interventions and outcomes. First, 76 studies excluded children with physical disabilities and 58 studies excluded children with mental disabilities. Second, we did not identify any studies (that met our inclusion criteria) that used a 'whole systems' or 'whole school' approach, or were focussed on improving the wider environment (i.e. beyond the home, school and community); we appreciate that such interventions are more able to integrate fully other socio-ecological factors that are determinants of individual-level diet and activity behaviours and, in theory, thus have a more meaningful population-level effect and public health benefit (Rutter 2016; Rutter 2017). Furthermore, although zBMI and/or BMI outcomes were reported by the majority of studies, some studies (including those published in the last 10 years) only reported BMI percentile or other body weight-related outcomes (e.g. proportion of children living with overweight and obesity). Most studies did not report on serious adverse events.

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

Quality of the evidence

We used the RoB 2 tool to assess the risk of bias of the 264 results from the 149 studies that were included in the meta-analyses. Overall, we judged most of the results (147) as 'Some concerns', while we judged 13 results as 'Low risk of bias'. We judged 105 results as 'High risk of bias', mostly because of missing outcome data and time of participant recruitment in cluster-RCTs. We tested the effect of removing studies rated at 'High risk of bias' (Appendix 6).

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

Risk of bias

Of the 21 results (i.e. outcomes) reported in the summary of findings tables, nine were downgraded one level due to high risk of bias (i.e. the studies at high risk of bias contributed > 30% of the weight in the meta-analysis). The results within the downgraded outcomes were judged at high risk of bias due to the randomisation process (nine outcomes), deviations from intended interventions (six outcomes), missing outcome data (nine outcomes), measurement of the outcome (one outcome) and the selection of the reported result (three outcomes). The other 12 outcomes were not downgraded due to risk of bias, as the results at high risk of bias contributed ≤ 30% of the weight in the meta-analysis, or there were no results at high risk of bias included in the meta-analysis. We did not downgrade outcomes with a high number of results judged as some concerns, as such judgement was mostly due to lack of information.

Imprecision

Of the 21 results (i.e. outcomes) reported in the summary of findings tables, three were downgraded one level due to imprecision (the number of participants included in each meta-analysis was < 3000 and there was no clear evidence of an effect). The number of participants was < 1000 in one outcome, between 1000 and 2000 in one outcome, and 2107 in one outcome. The other 18 outcomes were not downgraded as the number of participants was > 3000 per outcome.

Inconsistency

Of the 21 results (i.e. outcomes) reported in the summary of findings tables, 17 were downgraded one level due to inconsistency: 14 had a tau value > 0 and the direction of the results was inconsistent; in three outcomes that were not included in the meta-analyses (severe adverse events) the direction of the results was inconsistent. In three outcomes, tau was > 0, but the direction of the results was not inconsistent.

Indirectness

Of the 21 results (i.e. outcomes) reported in the summary of findings tables, none of the outcomes were downgraded due to indirectness (i.e. substantial contribution of the results of studies in

highly specific populations). Eleven outcomes included data from highly specific populations (e.g. in some studies, participants were individuals at high risk of developing overweight and obesity; one study specifically targeted Hispanic immigrant families; one study targeted healthy children that were daily consumers of at least one serving of whole-fat dairy; one study selected children that were at risk of a chronic disease), but we did not downgrade these outcomes, as the contribution of these studies to the results was moderate (< 30% weight). The other 10 outcomes only included data from the general population.

Publication bias

Of the 21 results (i.e. outcomes) reported in the summary of findings tables, six were downgraded one level due to non-reporting bias. In three of these outcomes, the meta-analyses showed no effect of the interventions, but the extent of the missing data was relatively high; therefore, there was potential for missing data to impact on the result. We downgraded three outcomes not included in the meta-analyses (severe adverse events) as the reported results are from studies that measured BMI, zBMI or BMI percentile at baseline and follow-up only and this led to the potential for missing evidence. We did not downgrade five outcomes in which the interventions did not affect adiposity (fatness) and for which evidence was missing due to a relatively small number of participants from whom data were missing. We did not downgrade four outcomes for which the interventions were beneficial, but evidence was missing due to a relatively small number of participants from whom data were missing. For the remaining six outcomes there was no evidence of missing data. For all 18 results included in the meta-analyses, we had some concerns over the potential for missing studies that are likely to have eligible results, but we did not downgrade those results.

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

Potential biases in the review process

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

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

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

In addition, heterogeneity could also be due to differences in participants' baseline characteristics within and across trials (e.g. PROGRESS characteristics, baseline weight status). Further analysis of the impact of these participant-level characteristics would be useful to help determine for whom preventive interventions work better. Such analyses would require collection of individual participant data or of aggregated results subgrouped by baseline participant characteristics, and future work should address this.

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

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

Agreements and disagreements with other studies or reviews

Other comprehensive reviews on this topic have found similar results to those reported in this review, in that there is a modest effect or no effect of interventions that target individual change to prevent obesity in children (Liu 2019; Nally 2021; Peirson 2015). Of course, one can always find the rare study that shows that an intervention is effective, but the evidence base taken together suggests that the effect of these interventions is, at best, modest.

Compared with previous reviews (Liu 2019; Nally 2021; Peirson 2015), including the previous version of the Cochrane review on preventing obesity in children (Brown 2019), this review includes the largest number of studies and children. The stark increase in the number of studies published over the past five to eight years reflects the focus and effort in tackling obesity in primary school-aged children by research funding bodies and researchers. Although the confidence in the certainty of results remains moderate or low, due to methodological issues of the studies, the increased volume of evidence available for this review provides readers and stakeholders with reassurance that the results, at least for school-based interventions, are unlikely to change with the addition of further studies that meet the same inclusion criteria.

AUTHORS' CONCLUSIONS

Implications for practice

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

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

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

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

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

It is worth highlighting that, although we only included studies in this review where the aim was to prevent obesity (rather than treat children already living with obesity), most studies included entire groups of children that attended, for example, the selected nurseries or childcare centres. This is a similar approach to that taken for most public health interventions. Therefore, a relatively small proportion of children in all the included studies were already living with obesity, and this proportion was great in those studies that selected groups at high risk of developing obesity as they get older (e.g. for children attending childcare programmes specifically for low-income families).

Implications for policy

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

We recognise that the methods we chose to employ, including the aggregating of all types of interventions together under one of three categories (diet, activity, or diet combined with activity), may create results of limited value to policymakers deciding on which specific interventions within each category would 'work best' in their context. However, within these categories, hierarchies of specific interventions by observed effectiveness could be misleading. We suggest, based on our knowledge of the evidence base (rather than any specific analysis conducted for this Cochrane review) that the effectiveness of the same intervention may vary by age and sex

(even within the 5- to 11-year age group) and context (e.g. type of school provision), and the feasibility of implementation may be dependent on local resources. Furthermore, policymakers who are responsible for implementing specific policies for the prevention of obesity in children need to ensure that such policies 'fit' within the wider public health strategy and initiatives of the community and population they serve. However, this review does provide policymakers with information about whether such policies should best focus on diet, activity, or both, and more detailed information about each intervention within these categories (and by country and setting) is provided if policymakers require further information.

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

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

Implications for research

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

For existing and ongoing studies that would meet the inclusion criteria of this review, we suggest that interventions and strategies to prevent obesity in childhood should include follow-up over several years. For short and medium-term studies, we understand the challenges associated with funding for
applications to conduct follow-up work. Such follow-up data could provide important information on the sustainability of behaviour change and impact on weight as children transition from the primary school years into secondary school and puberty. We understand the barriers to conducting this type of work, including funding challenges, ethical approval and data protection issues. We also understand the perceived higher prestige attached to primary research compared with secondary or follow-up research. We urge funding bodies and journal editors to place a higher value on this type of research activity. We also suggest that a better understanding of process and implementation, using evaluation methods by which one can better compare the results of one study with the next (and summarise the information for reviews such as this), would be extremely useful. This type of activity is critical for the successful translation of interventions from one context to another, and across different countries.

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

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

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

It is worth noting that there are many more published studies that have evaluated the impact of interventions and programmes to prevent obesity in children that are not RCTs as compared with those that are. Where funding and capacity allow, we would urge researchers to opt for a RCT design for their evaluations since this provides stronger evidence for policy, practice and the public.

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

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- **Sign-off Editor** (final editorial decision): Toby Lasserson, Deputy Editor-in-Chief, Cochrane Evidence Production and Methods Directorate;
- **Sign-off Editor** (first editorial decision): Brenda Bongaerts, Co-ordinating Editor, Cochrane Metabolic and Endocrine Disorders, Heinrich Heine University Düsseldorf, Germany;
- **Managing Editor** (edited the article, collated peer reviewer comments and provided editorial guidance to authors): Marwah Anas El-Wegoud, Cochrane Central Editorial Service;
- **Editorial Assistant** (selected peer reviewers, conducted editorial policy checks and supported the editorial team): Sara Hales-Brittain, Cochrane Central Editorial Service;
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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Adab 2018

Study characteristics	
Methods	Study name: WAVES study (West Midlands ActiVe lifestyle and healthy Eating in School children study) Study dates: recruitment took place between April and May 2011 (group 1 schools and pupils) and from January to May 2012 (group 2 schools and pupils) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 15 months; 30 months; 39 months
Participants	Participants: 2462 Setting: 54 state primary schools in the West Midlands Country: United Kingdom Country income: high-income Recruitment: Quote: "All state primary schools in the West Midlands (UK) which included school years 1 to 5 (children aged 5 to 10 years) and that were within a 35 mile radius of the University of Birmingham were eligible for inclusion. Schools were approached by letter, followed by a phone call and a visit to interested schools. All Year 1 pupils (aged 5 to 6 years) in participating schools were eligible to take part. An invitation letter, information leaflet and consent form were distributed through schools to parents/carers of eligible pupils." % of eligible population enrolled: schools: 16% (155/980; invited and assessed/eligible); 36% (54/149; recruited/assessed for eligibility); children: 60% (1470/2462; consented/eligible) Age (years): mean: 6.3 (SD 0.3) Gender/sex: 51.1% boys
Interventions	Theory: theoretically informed (no further details) Intervention type: dietary and activity Intervention group(s) participants: 1134 Comparator type: non-active intervention Comparison group participants: 1328 Comparison: dietary and activity vs control Setting of the intervention: school + community Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long-term (30 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN97000586 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institute for Health Research (NIHR) Health Technology Assessment Programme (project reference No 06/85/11). The funder had no role in study design, data collection, data analysis, data interpretation, or writing of the report." DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

Adab 2018 *(Continued)*

	General notes: to allow measurement of a large number of children in a limited timeframe within study resources, schools were recruited and randomised into 2 groups (27 schools in each group) 1 year apart. Data from the 39 months follow-up is reported only from schools in group 1.

Anand 2007

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

Annesi 2016

Study characteristics	
Methods	Study name: YF4L (Youth Fit 4 Life) Study design: cluster-RCT

Annesi 2016 *(Continued)*

	N of arms: 2 Unit of allocation: after-school care sites Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 3 months; 9 months
Participants	Participants: 114 Setting: YMCA-managed after-school care sites in the southeastern United States Country: United States Country income: high-income Recruitment: participants were registered users of YMCA-managed after-school care sites in the southeastern United States % of eligible population enrolled: NR Age (years): mean: 7.2 (SD 1.1) Gender/sex: 46.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 72 (at baseline) Comparator type: non-active intervention Comparison group participants: 42 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short-term (3 months) BMI medium term; BMI percentile medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: Quote: "This research received no specific funding" DOI: "The authors declare that they have no competing interests." General notes: NR

Annesi 2017

Study characteristics	
Methods	Study name: YF4L (Youth Fit 4 Life) Study design: cluster-RCT N of arms: 2 Unit of allocation: after-school care sites Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 3 months; 9 months
Participants	Participants: 141 Setting: YMCA-managed after-school care sites in the southeastern United States Country: United States Country income: high-income Recruitment: participants were registered users of YMCA-managed after-school care sites in the southeastern United States % of eligible population enrolled: NR

Annesi 2017 *(Continued)*

	Age (years): mean: 10 (SD 0.90) Gender/sex: 55% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 86 (at baseline) Comparator type: non-active intervention Comparison group participants: 55 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (3 months) BMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: conflict of interest: none declared General notes: the number of clusters for this study is not reported; a similar study was conducted by the same authors in a cohort of children aged 5 to 8; therefore, we presume that the study was conducted in the same after-school sites and we have extracted the number of clusters reported in the Annesi 2016 study to be the same in the Annesi 2017 study

Baranowski 2003

Study characteristics	
Methods	Study name: Baylor GEMS (Girls health Enrichment Multisite Studies) Study design: RCT N of arms: 2 Unit of allocation: parent/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 35 Setting: communities in Houston, Texas Country: United States Country income: high-income Recruitment: Quote: "All participating girl-parent dyad were volunteers who responded to radio advertisements, a GEMS-FFFP recruitment Website, fliers, presentations made to various church or other social groups serving the African-American community, and postcards sent to lists of names and addresses obtained from selected schools in the Houston area. Further details regarding our recruitment strategies are described in Story 2003." % of eligible population enrolled: children: NR Age (years): mean: 8 (SD 0.3) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 19 Comparator type: non-active intervention

Baranowski 2003 *(Continued)*

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

Baranowski 2011

Study characteristics	
Methods	Study name: Escape from Diab Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 5 months
Participants	Participants: 153 Setting: communities in Texas and North Carolina Country: United States Country income: high-income Recruitment: children were recruited primarily with advertisements on a radio station whose listening audience included parents of children in the targeted age groups from ethnic minority communities (African-American, Hispanic) % of eligible population enrolled: children: 68% (153/225) Age: 10 years: 42.5%; 11 years: 32.7%; 12 years: 24.8% Gender/sex: 56.2% boys
Interventions	Theory: Social Cognitive Theory, Self-determination and Persuasion Theories Intervention type: dietary and activity Intervention participants: 103 Comparator type: attention control (minimal activity intervention) Comparison participants: 50 Comparison: dietary and activity vs control Setting of the intervention: home Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI short-term; BMI percentile short-term (5 months)

Baranowski 2011 *(Continued)*

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00570466 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was primarily funded by a grant from the National Institute of Diabetes and Digestive and Kidney Diseases (5 U44 DK66724-01). This work is also a publication of the U.S. Department of Agriculture (USDA/ARS) Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston TX, and had been funded in part with federal funds from the USDA/ARS under Cooperative Agreement No. 58-6250-6001. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organization simply endorsement from the U.S. government." DOI: "Richard Buday (author of the publication) is the president of Archimage, Inc, the company that created Diab and Nano. No other financial disclosures were reported by the authors of this paper." General notes: the duration of the intervention is not clearly reported; in the previous review from Brown 2019 it is reported as 3 months

Barbeau 2007

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 201 Setting: eight local elementary schools in Augusta, Georgia Country: United States Country income: high-income Recruitment: Quote: "Subjects were recruited from eight local elementary schools using fliers. All black girls in grades 3, 4, and 5 were eligible if they met the eligibility criteria. Subjects and their parents attended information sessions and signed informed consent/assent forms in accordance with the Medical College of Georgia Human Assurance Committee." % of eligible population enrolled: schools: NR; children: 90% (278/309) Age (years): mean: 9.5 Gender/sex: 100% girls
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 118 (at baseline) Comparator type: non-active intervention Comparison group participants: 83 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Barbeau 2007 *(Continued)*

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the NIH (Grant HL64972)" DOI: NR General notes: the authors found in previous studies that accepting only one sibling per family resulted in eligible and interested potential subjects not signing up for the study. Therefore, they decided at the outset that they would accept sisters into this study to increase its acceptability on the part of subjects and their parents.

Barnes 2015

Study characteristics	
Methods	Study name: MADE4Life Program (Mothers And Daughters Exercising for Life) Study design: cluster-RCT N of arms: 2 Unit of allocation: mother + ≥ 1 daughter Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 20 weeks (8 weeks + 3 months)
Participants	Participants: 48 Setting: an Australian community Country: Australia Country income: high-income Recruitment: Quote: "Mothers and their primary school-aged daughters (5–12 years) were recruited from an Australian community through media releases, school newsletter advertisements, school presentations to students and parents, local newspapers, and local television news. Mothers were screened for eligibility by telephone questionnaire." % of eligible population enrolled: families: 91% (40/44) Age (years): mean: 8.5 (SD 1.7) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory and operationalised key constructs of self-efficacy, social support and outcome expectations Intervention type: activity Intervention group(s) participants: 25 Comparator type: non-active intervention Comparison group participants: 23 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (20 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12611000622909 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "MADE4Life was funded by the 2011 Seed Funding Grants from the Priority Research Centre in Physical Activity & Nutrition, University of Newcastle." DOI: NR General notes: NR

Barnes 2021

Study characteristics	
Methods	Study name: PACE (Physically Active Children in Education); SWAP IT Study design: cluster-RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: PACE: 9 months; SWAP IT: 5 to 6 months; PACE + SWAP IT: 9 months Follow-up time(s): 9 months
Participants	Participants: 815 Setting: 12 Catholic primary schools, located within the Hunter region of New South Wales Country: Australia Country income: high-income Recruitment: Quote: "Primary schools located within the Hunter region were eligible for inclusion in the trial if they satisfied the eligibility criteria. Recruitment packages, including a study information statement and consent form, were progressively distributed to the principals of potentially eligible schools in random order. schools were asked to sign a written consent form to confirm participation in the study, with recruitment continuing until the required sample (n = 12) was reached. All students aged 5–12 years (Kindergarten to Grade 6) attending participating schools were invited to participate in the trial, with anthropometric outcomes solely assessed for children in Grades 4–6. A recruitment package consisting of a study information statement and consent form were distributed to parents by school staff on behalf of the research team." % of eligible population enrolled: schools: 60% (12/20); 57.8% (916/1586; percent of students that provided consent) Age (years): mean: grades 4 to 6 (typically aged 9 to 12 years): grade 4: 35.5% ; grade 5: 35.7%; grade 6: 28.8% Gender/sex: 48.2% boys
Interventions	Theory: SWAP IT: Behaviour Change Wheel; PACE: Theoretical Domains Framework Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention group(s) participants: SWAP IT intervention: 283 Physically Active children in Education (PACE) intervention: 163 SWAP IT + PACE combined: 202 (at baseline) Comparator type: non-active intervention Comparison group participants: 167 (at baseline) Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12616001228471 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was supported by Hunter Children's Research Foundation (HCRF); Hunter Medical Research Institute (HMRI); and Hunter New England Population Health. CB is supported by a co-funded industry scholarship between Hunter New England Population Health and University of Newcastle; LW is supported by an NHMRC Career Development Fellowship

Barnes 2021 *(Continued)*

	(APP1128348), Heart Foundation Future Leader Fellowship (101175), and a Hunter New England Clinical Research Fellowship; RS is supported by an NHMRC TRIP Fellowship (APP1150661). None of the funding bodies had a role in the design, data collection, analysis or interpretation of data." DOI: "The authors declare that they have no conflicts of interest." General notes: the authors used factorial analyses to assess the synergistic effect of dietary and activity interventions

Beech 2003

Study characteristics	
Methods	Study name: Memphis GEMS pilot study Study design: RCT N of arms: 3 Unit of allocation: parent/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 60 Setting: communities in Memphis, Tennessee Country: United States Country income: high-income Recruitment: girls and their families were recruited through public service announcements on several local African-American radio stations, participation of GEMS investigators in live radio talk shows, and flyers distributed at local elementary schools. Further details regarding the recruitment strategies are described in Story 2003. % of eligible population enrolled: children: NR Age (years): mean: 8.9 (SD 0.8) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention participants: child targeted: 21; parent targeted: 21 Comparator type: attention control Comparison participants: 18 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by grant numbers UO1-HL62662, UO1-HL62663, UO1- HL62668, UO1-HL62732, and UO1- HL65160, from the National Heart, Lung, and Blood Institute. (Rochon 2003)" DOI: NR General notes: NR

Bohnert 2013

Study characteristics	
Methods	Study name: GIG ASPs (Girls in the Game after-school programmes) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 30 weeks Follow-up time(s): 30 weeks
Participants	Participants: 133 Setting: 5 public schools in Chicago, Illinois Country: United States Country income: high-income Recruitment: Quote: "The randomized controlled trial took place at five public schools that were designated GIG after-school sites. All schools were located in underserved, urban low-income communities. Brief announcements about the study and GIG program were made 2 weeks prior to Time 1 data collection. Consent forms were handed out at these sessions and sent home with all female students accompanied by a cover letter from the principal investigator and an intake form for the GIG Program. Participants in this study were volunteers in the third to fifth grade, aged 8 to 12." % of eligible population enrolled: children: 100% (133/133) Age (years): mean: 9.13 (SD 1) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory and Sociocultural Theory Intervention type: dietary and activity Intervention group(s) participants: 96 Comparator type: non-active intervention Comparison group participants: 37 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by a seed grant from the Chicago Consortium to Lower Obesity in Chicago Children (CLOCC:AU 508485). None of the authors have any financial involvement with this organization." DOI: "The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article." General notes: NR

Brandstetter 2012

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

Brandstetter 2012 *(Continued)*

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

Branscum 2013

Study characteristics	
Methods	Study name: Comics for Health Study design: cluster-RCT N of arms: 2 Unit of allocation: after-school programme Unit of analysis: individual Intervention period: 4 weeks Follow-up time(s): 4 months
Participants	Participants: 183 Setting: 12 YMCA sponsored after-school programmes from the Olentangy Local school district Country: United States Country income: high-income

Branscum 2013 *(Continued)*

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

Breheny 2020

Study characteristics	
Methods	Study name: Daily Mile Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 4 months; 12 months
Participants	Participants: 2280 Setting: 40 primary schools in the south of Birmingham Country: United Kingdom Country income: high-income Recruitment: Quote: "All Birmingham, UK schools with at least 20 pupils in school years 3 (aged 7–8 years) and 5 (aged 9–10 years) were eligible for participation in the Birmingham Daily Mile study. Initially eligible schools from an ethnically and socio-economically diverse part of the city (Northfield) were invited to participate and schools that expressed an interest in the trial were enrolled. Subsequent pragmatic invitation of eligible schools from a wider area was used to reach the recruitment target of 40 schools whilst ensuring the final sample included schools that varied in terms of ethnic make-up and levels of deprivation. Schools were approached by email, summarising the study and inviting them to attend a briefing event where the study would be described in

Breheny 2020 *(Continued)*

	detail. If unable to attend the briefing they could obtain further information and discuss participation with the study coordinator at another opportunity. Follow-up communication was by email and telephone. Pupils from one class in years 3 and 5 at participating schools were invited to take part in study measurements." % of eligible population enrolled: schools: 37% (40/108); children: NR Age (years): mean: 8.9 (SD 1) Gender/sex: 52.4% boys
Interventions	Theory: Behaviour Change Theory Intervention type: activity Intervention group(s) participants: 1153 Comparator type: non-active intervention Comparison group participants: 1127 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (4 months) zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN12698269 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by Birmingham City Council and was facilitated by a collaboration between Birmingham City Council, SportBirmingham, Services for Education and the University of Birmingham. The National Institute for Health Research in England under its Career Development Fellowship fund (CDF- 2015-08-013) supported KB and EF. The views expressed in this publication are those of the authors and do not necessarily reflect those of the UK NHS, the National Institute for Health Research, or the Department of Health for England. There are no other relationships or activities that could appear to have influenced the submitted work." DOI: "There are no relationships or activities that could appear to have influenced the submitted work." General notes: intervention schools were encouraged to implement The Daily Mile in all year groups, however outcome measurements were obtained only from children in years 3 and 5. The study is set in South Birmingham, the third most deprived city in the UK, but the final sample included schools that varied in terms of ethnic make-up and levels of deprivation.

Brown 2013

Study characteristics	
Methods	Study name: Journey to Native Youth Health Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 76 Setting: 2 American Indian reservations in north-central and southwestern Montana Country: United States Country income: high-income Recruitment: Northern Plains Indian youth 10 to 14 years old living on 2 American Indian reservations in north-central and southwestern Montana were recruited for the study

Brown 2013 *(Continued)*

	% of eligible population enrolled: children: 82% (76/93) Age (years): mean: 11.4 (SD 1.1) Gender/sex: 50% boys
Interventions	Theory: Transtheoretical Model, Stages of Change, Social Cognitive Theory Intervention type: dietary and activity Intervention participants: 38 Comparator type: attention control Comparison participants: 38 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term; BMI percentile short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Caballero 2003

Study characteristics	
Methods	Study name: Pathways Study Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 3 years
Participants	Participants: 1704 Setting: 7 American Indian schools serving American Indian communities in Arizona, New Mexico and South Dakota Country: United States Country income: high-income Recruitment: Quote: "A total of 41 schools in 7 American Indian communities were enrolled. All schools worked in partnership with a participating academic institution. Children were enrolled in the study, and baseline measurements were made at the end of the 2nd grade." % of eligible population enrolled: schools: NR; children: 83% (1704/2058) Age (years): mean: 7.6 (SD 0.6) Gender/sex: 51.7 boys
Interventions	Theory: Social Learning Theory and principles of American Indian culture and practice Intervention type: dietary and activity Intervention group(s) participants: 879 Comparator type: non-active intervention Comparison group participants: 825 Comparison: dietary and activity vs control Setting of the intervention: school

Caballero 2003 *(Continued)*

	Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long-term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by National Heart, Lung, and Blood Institute grants U01-HL-50869, -50867, -50905, -50885, and -50907." DOI: "None of the authors had financial interests related to this study." General notes: randomisation stratified by participants' % of body fat

Cao 2015

Study characteristics	
Methods	Study name: FIS (Family-Individual-School-Based Comprehensive Intervention) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 1 year; 2 years; 3 years
Participants	Participants: 2446 Setting: 14 primary schools in a district of Shanghai Country: China Country income: upper-middle-income Recruitment: Quote: "All 26 primary schools in a district of the city were divided into three groups according to average obesity prevalence quartile among all first-grade students in 2011. According to the economic level of the communities in which the schools were located and the condition of school sports fields and canteens, four of seven schools with high obesity prevalence were selected and divided into intervention and control groups randomly by sortation. Similarly, six of 12 schools with middle obesity prevalence and four of seven with low obesity prevalence were selected and divided into intervention and control groups." % of eligible population enrolled: schools: 54% (14/26); children: 100% (2446/2446) Age (years): mean: intervention: 7.01 (SD 0.44); control: 6.81 (SD 0.24); Gender/sex: 53.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1287 Comparator type: non-active intervention Comparison group participants: 1159 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (1 year) zBMI long term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Cao 2015 *(Continued)*

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was supported by an award (Award Number 12GWZX0301) from the Shanghai Municipal Health Bureau. The content is the sole responsibility of the authors and does not necessarily represent the official views of the Shanghai Municipal Health Bureau." DOI: "No financial disclosures were reported by the authors of this paper." General notes: NR

Carlin 2021

Study characteristics	
Methods	Study name: IPAP (Intelligent Personal Assistant Project) Study design: cluster-RCT N of arms: 2 Unit of allocation: parent + 1 to 2 child(ren) Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 4 months (outcome measurement was planned, but it is not reported if it was measured)
Participants	Participants: 34 Setting: Western Trust area of Northern Ireland Country: United Kingdom Country income: high-income Recruitment: phase 1: Quote: "All families attending a community-based obesity prevention project, Safe Wellbeing Eating & Exercise Together (SWEET) as a family, were invited to participate in the study./Families are recruited to the SWEET project via social media sites, flyer distributions in schools, and local paper advertisements. Before approaching families, permission was obtained from the Healthy Lifestyle Coordinator of the Healthy Living Centre where the project was being delivered. Members of the research team attended the first session of the project and provided a verbal overview of the research study."; phase 2: Quote: "Potentially eligible families were invited to take part in the study (not restricted to those attending the SWEET project) through a number of recruitment strategies. Local community group leaders were contacted and asked to provide permission for a member of the research team to approach families (parents) at relevant events, for example, parent or child groups, youth club, sports training sessions etc." % of eligible population enrolled: phase 1: families: 73% (11/15); children: NR; phase 2: families: 94% (15/16); children: NR Age (years): mean: phase 1: 9.1 (SD 2); phase 2: 7.9 (SD 2) Gender/sex: phase 1: 44% boys; phase 2: 56% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: phase 1: 16 (at baseline); phase 2: 18 (at baseline) Comparator type: non-active intervention Comparison group participants: NR Comparison: dietary and activity vs control Setting of the intervention: home Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI (planned) Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: measurement of the outcome at follow-up(s) was planned, but results are not reported (there is no evidence that it was measured)

Carlin 2021 *(Continued)*

Notes	Clinical Trial Registry: ISRCTN16792534 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was funded by the GetAMoveOnNetwork+ (Engineering and Physical Sciences Research Council grant EP/NO27299/1). The funder had no role in the study design, data collection and analysis, decision to publish, or preparation of the paper." DOI: conflict of interest: none declared General notes: zBMI data at follow-up not reported but height and weight were measured and zBMI is listed as secondary outcome in the trial registration but not in the main article. Quote: "All participant outcome measures were assessed at baseline and follow-up (12 weeks)." This pilot feasibility study was conducted in 2 phases. For phase 1, families who were attending a community-based weight management project were invited to participate, whereas phase 2 recruited families not currently receiving any additional intervention.

Chai 2019

Study characteristics	
Methods	Study name: Back2Basics (Family telehealth consultations) Study design: RCT N of arms: 3 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 46 Setting: communities in New South Wales, New Castle, Tamworth, Armidale Country: Australia Country income: high-income Recruitment: Quote: "Participants were children aged 4 to 11 years and their parents who consented to attend assessments at one of the three study sites in New South Wales, Australia, and to access the online intervention using their own electronic devices. The eligible child BMI was set to be above the mid-point of the healthy weight category (BMI ≥21.5 kg/m2) in order to be inclusive in recruiting children with overweight or obesity. Families were recruited to one metropolitan (i.e. Newcastle) and two rural sites (i.e. Tamworth, Armidale) between July 2017 and May 2018. Extensive recruitment strategies were used to distribute study information (including a direct link to the online screening survey) through networks surrounding the Hunter New England region: John Hunter Children's Hospital dietetics clinic (a regional tertiary weight management service; only one of three centres in New South Wales offering such service), health professional networks (including flyers mailed out to 136 general practitioners), 92 primary schools, family-friendly community venues (e.g. libraries, gyms, cafes), contemporary media (television news, newspaper and radio), and social media networks targeted to the Newcastle, Tamworth and Armidale regions." % of eligible population enrolled: families: 55% (46/83) Age (years): mean: 9 (SD 2.3) Gender/sex: 59% boys
Interventions	Theory: CALO-RE taxonomy of behaviour change techniques, Behaviour-change techniques Intervention type: dietary Intervention group(s) participants: Back2Basics family intervention (telehealth): 16 Back2Basics family intervention (telehealth + SMS): 15 Comparator type: non-active intervention Comparison group participants: 15 Comparison: dietary vs control Setting of the intervention: telehealth Setting of the intervention in subgroup analyses: other

Chai 2019 *(Continued)*

Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study received funding from NIB foundation through the Hunter Medical Research Institute. The funding body was not involved in the research design, implementation, data collection, analysis and interpretation, or writing of the manuscript. LKC is supported by the University of Newcastle International Postgraduate Research Scholarships, Barker PhD Award Top-up Scholarship, and Emlyn and Jennie Thomas Postgraduate Medical Research Scholarship through the Hunter Medical Research Institute. CEC is supported by an NHMRC Senior Research Fellowship and a Faculty of Health and Medicine, Gladys M Brawn Senior Research Fellowship, the University of Newcastle. TLB is supported by a Faculty of Health and Medicine, Early Career Brawn Fellowship, the University of Newcastle." DOI: "The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article. " General notes: to reduce the waiting time for families who enrolled early, families commenced the programme in 6 different cohorts at various time frames ranging from July 2017 to April 2018 and attended their respective data collection sessions for each time point.

Chen 2010

Study characteristics	
Methods	Study name: ABC (Active Balance Childhood) Study design: RCT N of arms: 2 Unit of allocation: mother/child dyad Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 5 months mean (intervention: 6 months; control: 4 months); 7 months mean (intervention: 8 months; control: 6 months; see Notes)
Participants	Participants: 67 Setting: San Francisco Bay area of California Country: United States Country income: high-income Recruitment: Quote: "Children 8-10-year old who self-identified as Chinese, and their mothers, were invited to participate in this study. Participants were recruited from Chinese language programs in the San Francisco Bay area. Research assistants described the study to potential children and gave them an introduction letter and research consent form to take home to their parents." % of eligible population enrolled: dyads: 97% (67/69) Age (years): mean: 8.97 (SD 0.89) Gender/sex: 56.7% boys
Interventions	Theory: behaviour-change techniques related to healthy eating Intervention type: dietary and activity Intervention group(s) participants: 35 Comparator type: non-active intervention Comparison group participants: 32 Comparison: dietary and activity vs control Setting of the intervention: study centre + home Setting of the intervention in subgroup analyses: other

Chen 2010 *(Continued)*

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

Choo 2020

Study characteristics	
Methods	Study name: The Three-Healthy Program (Healthy Children, Healthy Families, Health Communities Program) Study design: cluster-RCT N of arms: 2 Unit of allocation: community centre Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 120 Setting: 8 community child centres in the Seongbuk municipal county, Seoul Country: South Korea Country income: high-income Recruitment: the principal investigator contacted a steering group of 26 community child centres in Seongbuk county, and visited each one to explain the purpose and characteristics of the study. Eight centres agreed to participate, which had a total of 261 children, and then were randomly allocated to the intervention group (4 centres) and the control group (4 centres). % of eligible population enrolled: community centres: 31% (8/26); children: 88% (107/121) Age (years): mean: 10 (SD 1.23) Gender/sex: 54.8 boys
Interventions	Theory: Cognitive Learning Theory Intervention type: dietary and activity Intervention group(s) participants: 62 Comparator type: non-active intervention Comparison group participants: 58 Comparison: dietary and activity vs control Setting of the intervention: community + home Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN11347525

Choo 2020 *(Continued)*

	Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was supported by the National Research Foundation of Korea grant funded by the Korea government (MSIP) (No. NRF-2014R1A2A1A11050974" DOI: "The authors declare no conflict of interest." General notes: this study was a cluster-randomised controlled trial, embedded in a larger parent study, 'Development and Effects of the Healthy Children, Healthy Families, Healthy Communities Program (i.e. The Three-Healthy Programme) for Obesity Prevention among Vulnerable Children: Using the Ecological Perspective' conducted from 2014 to 2017

Clemes 2020

Study characteristics	
Methods	Study name: Stand Out In Class Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 4.5 months Follow-up time(s): 7 months
Participants	Participants: 176 Setting: 8 government-funded primary schools located in the City of Bradford Country: United Kingdom Country income: high-income Recruitment: Quote: "Government-funded primary schools located in the City of Bradford were invited to participate in the study. The following three-stage recruitment process was adopted for schools: 1) head teachers/senior teachers were sent an email detailing the study, which included a copy of an Information Sheet for Schools; 2) 2 days after sending the email, the schools were contacted via telephone and the reception team were asked to confirm receipt of the email; 3) a follow-up telephone call was made to establish the schools' interest or otherwise in participating in the study. A designated lead teacher was identified for each interested school who was then given full details of the study and what their involvement would entail. Consenting schools were asked to nominate a year 5 class and were provided with invitation packs for the parents/guardians of children within these classes. All children within participating classes were eligible to take part in the evaluation." % of eligible population enrolled: schools: 33% (8/24); children: 75% (176/234) Age (years): mean: 9.3 (SD 0.5) Gender/sex: 56% boys
Interventions	Theory: COM-B with Behaviour Change Wheel, Theoretical Domains Framework Intervention type: activity Intervention group(s) participants: 86 Comparator type: non-active intervention Comparison group participants: 90 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN12915848 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes

Clemes 2020 *(Continued)*

	Funding details: Quote: "This research was funded by the National Institute for Health Research (NIHR) Public Health Research Programme (reference: 14/231/20). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care." DOI: "The sit-stand desks used in this study were supplied via an in-kind donation from Ergotron Inc., USA. The company played no role in the study design, data collection or data analyses, or in the preparation of this paper. The company had no relevant interests/rights in terms of project outcomes and uses. JS notes that she has a potential conflict of interest as her husband owns a business to manufacture height-adjustable desks for schools. These desks were not used in this research, and she was not involved in the data analysis. The remaining authors declare no other competing interests." General notes: NR

Coleman 2012

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

Coleman 2012 *(Continued)*

	General notes: NR

Crespo 2012

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

Crespo 2012 *(Continued)*

	General notes: the Aventuras para Niños (APN) study was a three-year, 2 × 2 factorial design randomised controlled community trial with 13 schools randomised to one of 4 conditions

Cunha 2013

Study characteristics	
Methods	Study name: PAPPAS (parents, students and teachers for healthy eating) Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 6 months; 9 months
Participants	Participants: 574 Setting: 20 municipal schools in Duque de Caxias, Rio de Janeiro, Brazil Country: Brazil Country income: upper-middle-income Recruitment: Quote: "This district has 35 municipal schools, and 20 schools with fifth grade classes were selected; these were all located in areas not considered high risk for violence. The sample included most of public schools from Duque de Caxias, and the dropout rate was low. The sample included 20 classes from 20 schools (1 class in each school)." % of eligible population enrolled: schools: 100% (20/20); children: 100%: (574/574) Age (years): mean: intervention: 11.2 (SD 1.3); control: 11.2 (SD 1.3) Gender/sex: intervention: 52.3% boys; control: 51.4% boys
Interventions	Theory: Transtheoretical Model Intervention type: dietary Intervention group(s) participants: 281 Comparator type: non-active intervention Comparison group participants: 293 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01046474 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by Foundation of Support of Research of the State of Rio de Janeiro - FAPERJ (E261029422008); National Counsel of Technological and Scientific Development - CNPQ (474288/2009-9); Pan American Health and Education Foundation - PAHEF. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript" DOI: "The authors declared that no competing interests exist." General notes: different students entered and left the study at different points in time: "During the school year, a number of students left the school and others joined. In addition, some students who did return the signed informed consent at baseline did so in the middle of the school year (phase 2) or during the third phase of the study."

Damsgaard 2014

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

Davis 2021

Study characteristics	

Davis 2021 *(Continued)*

Methods	Study name: TX (Texas) Sprouts Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (10 months) Follow-up time(s): 10 months
Participants	Participants: 3302 Setting: 16 primary school located within 60 miles of the University of Texas at Austin (UT-Austin) campus, Texas Country: United States Country income: high-income Recruitment: Quote: "All schools had to meet the following inclusion criteria: (1) high proportion of Hispanic children (>50%); (2) high proportion of children participating in the free and reduced lunch (FRL) program (>50%); (3) location within 60 miles of the University of Texas at Austin (UT-Austin) campus; and (4) no existing garden or gardening program. The 2014–2015 Texas Education Agency (TEA) directory of schools in Texas contained 8,653 active public elementary schools in Texas and 582 schools had a distance of less than 60 miles from UT-Austin. Only 79 of these schools had over 50% or more Hispanic students in each of grades 3–5. Seventy-three of the schools had 50% or more students participating in the FRL program in each one of the 3rd-5th grades. All 73 schools were invited to participate: 20 schools from five different independent school districts agreed to participate. Research staff visited all 20 schools to ensure that the school did not have an existing garden or gardening program. The first 16 out of the 20 schools to provide letters of support were randomly assigned to either the intervention (n=8 schools) or control group (delayed intervention; n=8 school). The four remaining schools were placed on a contingency list, in case any of the 16 randomly assigned schools dropped out. Of the 16 randomly assigned schools, two schools declined to participate due to their academic status and were replaced with two of the schools on the contingency list. Due to budgetary concerns and the large enrollment in schools, two schools measured only 4th and 5th grade students instead of 3rd-5th grade students. All 3rd-5th grade students and parents at the recruited schools were contacted to participate via information tables at “Back to School” and “Meet the Teacher” evening events, flyers sent home with students, and teachers making class announcements in the fall after the garden had been built at the school. All recruitment materials were available in both English and Spanish." % of eligible population enrolled: schools: 22% (16/73); children: 74% (3125/4239) Age (years): mean: 9.23 (SE 0.02) Gender/sex: 47.4% boys
Interventions	Theory: Social Ecological-Transactional Model Intervention type: dietary Intervention group(s) participants: 1491 (at baseline) Comparator type: non-active intervention Comparison group participants: 1811 (at baseline) Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term; BMI percentile medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02668744 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This clinical study was funded by the National Institutes of Health [1R01HL123865, 2015–2020). Whole Kids Foundation, c, and Sprouts Healthy Communities Foundation gave funding for garden builds and enhancements. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript."

Davis 2021 *(Continued)*

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

De Bock 2013

Study characteristics	
Methods	Study name: Ene mene fit Study design: cluster-RCT N of arms: 2 Unit of allocation: preschool Unit of analysis: individual Intervention period: 6 to 9 months Follow-up time(s): 6 months; 12 months
Participants	Participants: 1028 Setting: 39 preschools in 3 distinct regions of Baden-Württemberg Country: Germany Country income: high-income Recruitment: children who enrolled at one of the preschools participating in the state-sponsored health promotion programme “Komm mit in das gesunde Boot” (“Come aboard the healthy boat”) were eligible % of eligible population enrolled: preschools: 85% (39/46); children: 80% (826/1028; children with informed consent/eligible children) Age (years): mean: 5.05 (SD or SE 0.2) Gender/sex: 52% boys
Interventions	Theory: General Systems Theory Intervention type: activity Intervention group(s) participants: 534 Comparator type: non-active intervention Comparison group participants: 494 Comparison: activity vs control Setting of the intervention: school + community Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (6 months) BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00987532 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by a grant from the Baden- Wu¨rttemberg Stiftung. FDB is supported by the European Social Fund and by the Ministry of Science, Research and the Arts Baden-Württemberg. Neither the funding bodies nor any company played a role in the design of the study, data collection, analysis or interpretation of the results, the decision to publish, or the contents of the report. Experts paid by the Baden-Württemberg Stiftung have developed the state sponsored PA program, but were not involved with the development of the participatory parent-focused intervention." DOI: "No financial disclosures were reported by the authors of this paper. " General notes: the current study, “Ene mene fit”, is a cluster-randomised trial embedded within the state-sponsored programme “Come aboard the healthy boat” ("Komm mit in das gesunde Boot"). It uses a two-level sampling strategy involving both preschools from 3 geographic regions that had formally applied for participation in the state-sponsored programme and the parents of children enrolled at these sites. One preschool (8 children) from the intervention group withdrew consent

De Bock 2013 *(Continued)*

	because teacher disliked measurements; 1 preschool (9 children) from the control group declined measurement because teacher disliked measurements.

de Greeff 2016

Study characteristics	
Methods	Study name: F&V (Fit en Vaardig op school) Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 22 weeks Follow-up time(s): 22 weeks
Participants	Participants: 378 Setting: 12 different schools in the Northern Netherlands Country: Netherlands Country income: high-income Recruitment: Quote: "Data were obtained from 388 children across 12 different schools in the northern part of the Netherlands. From every school, the second- or third-grade class was randomly assigned to the intervention group." % of eligible population enrolled: schools: NR; children: 97% (376/388) Age (years): mean: 8.1 (SD 0.7) Gender/sex: 55% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 183 Comparator type: non-active intervention Comparison group participants: 195 9 (note: data from 10 children were excluded from the analysis as were considered outliers) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (22 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study is supported by a national educational grant from the Ministry of Education, Culture and Science (ODB10015)." DOI: NR General notes: NR

De Heer 2011

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT

De Heer 2011 *(Continued)*

	N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 4 months
Participants	Participants: 646 Setting: 6 schools in El Paso, Texas Country: United States Country income: high-income Recruitment: the authors approached 9 schools in El Paso, Texas, in July and August 2008 by contacting the principal and the physical education (PE) teachers; 6 schools (67%) agreed to participate. Selection criteria were school location (for logistical purposes, half of those chosen were located within 5 miles of the University of Texas at El Paso campus), size, socioeconomic status and percentage of children with limited English proficiency. They recruited students in third, fourth and fifth grades by making announcements and passing out consent forms during PE classes. % of eligible population enrolled: schools: 67% (6/9); children: 52% (901/1720) Age (years): mean: intervention: 9.24 (SD 0.87); control: 9.10 (SD 1.08); spillover: 9.27 (SD 0.84) Gender/sex: intervention: 54.1% boys; control: 55.4% boys; spillover: 48.6%
Interventions	Theory: Ecological Principles, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 292 Comparator type: non-active intervention Comparison group participants: 354 (note: 251 children did not agree to participate in the programme but agreed to be surveyed (spillover group)) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short-term; BMI percentile short-term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This project was supported by pilot research grants from the Center for Border Health Research through the Paso del Norte Health Foundation and by the National Institutes of Health Hispanic Health Disparities Research Center (grant P20MD002287-01)." DOI: NR General notes: NR

de Ruyter 2012

Study characteristics	
Methods	Study name: DRINK (Double-blind Randomized Intervention Study in Kids) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 18 months Follow-up time(s): 6 months; 12 months; 18 months; 24 months
Participants	Participants: 641

de Ruyter 2012 *(Continued)*

	Setting: 8 elementary schools in Zaanstreek, Purmerend and Haarlem Country: Netherlands Country income: high-income Recruitment: the authors recruited children at 8 elementary schools in an urban area near Amsterdam. They enrolled and individually randomly assigned 641 children, stratified according to school, sex, age and initial body mass index. Children in the same household received the same type of beverage, but they were unaware of this assignment. % of eligible population enrolled: children: 92% (641/699) Age (years): mean: 8.2 (SD 1.9) Gender/sex: 53.1% boys
Interventions	Theory: NR Intervention type: dietary Intervention participants: 319 Comparator type: attention control Comparison participants: 322 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short term (6 months) zBMI medium term (12 months) zBMI long term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00893529; NTR1796 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by grants from the Netherlands Organization for Health Research and Development (120520010), the Netherlands Heart Foundation (2008B096), and the Royal Netherlands Academy of Arts and Sciences (ISK/741/PAH)." DOI: "Disclosure forms provided by the authors are available with the full text of this article at NEJM.org." General notes: NR

Di Maglie 2022

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 160 Setting: 2 secondary level public schools in Southern Italy Country: Italy Country income: high-income Recruitment: the authors selected a sample of 160 children, aged 11.5 ± 0.5 years, belonging to 2 schools. These schools had never participated in health promotion programmes and were located in 2 cities with similar socioeconomic status. % of eligible population enrolled: children: 100% (160/160) Age (years): mean: intervention: 12.1 (SD 0.5); control: 11.5 (SD 0.5)

Di Maglie 2022 *(Continued)*

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

Diaz-Castro 2021

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 103 Setting: a centre for primary and secondary education in the Malaga region Country: Spain Country income: high-income Recruitment: Quote: "A total of 122 students were asked to participate in the study. During the enrolment phase, 14 students refuse to participate, mainly because they were already performing sports extracurricular activities several days per week after school hours, and one of them because he had a chronic disease (diabetes). Moreover, 5 students who agreed to participate in the study, finally left it because parents did not complete the informed consent form. The boys were studying during the second semester in a Center for Primary and Secondary Education in the Malaga region (Spain)." % of eligible population enrolled: children: 85% (103/121) Age (years): mean: intervention: 11.16 (SD 0.18); control: 11.21 (SD 0.17) Gender/sex: 100% boys
Interventions	Theory: NR Intervention type: activity

Diaz-Castro 2021 *(Continued)*

	Intervention group(s) participants: 52 Comparator type: non-active intervention Comparison group participants: 51 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "JM-F was supported by a Postdoctoral Contract (Perfeccionamiento de Doctores) from the University of Granada" DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: NR

Donnelly 2009

Study characteristics	
Methods	Study name: PAAC (Physical Activity Across the Curriculum) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 2.5 years
Participants	Participants: 1527 Setting: 24 elementary schools in Northeast Kansas Country: United States Country income: high-income Recruitment: Quote: "Twenty-four elementary schools in Northeast Kansas were randomized to receive PAAC or to serve as control. Randomization was stratified by school size and rural versus urban location. All students in the respective grades in the schools randomized to PAAC participated in PAAC since it was adopted as a curriculum. Prior to enrollment in the study, a standardized, power point presentation was made by the study investigators at each school to assure that the school staff understood all the obligations associated with participation. The targeted enrollment into the study was to have 27% of the students classified as minorities and 50% of the students will be receiving free or reduced meals." % of eligible population enrolled: NR Age (years): mean (SD): grade 2: female intervention: 7.7 (SD 0.3); female control: 7.8 (0.4); male intervention: 7.7 (0.4); male control: 7.8 (0.3); grade 3: female intervention 8.7 (0.4); female control: 8.7 (0.4)); male intervention: 8.7 (0.3); male control: 8.8 (0.4) Gender/sex: 48.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 814 Comparator type: non-active intervention Comparison group participants: 713 Comparison: activity vs control Setting of the intervention: school

Donnelly 2009 *(Continued)*

	Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long-term (2.5 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by grant NIH NIDDK R01 061489 from the National Institute of Diabetes and Digestive and Kidney Disease, Bethesda, MD. The authors would like to thank the International Life Sciences Institute for Health Promotion for educational materials" DOI: NR General notes: data reported as narrative only for BMI percentile outcome

Drummy 2016

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 107 Setting: 7 primary schools in Northern Ireland Country: United Kingdom Country income: high-income Recruitment: 150 children aged 9 and 10 in 7 primary schools in Northern Ireland were invited to participate in the study. The schools were a convenience sample of primary schools. % of eligible population enrolled: schools: NR; children: 80% (120/150) Age (years): mean: 9.5 Gender/sex: NR
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 54 Comparator type: non-active intervention Comparison group participants: 53 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: conflict of interest: none declared

Drummy 2016 *(Continued)*

	General notes: the follow-up appears to be at the end of the intervention, which lasted 12 weeks, but it is not clearly stated

Duncan 2019

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

Elder 2014

Study characteristics	

Elder 2014 *(Continued)*

Methods	Study name: MOVE/me Muevo Study design: cluster-RCT N of arms: 2 Unit of allocation: recreation centre Unit of analysis: individual Intervention period: 24 months Follow-up time(s): 12 months; 24 months
Participants	Participants: 541 Setting: 30 public recreation centres in San Diego County Country: United States Country income: high-income Recruitment: Quote: "Thirty public recreation centers in San Diego County were recruited. Families were recruited through targeted phone calls; 8600 telephone numbers were obtained from a research marketing company. In addition, 1000 families were contacted at public locations, such as libraries, schools, community events (street fairs, special gatherings) and the 30 participating recreation centers. In accordance with the study design, recreation centers were the unit of randomization and individual participating families were the unit of analysis (~18 families per recreation center)." % of eligible population enrolled: recreation centres: NR; families: 46.5% (541/1162; enrolled/screened) Age (years): mean: 6.6 (SD 0.7) Gender/sex: 45.1% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 271 Comparator type: non-active intervention Comparison group participants: 270 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term; BMI percentile medium-term (12 months) BMI long-term; zBMI long-term; BMI percentile long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00381069 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by the National Institutes of Health grant NIDDK R01DK072994. NCC was supported by grants T32HL079891 and F31KD079345. KC was supported by the Medical Research Council Epidemiology Unit [Unit Programme number U106179474] and the Centre for Diet and Activity Research (CEDAR), a UKCRC Public Health Research: Centre of Excellence. Funding from the British Heart Foundation, Economic and Social Research Council, Medical Research Council, the National Institute for Health Research, and the Wellcome Trust, under the auspices of the UK Clinical Research Collaboration, is gratefully acknowledged." DOI: "The authors have no disclosures or conflict of interest to declare." General notes: NR

Epstein 2001

Study characteristics

Epstein 2001 *(Continued)*

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

Fairclough 2013

Study characteristics	
Methods	Study name: CHANGE! (Children's health, Activity and Nutrition: Get Educated!) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 20 weeks; 30 weeks

Fairclough 2013 *(Continued)*

Participants	Participants: 318 Setting: 12 primary schools in the Wigan Borough in northwest England Country: United Kingdom Country income: high-income Recruitment: Quote: "Eligible schools were identified within pre-defined geographical units known as Neighbourhood Management Areas (NMA). school-level socio-economic status (SES) was defined as the percentage of students per school eligible to receive free school meals. Within each NMA, one high and one low socioeconomic status school were randomly selected to take part to ensure representation of the diverse geographical and social contexts present within the locale. Twelve primary schools were approached and recruited to the study. In each school all children within Year 6 (10–11 years old) were invited to take part in the study." % of eligible population enrolled: schools: 100% (12/12); children: 76% (318/420) Age (years): mean: intervention: 10.6 (SD 0.3); control: 10.7 (SD 0.3) Gender/sex: NR
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 166 Comparator type: non-active intervention Comparison group participants: 152 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN03863885 Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: "The authors declare that they have no competing interests." General notes: NR

Farmer 2017

Study characteristics	
Methods	Study name: PLAY Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 year Follow-up time(s): 1 year, 2 years
Participants	Participants: 902 Setting: 16 state primary schools in the Otago region and Waitakere City (within the Auckland region) Country: New Zealand Country income: high-income Recruitment: Quote: "State primary schools (years 1–8 that are fully funded by the state and co-educational) with at least 150 pupils, and a school decile ranking of 1–6 were eligible. Eleven schools met these criteria within the Otago region and 31 in Waitakere City. Eleven schools were approached in Otago and 10 in Auckland and recruitment stopped once 16 schools (eight in each

Farmer 2017 *(Continued)*

	region) provided informed consent to participate (November 2010 to March 2011). Pairs of schools were created by matching for region, school roll and decile ranking. Although all children in intervention schools were exposed to the intervention, only children in school years 2 and 4 were invited to participate in outcome assessments." % of eligible population enrolled: schools: 38% (16/42); children: 54.2% (902/1663) Age (years): mean: intervention: 8.0 (SD 1.2); control: 7.9 (SD 1.1) Gender/sex: 53.6% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 458 Comparator type: non-active intervention Comparison group participants: 444 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (1 year) BMI long term; zBMI long term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12612000675820 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The PLAY study was funded by the Health Research Council of New Zealand and the Otago Diabetes Research Trust. VLF was in receipt of a Medicine Award and subsequently a Lottery Health Research New Zealand PhD Scholarship during her PhD study. RWT is partially funded by a Fellowship from the Karitane Products Society (KPS) Limited. The funders had no role in the design of the study; the collection, analysis and interpretation of the data; the writing of the manuscript; or the decision to submit the article for publication." DOI: "The authors declare that they have no conflicts of interest." General notes: NR

Ford 2013

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 15 weeks Follow-up time(s): 15 weeks; 30 weeks
Participants	Participants: 152 Setting: 2 primary schools located within the South East of England Country: United Kingdom Country income: high-income Recruitment: Quote: "In total, 174 pupils aged 5–11 years, from two primary schools located within the southeast of England, were invited to take part in the study." % of eligible population enrolled: children: 87% (152/174) Age (years): range 5 to 11 Gender/sex: 52% boys (cohort that completed the intervention)

Ford 2013 *(Continued)*

Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 77 (at baseline) Comparator type: non-active intervention Comparison group participants: 75 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (30 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Foster 2008

Study characteristics	
Methods	Study name: SNPI (School Nutrition Policy Initiative) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 1349 Setting: 10 schools in the School District of Philadelphia Country: United States Country income: high-income Recruitment: Quote: "The study was conducted in 10 schools in the school District of Philadelphia. Schools were the unit of randomization and intervention. Ten schools were selected from among 27 Kindergarten through eighth grad schools with 50% of students eligible for free or reduced-price meals. To obtain pairs of 2 schools per cluster, the 27 schools were first organized into 5 clusters of 4 to 7 schools each, based on school size and type of food service (eg, full service [2 clusters] or heat and serve [3 clusters]). Schools within each cluster were approached to participate in a predetermined, random order. When 2 schools in each cluster agreed to participate, the schools were randomly assigned as intervention or control schools. A total of 12 schools were approached; 2 declined and 10 were enrolled." % of eligible population enrolled: schools: 37% (10/27); children: 94% (1349/1441) Age (years): mean: 11.2 (SD 1) Gender/sex: 46.2% boys
Interventions	Theory: settings-based approach; CDC Guidelines to Promote Lifelong term Healthy Eating and Physical Activity Intervention type: dietary and activity Intervention group(s) participants: 749 Comparator type: non-active intervention Comparison group participants: 600 Comparison: dietary and activity vs control

Foster 2008 *(Continued)*

	Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI long-term; zBMI long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00142012 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by grants from the Centers for Disease Control and Prevention (R06/CCR321534-01) and the US Department of Agriculture/Food and Nutrition Service through the Pennsylvania Nutrition Education Program as part of Food Stamp Nutrition Education." DOI: NR General notes: number of eligible participants was extracted from Borradaile 2017

Fulkerson 2010

Study characteristics	
Methods	Study name: HOME (Healthy Home Offerings via the Mealtime Environment) Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 44 Setting: 2 elementary schools/after-school programmes in Minneapolis Country: United States Country income: high-income Recruitment: Quote: "Parent/child dyads were recruited from two elementary schools/after-school programs via flyers, school newsletters, and small group presentations. After-school program staff were hired on a limited basis to aid recruitment efforts and provide childcare services during the intervention sessions. The parent/guardian that prepared most of the household meals and one 8–10 year old child were recruited per household. Interested parents (n=50) were directed to contact the project director by phone, email, or inperson for eligibility screening." % of eligible population enrolled: dyads: 90% (44/49) Age (years): range 8 to 10 Gender/sex: 48% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary Intervention group(s) participants: 22 Comparator type: non-active intervention Comparison group participants: 22 Comparison: dietary vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI short-term; BMI percentile short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Fulkerson 2010 *(Continued)*

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institutes of Health (NIDDK R21 DK72997). The authors do not have a conflict of interest. The funders played no role in the design, implementation or write up of the study." DOI: "The authors do not have a conflict of interest." General notes: pilot study designed to develop, implement and test the feasibility and acceptability of the HOME program

Fulkerson 2015

Study characteristics	
Methods	Study name: HOME (Healthy Home Offerings via the Mealtime Environment) Plus Study design: RCT (staggered-cohort design - see notes) N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 12 months; 21 months
Participants	Participants: 160 Setting: Minneapolis Country: United States Country income: high-income Recruitment: staff and volunteers recruited children and their families from community centres using flyers, targeted email lists, in-person presentations/discussions, and some learned of the study by word of mouth. % of eligible population enrolled: children: 81% (160/198) Age (years): mean: 10.3 (SD 1.4) Gender/sex: 53% boys
Interventions	Theory: Social Cognitive Theory, Socio-Ecological Framework, Behaviour-Change Techniques Intervention type: dietary Intervention participants: 81 Comparator type: attention control Comparison participants: 79 Comparison: dietary vs control Setting of the intervention: home + community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (12 months) zBMI long term (21 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01538615 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Research reported in this publication was supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) of the National Institutes of Health (NIH) under Award Number R01DK08400 (J. Fulkerson, PI). The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH. Software support was also provided by the University of Minnesota's Clinical and Translational Science Institute (Grant Number UL1TR000114 from the National Center for Advancing Translational Sciences of the NIH)."

Fulkerson 2015 *(Continued)*

	DOI: "The authors declare that they have no competing interests." General notes: a staggered-cohort design was used in which 2 cohorts of families from a large metropolitan area in the upper US Midwest were recruited and randomised to treatment groups 1 year apart (2011 and 2012).

Fulkerson 2022

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

Fulkerson 2022 *(Continued)*

	General notes: a staggered-cohort design was used with 2 cohorts recruited 1 year apart

Gentile 2009

Study characteristics	
Methods	Study name: Switch programme (Switch what you do, view, and chew) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months; 14 months
Participants	Participants: 1323 Setting: 10 elementary schools in Lakeville, Minnesota and Cedar Rapids, Iowa Country: United States Country income: high-income Recruitment: Quote: "All 10 elementary schools in Lakeville, MN and Cedar Rapids, IA, USA, participated in the study. These two school districts were approached due to the requirements of funding agencies. Schools were matched within district by enrollment and percent free/reduced-cost lunch and then randomly assigned to the experimental (three in Cedar Rapids and two in Lakeville) or control (three in Cedar Rapids and two in Lakeville) condition." % of eligible population enrolled: schools: 100% (10/10); children: 65% (1323/2091) Age (years): mean: 9.6 (SD 0.6) Gender/sex: 47% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 670 Comparator type: non-active intervention Comparison group participants: 653 Comparison: dietary and activity vs control Setting of the intervention: school + home + community Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (8 months) BMI medium term (14 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00685555 Funder(s) type: mixed Writing and/or research independent from funder(s): no Funding details: Quote: "In Lakeville, Minnesota, Switch was sponsored by Medica Foundation, the Healthy and Active America Foundation, and Fairview Health Services. In Cedar Rapids, Iowa Switch was sponsored by Cargill, Inc. and the Healthy and Active America Foundation. The Switch program is a program of the National Institute on Media and the Family, a non-profit organization. Several of the authors were employed by the Institute to create the program or to conduct the research (DAG, DAW, MW, SS, RC, and KF), or consulted with the Institute on the design (JCE) or analysis (DWR and RAR)." DOI: "The authors declare that they have no competing interests. " General notes: NR

Gortmaker 1999

Study characteristics	
Methods	Study name: Planet Health Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 18 months (2 school years)
Participants	Participants: 1295 Setting: 10 schools located in 4 communities in the Boston, Mass, metropolitan area Country: United States Country income: high-income Recruitment: Quote: "Planet Health interventions occurred in 5 schools located in 4 communities in the Boston, Mass, metropolitan area; the 5 control schools were located in the same communities. Recruitment of school systems to participate was based on their willingness to implement the classroom and physical education (PE) interdisciplinary curriculum, a multiethnic student population, and cooperation with random assignment of schools to the intervention or control condition. Informed consent procedures were followed for all students. Five schools required an active consent procedure for the survey and physical measurements; parents (or guardians) needed to return a form regardless of whether they wanted their child to participate. The remaining schools used a passive consent procedure: a letter was sent to all parents describing the project, with the option to sign and return the form if they did not want their child to participate." % of eligible population enrolled: schools: NR; children: NR Age (years): mean: 11.7 (SD 0.7) Gender/sex: 52% boys
Interventions	Theory: Behavioural Choice, Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 641 (at baseline) Comparator type: non-active intervention Comparison group participants: 654 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: BMI was measured, but results are not reported; data are reported as proportion of children that had a weight status classified as obesity according to an index based on BMI and triceps skinfold measures
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "National Institutes of Child Health and Human Development; Centers of Disease Control and Prevention." DOI: NR General notes: data reported as prevalence and incidence of, and remission from, obesity; obesity was defined as composite indicator based on both BMI and triceps skinfold value grater equal or than age and sex-specific 85% percentile

Greve 2015

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

Griffin 2019

Study characteristics	
Methods	Study name: HDHK-UK (Healthy Dads, Healthy Kids, United Kingdom) Study design: cluster-RCT N of arms: 2 Unit of allocation: father + ≥ 1 daughter Unit of analysis: individual Intervention period: 9 weeks Follow-up time(s): 3 months and 6 months
Participants	Participants: 61

Griffin 2019 *(Continued)*

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

Grydeland 2014

Study characteristics	
Methods	Study name: HEIA (HEalth In Adolescents) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 months Follow-up time(s): 20 months
Participants	Participants: 2165 Setting: 37 schools in the largest towns/municipalities in 7 counties surrounding Oslo Country: Norway Country income: high-income

Grydeland 2014 *(Continued)*

	Recruitment: eligible schools were those with more than 40 students in the sixth grade and located in the largest towns/municipalities in 7 counties in south-eastern Norway. All sixth graders in these schools were invited to participate. % of eligible population enrolled: schools: 21% (37/177); children: 73% (1580/2165) Age (years): mean: intervention: 11.2 (SD 0.3); control: 11.2 (SD 0.3) Gender/sex: 51.4% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 784 Comparator type: non-active intervention Comparison group participants: 1381 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long-term; BMI long-term (20 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN98552879 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study HEalth In Adolescents (HEIA) was funded by the Norwegian Research Council (grant number 175323/V50) with supplementary funds from the Throne Holst Nutrition Research Foundation, University of Oslo and the Norwegian School of Sport Science" DOI: competing interests: none General notes: NR

Ha 2021

Study characteristics	
Methods	Study name: Active 1 + Fun Study design: cluster-RCT N of arms: 2 Unit of allocation: parent + ≥ 1 child Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months; 12 months
Participants	Participants: 160 Setting: families from 8 local primary schools in Hong Kong Country: China Country income: upper-middle-income Recruitment: 8 local primary schools in Hong Kong responded to invitation and helped recruit families to take part in the trial % of eligible population enrolled: families: 93% Age (years): mean: 10 Gender/sex: 59.6 % boys
Interventions	Theory: Self-Determination Theory Intervention type: activity Intervention group(s) participants: 83 (at baseline) Comparator type: non-active intervention Comparison group participants: 77 (at baseline)

Ha 2021 *(Continued)*

	Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (6 months) BMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12618001524280 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was funded by the General Research Fund (Project number: 14616117), University Grants Committee, Hong Kong. The funding body wasnot involved in study design, data collection, data analyses, result interpretation, or the preparation of the manuscript." DOI: "The authors declare that they have no competing interests." General notes: a total of 171 families from 7 schools were recruited and completed all data collection in the first year (from September 2018). A second cohort of 33 families from 1 school was recruited and began the trial in September 2019. Unfortunately, data collection and intervention delivery to the second cohort were severely affected due to the outbreak of COVID-19 between January to September 2020. As a result, data from the second cohort were not included in the final analyses.

Habib-Mourad 2014

Study characteristics	
Methods	Study name: Health-E-PALS (Healthy Eating and Physical Activity in Lebanese School) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 4 months
Participants	Participants: 374 Setting: 8 private and public schools in Beirut Country: Lebanon Country income: lower-middle-income Recruitment: Quote: "Children were recruited in several phases. schools were approached through the Ministry of Higher Education. A letter explaining all components of the intervention was sent to schools, this was followed by a visit conducted by the researcher to the school principle to further provide details along term with the aims and objectives of the study. All eight schools approached, agreed to participate. schools were asked to select one or two classes of children aged 9-11 years which corresponded to grades Four or Five to participate in the study (Habib-Mourad 2013). All students in Grades 4 and 5 (aged 9–11 years) were invited to take part in the pilot study (Habib-Mourad 2014)." % of eligible population enrolled: schools: 100% (8/8 selected); children: 97% (374/387) Age (years): mean: intervention: 10.3 (SD 0.9); control: 10.1 (SD 1) Gender/sex: 54.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 193 Comparator type: non-active intervention Comparison group participants: 181 Comparison: dietary and activity vs control

Habib-Mourad 2014 *(Continued)*

	Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03040258 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by an Eastern Mediterranean Regional Office Special Grant for Research in Priority Areas of Public Health (EMRO/WHO)." DOI: "The authors declare that they have no competing interests." General notes: pilot study of Habib-Mourad 2020

Habib-Mourad 2020

Study characteristics	
Methods	Study name: Ajyal Salima Program Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years; 3 years
Participants	Participants: 1239 Setting: private and public schools in Beirut Country: Lebanon Country income: lower-middle-income Recruitment: Quote: "Private schools were directly approached by the research team to participate in the study whereas public schools were recruited by the Lebanese Ministry of Education and Higher Education (MEHE). The final list of participating schools included 20 public and 16 private schools. Schools were stratified by type (private and public). Within each participating school, all classrooms in grades 4 and 5 (aged 8–12 years) were approached, and all students in the selected classrooms were invited to participate in the study. Consent forms were sent to the students' parents/guardians to obtain their approval; students also signed assent forms." % of eligible population enrolled: schools: NR; children: 62% (1239/2000) Age (years): mean: 9.95 (SE 1.13) Gender/sex: 46.3% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 698 Comparator type: non-active intervention Comparison group participants: 541 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long-term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Habib-Mourad 2020 *(Continued)*

Notes	Clinical Trial Registry: NCT04297059 Funder(s) type: industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The intervention was funded by the Nestlé for Healthier Kids Initiative–Nestlé Middle East. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results." DOI: "The authors declare no conflict of interest." General notes: Habib-Mourad 2014 is the pilot study

Haire-Joshu 2010

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

Haire-Joshu 2010 *(Continued)*

	General notes: the authors reported that due to the academic calendar, 4 months were allotted for delivery of PARADE between conduct of the pre- and post-test. The mean time elapsed between pre-test and post-test was 5.7 months (SD 2.6) with a minimum of 2.1 months and maximum of 16.2 months.

Han 2006

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

Hannon 2018

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

HEALTHY Study Group 2010

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

HEALTHY Study Group 2010 *(Continued)*

	Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 3 years
Participants	Participants: 11158 Setting: 42 schools from 7 centres across the country Country: United States Country income: high-income Recruitment: Quote: "After a list of potential schools was identified by each center, the principal investigator and the project coordinator contacted the superintendent of schools and other key individuals at the district level and provided them with an overview of the study. Meetings were then scheduled with school principals during which they were given an informational notebook. Sixth grade students were recruited and enrolled during a single campaign focusing on participation in health screenings and data collection procedures. A recruitment packet was provided to every student in the sixth grade during the fall of 2006. The packet contained letters from the study center principal investigator and the school principal to the parents/guardians of the student, a brochure that described the study, its objectives and basic information about data collection, parent informed consent forms, student informed assent forms and a pen to facilitate the completion of materials. Black and Hispanic children of lower socioeconomic status were oversampled, given the fact that these children are at a high risk for both obesity and type 2 diabetes." % of eligible population enrolled: schools: NR (42 schools recruited, not reported how many potential schools were identified); children: 59% (6573/11158) Age (years): mean: 11.3 (SD 0.6) Gender/sex: 47.3% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 5571 Comparator type: non-active intervention Comparison group participants: 5587 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long-term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03040258 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by grants (U01-DK61230, U01-DK61249, U01- DK61231, and U01-DK61223) from the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health to the Studies to Treat or Prevent Pediatric Type 2 Diabetes (STOPP-T2D) collaborative group, with additional support from the American Diabetes Association. The following companies and persons provided donations in support of the study's efforts: Discovery Health Channel, General Mills, Jamis Bicycles, Johnson & Johnson, LifeScan, Nestlé, Neutrogena, Nike, Polar, Walgreens, Shaun T and Beachbody, Leslie Sansone, Chef LaLa, Jakob Dylan, Randy Jackson, Jonas Brothers, Massey Brothers, James Edward Olmos, and Jerry Zucker." DOI: "Disclosure forms provided by the authors are available with the full text of this article at NEJM.org." General notes: NR

Hendrie 2011

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: family (parent(s) + ≥ 1 child) Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 24 weeks
Participants	Participants: 145 Setting: seven schools in Adelaide Metropolitan area Country: Australia Country income: high-income Recruitment: families were recruited via media publicity (newspaper stories and paid advertisements) and an established volunteer database of families between June 2009 and January 2010 % of eligible population enrolled: schools: 87.5% (7/8); families: 94% (171/182) Age (years): mean: 8.6 (SD 2.9) Gender/sex: 60% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 76 Comparator type: non-active intervention Comparison group participants: 69 Comparison: dietary vs control Setting of the intervention: home Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (24 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12609000453280 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The research was supported by CSIRO Food and Nutrition Sciences. GS was a Flinders University Nutrition and Dietetics Masters Student. RKG is funded by a NHMRC public health training award (478115). The RCT was funded by Dairy Australia. The study was conducted and this manuscript prepared without input from Dairy Australia (the funding body). Dairy Australia approved this manuscript for publication. All authors declare no conflicts of interest."" DOI: "Neither of the authors declared a conflict of interest." General notes: NR

Hendy 2011

Study characteristics	
Methods	Study name: KCP (Kid's Choice Program) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months

Hendy 2011 *(Continued)*

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

Hooft van Huysduynen 2014

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

Hooft van Huysduynen 2014 *(Continued)*

	Intervention type: dietary Intervention group(s) participants: 92 (parents) Comparator type: non-active intervention Comparison group participants: 94 (parents) Comparison: dietary vs control Setting of the intervention: home Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narratively
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: the target of the intervention are the parents; BMI data are reported only for the parents

Hopper 2005

Study characteristics	
Methods	Study name: Family Fitness Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 8 months
Participants	Participants: 238 Setting: 6 elementary schools in Humboldt County, California Country: United States Country income: high-income Recruitment: 6 elementary schools in Humboldt County, California, a predominantly rural area, agreed to participate % of eligible population enrolled: classrooms: NR; children: 62% (238/381; number of children excluded because not eligible is not reported) Age (years): mean: 8.57 (SD 0.63) Gender/sex: 51% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 142 (at baseline) Comparator type: non-active intervention Comparison group participants: 96 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a

Hopper 2005 *(Continued)*

Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Support for this study was provided by the National Heart, Lung and Blood Institute, R15 HL 42626-01A4." DOI: NR General notes: NR

Howe 2011

Study characteristics

Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 106 Setting: 5 local elementary schools in Georgia Country: United States Country income: high-income Recruitment: Quote: "Black boys (8–12 years of age) were recruited from five local elementary schools using study fliers. All 3rd through 5th grade black boys were eligible if they met the eligibility criteria. Twenty-eight percent (300 boys) of the targeted population (1050 boys in 3rd–5th grade) were screened by phone to determine their eligibility to participate in the study. Potential participants and their parent or guardian were invited to attend a group information session where they read and signed the informed consent/assent documents in accordance with the Medical College of Georgia Human Assurance Committee." % of eligible population enrolled: children: 71% (106/149) Age (years) mean: attended participants: 9.7 (SE 0.2); non-attended participants: 9.8 (SE 0.2); controls: 9.9 (SE 0.2) Gender/sex: 100% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 62 Comparator type: non-active intervention Comparison group participants: 44 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the NIH (Grant HL69999)" DOI: NR General notes: NR

Hull 2018

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

Hull 2018 *(Continued)*

	outcome for follow-up assessments that occurred up to 9.9 months after baseline, and the long-term outcome for follow-up assessments that took place between 10 and 24 months after baseline.

Huys 2020

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

Huys 2020 *(Continued)*

	evaluated. zBMI data at follow-up not reported but height and weight was measured at follow-up: "All participant outcome measures were assessed at baseline and follow-up (12 weeks)." zBMI listed a secondary outcome in the trial registration but not in the main article.

Ickovics 2019

Study characteristics	
Methods	Study name: School-Based Policies intervention Study design: cluster-RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 1 year; 2 years; 3 years
Participants	Participants: 756 Setting: 12 schools (kindergarten through 8th grade) in New Haven, Conecticut Country: United States Country income: high-income Recruitment: Quote: "Twelve schools (kindergarten through eighth grade [K–8]) were randomly selected from among the 50 K–8 district schools. All agreed to participate. Parental consent and student assent were obtained, and participation was entirely voluntary and noncoercive." % of eligible population enrolled: schools: 24% (12/50); children: NR Age (years): mean: 10.9 (SD 0.62) Gender/sex: 46.2% boys
Interventions	Theory: NR Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention participants: Policy interventions related to nutrition: 202 Policy interventions related to physical activity: 176 Policy interventions related to nutrition and physical activity: 237 Comparator type: attention control Comparison participants: 141 Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: BMI percentile long-term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02043626 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the National Institute of Child Health and Human Development, NIH (1R01 HD070740, JR Ickovicsand MB Schwartz, Multiple PIs), with additional support from the U.S. Centers for Disease Control and Prevention and Yale-Griffin Prevention Research Center (5U48DP000053, JR Ickovics, PI). The funders had no role in the design, implementation, evaluation, or interpretation of this study." DOI: "No financial disclosures were reported by the authors of this paper. "

Ickovics 2019 *(Continued)*

	General notes: NR

James 2004

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

Jansen 2011

Study characteristics	
Methods	Study name: Lekker Fit! (Enjoy being fit!) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 2770 Setting: 20 primary schools in low-income inner-city neighbourhoods in Rotterdam Country: Netherlands Country income: high-income Recruitment: Quote: "Primary schools in inner-city areas of Rotterdam were free to apply for participation in the intervention. A total of 27 schools spontaneously applied. No further exclusion criteria for schools or pupils were applied. Parents and older children received information on the study and parents supplied their consent through the schools. All children were free to refuse participation without giving any explanation." % of eligible population enrolled: schools: 74% (20/27); children: NR Age (years): mean: grade 3 to 5 group: intervention: 7.7 (SD 1.0); control: 7.8 (SD 1.0); grade 6 to 8 group: intervention: 10.8 (SD 1.0); control: 10.8 (SD 1.0) Gender/sex: grade 3 to 5 intervention: 49.5% boys; grade 3 to 5 control: 49% boys; grade 6 to 8 intervention: 47.2% boys; grade 6 to 8 control: 51% boys
Interventions	Theory: Theory of Planned Behaviour, Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 1271 Comparator type: non-active intervention Comparison group participants: 1499 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN84383524 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "No details on funding reported in the main article but in the trial registration the funder type is reported as government (Community of Rotterdam, The Netherlands). The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper." DOI: "The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper." General notes: NR

Johnston 2013

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

Johnston 2013 *(Continued)*

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

Jones 2015

Study characteristics	
Methods	Study name: The Wollongong SPORT Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 7 months

Jones 2015 *(Continued)*

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

Kain 2014

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 651 Setting: 9 primary public schools in Ñuñoa, a district of Santiago Country: Chile Country income: high-income Recruitment: Quote: "There are 10 primary public schools in Ñuñoa, of these, one was excluded because in 2010 one of our students had carried out a pilot program in that school. In 2011, the authors selected the sample for this intervention; it included children from kindergarten to 2nd grade

Kain 2014 *(Continued)*

	from the 9 schools. They were followed during 12 months (4 in 2011 and 8 in 2012). The total sample size amounted to 1471 children." % of eligible population enrolled: schools: 100% (9/9); children: NR Age (years): mean: 6.6 (SD 1.07) Gender/sex: 53.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 651 (at baseline) Comparator type: non-active intervention Comparison group participants: 823 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: NR Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The authors would like to thank the “Corporaci´onMunicipal de Educaci´on y Salud” of ˜ Nu˜noa for funding the study. The authors declare that there is no conflict of interests regarding the publication of this paper." DOI: "The authors declare that there is no conflict of interests regarding the publication of this paper." General notes: NR

Keller 2009

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 365 Setting: communes in Germany Country: Germany Country income: high-income Recruitment: Quote: "The pediatricians forwarded the values for height and body weight of their patients pseudonymously to a central CrescNet database. The network CrescNet collected data (participant height and weight) from > 300,000 children and 365 were selected at risk of obesity (age 4-7 years) to participate. " % of eligible population enrolled: children: 100% (365/365) Age (years): mean: intervention: 5.9 (SD 1.4); control: 5.6 (SD 1.2) Gender/sex: 46.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 180

Keller 2009 *(Continued)*

	Comparator type: non-active intervention Comparison group participants: 185 Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The authors declare that they have no financial ties with a company whose product plays an important role in the article (or with a company that distribute a competitor product)." DOI: "The authors declare that they have no financial connections with a company whose product features prominently in the article (or with a company that sells a competing product)." General notes: article in German that we translated using Google Translate. Eligible children were at risk of a chronic disease. There were 2 subgroups for the intervention group: 59 children were assigned to the active intervention group with willingness to participate (IGa). The 121 children from families who reject the offer of targeted prevention formed the "observed intervention group" (I-Go).

Keshani 2016

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 221 Setting: 10 high schools and 1 class in each school in Shiraz Country: Iran Country income: lower-middle-income Recruitment: Quote: "Two out of four educational districts were selected randomly; then eight schools and one class in each school were selected. Grade 4 students and their parents participated in this school-based nutrition education intervention." % of eligible population enrolled: schools: NR; children: 77% (171/221) Age (years): range 9.5 to 10.5 Gender/sex: 48.5% boys (refers to the sample included in the analysis)
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 110 Comparator type: non-active intervention Comparison group participants: 111 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school

Keshani 2016 *(Continued)*

Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: IRCT2016012626078N2 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by Health Sciences Research Center, affiliated with Shiraz University of medical sciences, Shiraz, Iran." "This study was supported by Shiraz University of Medical Sciences, Shiraz, Iran" DOI: "The authors declared no financial interest." General notes: the clusters are the schools; randomisation was done at the level of district, then school and 1 class from each school was selected (method not reported)

Ketelhut 2022

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

Ketelhut 2022 *(Continued)*

	DOI: "4 authors declare that they have no conflicts of interest. Besides being a senior researcher at the Zurich University of the Arts, the final author is also co-founder and CEO of the spinoff company Sphery. No revenue was paid (or promised to be paid) to this author, Sphery, or the research institutions." General notes: unclear if the unit of randomisation was the student or the classroom

Khan 2014

Study characteristics	
Methods	Study name: FITKids (Fitness improves thinking in kids) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 9 months
Participants	Participants: 220 Setting: 7 schools in East-central Illinois Country: United States Country income: high-income Recruitment: Quote: "Prepubertal children (8–9 years old) were recruited from 7 schools in east-central Illinois. All children in third to fifth grade were targeted, and those who expressed interest were screened for physical disabilities that could limit participation in the after-school program." % of eligible population enrolled: children: 66% (220/334) Age (years): mean: intervention: 8.8 (SD 0.5); control: 8.8 (SD 0.6) Gender/sex: 53.2% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 110 Comparator type: non-active intervention Comparison group participants: 110 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01334359 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funded by the National Institutes of Health (NIH) grant HD055352." DOI: "The authors have indicated they have no potential conflicts of interest to disclose. " General notes: the study took place among 4 cohorts between 2009 and 2013

Kipping 2008

Study characteristics	
Methods	Study name: AFLY5 (Active for Life Year 5)

Kipping 2008 *(Continued)*

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

Kipping 2014

Study characteristics	
Methods	Study name: AFLY5 (Active for Life Year 5) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 to 7 months (2 to 3 school terms) Follow-up time(s): 7 months; 19 months

Kipping 2014 *(Continued)*

Participants	Participants: 2221 Setting: 60 state primary and junior schools in the Bristol City and North Somerset administrative areas Country: United Kingdom Country income: high-income Recruitment: Quote: "State primary or junior schools with year 4-6 pupils in the Bristol City and North Somerset administrative areas were eligible for inclusion. Between March and July 2011 all state primary and junior schools with children in years 4-6 (age 8-11 years) in the areas covered by Bristol City Council (93 schools) and North Somerset Council (55 schools) were invited to participate. We invited 148 schools to participate, and 63 expressed an interest in taking part; three schools subsequently withdrew their interest. We recruited 60 schools (46 in Bristol and 14 in North Somerset). Once schools had agreed to participate in the study, we sent parents/guardians of children in year 4 a letter and information sheet about the study with an opt-out consent form for their child for each of the measurements." % of eligible population enrolled: schools: 40.5% (60/1480); children: NR Age (years): mean: intervention: 9.5 (SD 0.3); control: 9.5 (SD 0.3) Gender/sex: 49.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 1064 Comparator type: non-active intervention Comparison group participants: 1157 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (7 months) zBMI long-term (19 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN50133740 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The AFLY5 RCT is funded by the UK National Institute for Health Research (NIHR) Public Health Research Programme (09/3005/04). Funding also from the UK Medical Research Council (MRC) (MC_UU_12013/5), the British Heart Foundation, Cancer Research UK, the Economic and Social Research Council (RES-590-28-0005), the Welsh Assembly Government and the Wellcome Trust (WT087640MA), under the auspices of the UK Clinical Research Collaboration. None of the funders had involvement in the Trial Steering Committee, data analysis, data interpretation, data collection, or writing of the paper" DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: support from research funders in accordance with the funding statement included in the manuscript;no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work, other than that RC is directer of DECIPHer Impact, a not for profit company that is wholly owned by the Universities of Brisol and Cardiff whose purpose is to licence and support the implementation of evidenced based health promotion interventions." General notes: the pilot study is Kipping 2008. None of the schools or teachers who were involved in the feasibility and pilot work were included in the main trial.

Klesges 2010

Study characteristics

Klesges 2010 *(Continued)*

Methods	Study name: Memphis GEMS (Girls health Enrichment Multisite Studies) Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 1 year; 2 years
Participants	Participants: 303 Setting: communities in Memphis, Tennessee Country: United States Country income: high-income Recruitment: recruitment occurred over 5 waves, primarily through television and radio ads, and through flyers and presentations in the community. Advertisements described GEMS as a study of healthy growth. Further details regarding our recruitment strategies are described in Klesges et al 2008 (study protocol): "Girls and their parent/caregiver were recruited primarily through television advertisements featuring one of the study interventionists, a female, African-American adult. In addition, public service announcements were placed on African-American radio stations, and flyers were distributed along term with presentations at elementary schools, African-American churches, and local health fairs. All advertisements indicated that GEMS was a study of healthy growth intended to encourage positive physical and emotional growth, as well as celebrate and instill community pride." % of eligible population enrolled: dyads: 90% (303/337) Age (years): mean: 9.3 (SD 0.9) Gender/sex: 100% girls
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 153 Comparator type: attention control Comparison participants: 150 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (1 year) BMI long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00000615 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "National Heart, Lung, and Blood Institute Project Office" DOI: NR General notes: Memphis GEMS phase 1 is described in Beech 2003

Kobel 2017

Study characteristics	
Methods	Study name: Join the Healthy Boat (Baden-Württemberg Study) Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual

Kobel 2017 *(Continued)*

	Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 525 Setting: 91 primary schools of the state of Baden-Württemberg Country: Germany Country income: high-income Recruitment: Quote: "Information about the program and Baden-Württemberg Study were issued during the academic year 2009/2010 using a number of ways, e.g. education and health authorities, and universities of education; electronic newsletter; television and radio; adverts in training catalogs for primary school teachers; participation at trade shows. The recruitment process was also promoted by ten informative events in different parts of Baden-Württemberg. Further, all primary schools of the state of Baden-Württemberg received written information about the program and the structure of the study, asking teachers to participate. Interested teachers contacted the program center. The participation in the program was voluntary, participating teachers had to agree with randomization. Within the larger study, only those classified as having a migration background were included in this sub-sample." % of eligible population enrolled: schools: 97% (91/94); children: 100% (525/525) Age (years): mean: 7.1 (SD 0.7) Gender/sex: 48.6% boys
Interventions	Theory: Bandura's Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 318 Comparator type: non-active intervention Comparison group participants: 207 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium-term; BMI percentile medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: DRKS00000494 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The school-based health promotion programme "Join the Healthy Boat" and its evaluation study were financed by the Baden-Wurttemberg Foundation, which had no influence on the content of this paper." DOI: "The authors declare that there is no conflict of interests regarding the publication of this paper." General notes: trial nested in the Baden-Württemberg Study: only the subsample of children with at least 1 parent was born abroad or children that were spoken to in another language than German in the first 3 years of life were included in the substudy.

Kocken 2016

Study characteristics	
Methods	Study name: Extra Fit! Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years

Kocken 2016 *(Continued)*

	Follow-up time(s): 6 months; 24 months
Participants	Participants: 1112 Setting: 45 schools Country: Netherlands Country income: high-income Recruitment: a total of about 500 schools were approached for participation in this study % of eligible population enrolled: schools: 60% (45/75; randomised/agreed to participate); children: NR Age (years): mean: intervention: 9.2 (SD 0.6); control: 9.1 (SD 0.6) Gender/sex: 48% boys
Interventions	Theory: Theory of Planned Behaviour Intervention type: dietary and activity Intervention group(s) participants: 615 Comparator type: non-active intervention Comparison group participants: 497 Comparison: dietary and activity vs control Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (6 months) zBMI long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: unclear/NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research project was funded by The Netherlands Organization for Health Research and Development (grant 120610007). The food diary/24-h recall and physical activity measurements were supported by the Netherlands Heart Foundation." DOI: "The research project was funded by the Netherlands Organization for Health Research and Development. The food diary/24h recall and physical activity measurements were supported by the Netherlands Heart Foundation." General notes: NR

Kovalskys 2016

Study characteristics	
Methods	Study name: SALTEN (Spanish initials of: Healthy, Active, and Free from Non Communicable Chronic Diseases) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 18 months
Participants	Participants: 760 Setting: Moron, a town in the province of Buenos Aires Country: Argentina Country income: upper-middle-income Recruitment: participation was voluntary and subsequent to parental signed consent % of eligible population enrolled: schools: NR; children: NR

Kovalskys 2016 *(Continued)*

	Age (years): mean: 9.5 Gender/sex: 48% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 424 Comparator type: non-active intervention Comparison group participants: 336 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long-term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: NR Writing and/or research independent from funder(s): yes Funding details: no funding reported. Note that the funding for the Mini-SALTEN study was reported as: "The Coca Cola Foundation provided a scientific grant for the MINI SALTEN study. The International Life Sciences Institute of Argentina provided additional support to the authors and to its' implementation. Competing interests: The authors declare that they have no competing interests. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of manuscripts." DOI: "The authors declare that they have no competing interests. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of manuscripts." General notes: conference abstract, no details about intervention are reported and baseline data are extracted from Kovalskys 2016b

Kriemler 2010

Study characteristics	
Methods	Study name: KISS (Kinder-Sportstudie) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 9 months; 3 years
Participants	Participants: 502 Setting: 15 schools in Aargau and Baselland provinces Country: Switzerland Country income: high-income Recruitment: Quote: "Recruitment started in Autumn 2004, and the actual study took place between August 2005 and July 2006. Intervention and control schools were located in provinces that were comparable as regards socioeconomic status of the population and recreational facilities at school. Classes from the intervention and control groups were located in different villages or towns. From study protocol: Recruitment of participating schoolswas based on the willingness of these 95 elementary schools to be randomized either to an intervention group or a control group." % of eligible population enrolled: schools: 16% (15/95); classrooms: 15% (28/190); children: 93% (502/540) Age (years): mean: 6.9 (SD 0.3) Gender/sex: 48.8% boys

Kriemler 2010 *(Continued)*

Interventions	Theory: Social Ecological Model Intervention type: activity Intervention group(s) participants: 297 Comparator type: non-active intervention Comparison group participants: 205 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (9 months) BMI long-term (3 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN15360785 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was funded by the Swiss Federal Office of Sports (grant number SWI05-013), the Swiss National Science Foundation(grant number PMPDB-114401), and the Diabetes Foundation of the Region of Basel. The funding sources had no role in the design and conduct of the study or in the collection, management, analysis, and interpretation of the data." DOI: competing interests: none General notes: a higher number of schools in the intervention than in the control group, i.e. a randomisation ratio of 3:2, was chosen to gain more experience with the intervention and to reduce costs of the trial

Kubik 2021

Study characteristics	
Methods	Study name: SNAPSHOT (Students, Nurses, and Parents Seeking Healthy Options Together) Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months; 24 months
Participants	Participants: 132 Setting: 54 elementary schools in Schools in Minneapolis/St. Paul, Minnesota Country: United States Country income: high-income Recruitment: Quote: "Participants were recruited in partnership with an urban (43 elementary schools) and suburban (11 elementary schools) school district located in the St. Paul/Minneapolis, Minnesota metropolitan area. Cohorts of children and parents were recruited annually from 2014 to 2017 and January through May for a total of four cohorts. Recruitment materials were developed in collaboration with school district administrators and included eligibility criteria, study participation requirements, and study staff contact information for enrollment and were distributed to all parents of second-, third-, and fourth-grade students attending a study school." % of eligible population enrolled: dyads: 89.8% (132/147) Age (years): mean: 9.3 (SD 0.9) Gender/sex: 51% boys
Interventions	Theory: Social-Ecological Framework, the Healthy Learner Model for Student Chronic Condition Management, the Chronic Care Model Intervention type: dietary and activity

Kubik 2021 *(Continued)*

	Intervention participants: 66 Comparator type: attention control Comparison participants: 66 Comparison: dietary and activity vs control Setting of the intervention: home + community Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) BMI long term; zBMI long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02029976 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was supported by the National Institute of Nursing Research under Award Number R01NR013473 of the NIH....The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH." DOI: "The content is solely the responsibility of the authors and does not necessarily represent the views of the NIH." General notes: targeted secondary prevention of obesity among 8- to 12-year old children with a reported BMI ≥ 75th percentile

Lau 2016

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 80 Setting: 1 local primary school in Hong Kong Country: China Country income: upper-middle-income Recruitment: Quote: "Participants were recruited from one local primary school. A prior PA promotion workshop was delivered in the primary school to introduce AVGs and their health benefits. All students in grade four and their parents were invited to the workshop. Five students were invited to perform a trial play session in the workshop. An invitation letter, participant information sheet, and study consent form were delivered to workshop participants (both the students and their parents)." % of eligible population enrolled: children: 54% (80/149) Age (years): mean: 9.23 (SD 0.52) Gender/sex: 68.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 40 Comparator type: non-active intervention Comparison group participants: 40 Comparison: activity vs control Setting of the intervention: school

Lau 2016 *(Continued)*

	Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was funded by the General Research Fund (GRF) from Research Grants Council of Hong Kong (project number: GRF 244913)." DOI: "No competing financial interests exist." General notes: NR

Lazaar 2007

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

Lazaar 2007 *(Continued)*

	Funding details: Quote: "This study was supported by grants from French National Plan for Nutrition and health (PNNS), the Comité Régional Exécutif des Actions de Santé d'Auvergne (CREAS), the Caisse Régionale d'Assurance Maladie d'Auvergne (CRAMA), the Appert Institutes, the town of Clermont-Ferrand and schools' governing bodies of Clermont-Ferrand." DOI: NR General notes: our analyses only included children with weight status classified as normal weight

Lent 2014

Study characteristics	
Methods	Study name: Healthy Corner Store Initiative Study design: cluster-RCT N of arms: 2 Unit of allocation: school-store (school and its surrounding corner stores within a 4-block radius) Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 1 year; 2 years
Participants	Participants: 770 Setting: ten schools in Philadelphia, PA Country: United States Country income: high-income Recruitment: Quote: "Staff approached principals in a pre-determined random order. Of the 20 eligible schools, 13 were approached, 3 declined and 10 were randomized. The seven schools not approached were in close proximity to other schools or had limited nearby corner stores. The principal of each school sent a letter home describing the study and inviting parents to consent and children to assent for assessments of the child's height and weight, as well as to assessments (intercepts) of corner store purchases made by the children. All children were encouraged to return the consent/assent form regardless of whether or not they agreed to participate. Study staff approached the owners of all corner stores within a four block radius of each school." % of eligible population enrolled: schools: 50% (10/20); children: 42.6% (767/1802) Age (years): mean: intervention: 10.97 (SD 1.02); control: 10.99 (SD 0.92) Gender/sex: intervention: 44.6% boys; control: 42.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary Intervention group(s) participants: 436 Comparator type: non-active intervention Comparison group participants: 334 Comparison: dietary vs control Setting of the intervention: school + community Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term; BMI percentile medium-term (1 year) BMI long-term; zBMI long-term; BMI percentile long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The Robert Wood Johnson Foundation (Healthy Eating Research grant #63052) and NIH (F32DK096756). Disclosure: GDF served as a consultant to ConAgra Foods, United Health Group, and Tate & Lyle during the time of this study. GDF and SSV are currently full-time em-

Lent 2014 *(Continued)*

	ployees of Weight Watchers International. All other authors report no conflict of interest or financial disclosures." DOI: "One author served as a consultant to ConAgra Foods, United Health Group, and Tate & Lyle during the time of this study. Two authors currently full time employees of Weight Watchers International. All other authors report no conflict of interest or financial disclosures." General notes: NR

Levy 2012

Study characteristics	
Methods	Study name: Nutrition on the go Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 7 months
Participants	Participants: 1020 Setting: 60 schools in different municipalities of the State of Mexico Country: Mexico Country income: upper-middle-income Recruitment: Quote: "The sample was representative of the population attending fifth grade elementary schools in the State of Mexico. Sixty schools were selected at random, of a total of 2,969 public schools in the State of Mexico that receive school breakfasts. Within each school, 17 fifth grade children were also ran domly selected, resulting in a total of 510 children per intervention group in order to have a sufficient sample size at follow-up." % of eligible population enrolled: schools: 2% (60/2969); children: NR (note: the non-response rate expected in this study was ≤ 5% Age (years): % of age 10: intervention: 78.6%; control: 75.3% Gender/sex: intervention: 48.4% boys; control: 50.3% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 510 Comparator type: non-active intervention Comparison group participants: 510 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by: State system for the comprehensive development of the family, State of Mexico (DIFEM)." DOI: "The authors declare that they have no competing interests." General notes: NR

Li 2010

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

Li 2019

Study characteristics	
Methods	Study name: CHIRPY DRAGON Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months

Li 2019 *(Continued)*

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

Lichtenstein 2011

Study characteristics

Lichtenstein 2011 *(Continued)*

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

Liu 2019

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 year Follow-up time(s): 6 months, 1 year
Participants	Participants: 1889 Setting: 12 schools from Dongcheng District, a central districts in the east of Beijing Country: China Country income: upper-middle-income

Liu 2019 *(Continued)*

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

Liu 2022

Study characteristics	
Methods	Study name: DECIDE (Diet, Exercise and Cardiovascular Health) - Children Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 4 months; 9 months
Participants	Participants: 1392 Setting: 24 schools from 3 socioeconomically distinct Chinese areas: Beijing, Changzhi of Shanxi Province, and Urumuqi of Xinjiang Province Country: China Country income: upper-middle-income Recruitment: Quote: "We selected 3 socioeconomically distinct regions in China from the eastern (Beijing), central (Changzhi, in Shanxi Province), and western (Urumuqi, in Xinjiang Province) parts of the country. A total of 24 primary schools were selected, with 8 schools in each region (eFigure 1 in Supplement 3). We recruited 1 or 2 grade 4 classes from each school, depending on class size, to ensure that approximately 50 children aged 8 to 10 years were included per school." % of eligible population enrolled: schools: 37% (24/70); children: 82% (1392/1695) Age (years): mean: intervention: 9.6 (0.4); control: 9.6 (0.4)

Liu 2022 *(Continued)*

	Gender/sex: 51.5% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 705 Comparator type: non-active intervention Comparison group participants: 687 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (4 months) BMI medium-term; zBMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03665857 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The design and conduct of the study was supported by grant 2016YFC1300204 from the National Key R&D Program of China (Dr Wang), grants 92046019 (Dr-Wang) and 81903343 (Dr Liu) from the National Natural Science Foundation of China, and grant 2019M650391 from the China Postdoctoral Science Foundation (Dr Liu). The sponsors had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication." DOI: "One author reported serving as a consultant for Medtronic outside of the submitte dwork. No other disclosures were reported." General notes: outcome data at the last follow-up (21 months after baseline as reported in the study protocol) are not reported in the main article

Llargues 2012

Study characteristics	
Methods	Study name: Avall project Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years; 4 years; 6 years; 10 years
Participants	Participants: 278 Setting: 16 schools in Granollers, Barcelona Country: Spain Country income: high-income Recruitment: Quote: "In 2006, the 16 schools in Granollers (10 public schools fully supported by the government and 6 semi-private schools partially supported by the government) were randomly distributed to the intervention or control group stratified according to public or semi-private status, number of first-year's classrooms and socioeconomic status of the local neighborhood. All the children born in 2000 who attended any of the schools in Granollers were eligible to participate." % of eligible population enrolled: schools: 100% (16/16); children: 85% (958/704) Age (years): mean: 6.03 (SD 0.3) Gender/sex: 54% boys

Llargues 2012 *(Continued)*

Interventions	Theory: Investigation, Vision, Action and Change (IVAC) Methodology Intervention type: dietary and activity Intervention group(s) participants: 156 (at baseline) Comparator type: non-active intervention Comparison group participants: 122 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long-term (10 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01156805 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported by Observatori de la Salut Carles Vallbona, Fundacio´ Hospital Asil de Granollers, Public Health Department, Granollers City Council, Primary Health Subdivision (PCS) Granollerse Mollet, Catalan Institute of Health and by Health Department, Generalitat de Catalunya, Spain." DOI: "The authors state that they have no conflicts of interest." General notes: NR

Lloyd 2018

Study characteristics

Methods	Study name: HeLP (Healthy Lifestyles Programme) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 school terms (the spring and summer term of Year 5 and the autumn term of Year 6) Follow-up time(s): 18 months; 24 months
Participants	Participants: 1324 Setting: 32 state-run primary and junior schools in Devon and Plymouth Country: United Kingdom Country income: high-income Recruitment: Quote: "All state-run primary and junior schools in Devon and Plymouth (UK) with enough pupils for at least one year-5 class (children aged 9–10 years) were eligible. Schools for children whose additional needs cannot be met in a mainstream setting were excluded because they were unlikely to be teaching the standard national curriculum, around which the intervention had been designed. Schools willing to participate and fulfilling the inclusion criteria were then purposefully sampled by JL and KW to represent a range of school sizes (one to three year-5 classes), locations (urban and rural), and socioeconomic status (<19% and ≥19% of children eligible for free school meals). We aimed to have half of the schools in the trial with at least the national average proportion of pupils eligible for free schools meals (19% at the time of recruitment of schools). Before randomisation, head teachers from all schools gave written informed consent. To accommodate the logistics and personnel required for delivering the week-long term drama component of the intervention to each year-5 class, the trial ran across two cohorts (cohort 1 commenced the trial in September, 2012, and cohort 2 in September, 2013). Schools that were eligible but not sampled for the trial were asked if they were prepared to go on a waiting list in case any of the schools allocated to participate in cohort 2 dropped out during the interim 1-year period before commencing participation. All children in all year-5 classes within each recruited school were invited to partici-

Lloyd 2018 *(Continued)*

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

Lynch 2016

Study characteristics	
Methods	Study name: Let's Go! 5-2-1-0 Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 4 months
Participants	Participants: 51 Setting: a local elementary school in Rochester, Minnesota Country: United States Country income: high-income Recruitment: Quote: "All second- and third-grade students at a local elementary school (n = 183) in Rochester, Minnesota, were invited to participate in the study. children were included in the study if a caregiver signed the HIPAA (Health Insurance Portability and Accountability Act) form, completed the initial study surveys, and if the child gave assent. For families whose primary language was Spanish, documents were translated to Spanish by the Mayo Clinic Language Department. Se-

Lynch 2016 *(Continued)*

	cond- and third-grade teachers sent home a packet of information, prepared by the study team, to each student's legal guardian caregiver, including a letter of invitation, which explained the study, a 5-2-1-0 Healthy Habits survey, a demographic survey, and a HIPAA form accompanied by a return envelope. The contact letter also stated that, by completing questionnaires, caregivers authorized the use of pedometers for their child both at the beginning and the end of the study. For families whose primary language was not English or Spanish, school interpreters were available to translate information via phone; all school interpreters satisfy the Minnesota Court Interpreter training requirements." % of eligible population enrolled: classroom: NR; children: 28% (51/183) Age (years): median: intervention: 8 (IQR 7 to 8), control: 8 (IQR 7 to 9) Gender/sex: 51% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 29 Comparator type: non-active intervention Comparison group participants: 22 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as median (IQR) BMI
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was supported by a grant from the Ben and Zelma Dorson Family Charitable Foundation as well as funding through the Mayo Clinic Department of Family Medicine. This publication was made possible by the CTSA Grant UL1 TR000135 from the National Center for Advancing Translational Sciences (NCATS), a component of the National Institutes of Health (NIH).The contents of this study are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health."" DOI: "The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article." General notes: data reported as median (IQR) BMI

Macias-Cervantes 2009

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 76 Setting: public schools at León, Guanajuato Country: Mexico Country income: upper-middle-income Recruitment: Quote: "We carried out a randomized, controlled trial during 12 weeks in children from public schools at León, Guanajuato, Mexico. We invited to participated children who attended

Macias-Cervantes 2009 *(Continued)*

	public schools in four neighborhoods. Only children considered as sedentary and moderate active were included in the study." % of eligible population enrolled: children: 90.5% (76/84) Age (years): median: intervention: 8 (IQR 6.1 to 9.1); control: 7.5 (IQR 6.9 to 8.4) Gender/sex: 56.4% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 38 Comparator type: non-active intervention Comparison group participants: 38 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as median (IQR) BMI
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was supported in part by grant number FOMIX GTO-2006-C01-31929. The authors do not have financial interest with the organization that sponsored this work." DOI: "The authors do not have financial interest with the organization that sponsored this work." General notes: study targets children considered as sedentary and moderate active

Madsen 2013

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

Madsen 2013 *(Continued)*

	Age (years): mean: 9.8 (SD 0.6) Gender/sex: 60% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 82 Comparator type: non-active intervention Comparison group participants: 74 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported narratively
Notes	Clinical Trial Registry: NCT01156103 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was by the following grants: NIH/ NICHDK23HD054470 and American Heart Association 0865005F." DOI: NR General notes: NR

Magnusson 2012

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 321 Setting: 6 schools in Reykjavik Country: Iceland Country income: high-income Recruitment: Quote: "Three pairs of schools in the city of Reykjavik were selected and matched on size, i.e. number of students and total number of grades. All children attending second grade (born in 1999) were invited to participate and to hand in a written parental consent form (signed by either parent and the child) before the first measurement sessions in the fall of 2006." % of eligible population enrolled: schools: NR; children: NR Age (years): mean: intervention: 7.3 (SD 0.3); control: 7.4 (SD 0.3) Gender/sex: 44.3 boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 151 Comparator type: non-active intervention Comparison group participants: 170 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school

Magnusson 2012 *(Continued)*

Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was primarily funded by the Icelandic Centre for Research (RANNIS), but also supported by the city of Reykjavik, the Ministry of Education, Science and Culture and BRIM Seafood" DOI: "The authors have no conflict of interest." General notes: NR

Marcus 2009

Study characteristics	
Methods	Study name: STOPP (Science and Technology in Childhood Obesity Policy Project) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 to 4 years Follow-up time(s): 4 years
Participants	Participants: 3135 Setting: 10 primary schools in the Stockholm county area Country: Sweden Country income: high-income Recruitment: Quote: "Ten primary schools including children between 6 and 10 years of age within the Stockholm county area were selected. Participating schools had a mixed pupil population with children from middle and working class families living both in blocks of flats and in detached houses. The proportion of children with an immigrant background, defined as children requiring native-language teaching did not exceed 15%. Five of the selected schools were thereafter randomized to intervention and five schools to control. All children participated in the study until the end of their fourth school year, that is, until the age of 9–10 years. Ninety-two to 100% of the children in the intervention schools and 90 to 100% in the control schools were entered into the study and participated in at least one occasion of weight and height assessment." % of eligible population enrolled: schools: 2.6% (10/387; selected/invited to participate); children: 90% to 100% (92% to 100% of the children in the intervention schools and 90% to 100% in the control schools were entered into the study and participated in at least one occasion of weight and height assessment) Age (years): mean: intervention: 7.4 (SD 1.3); control: 7.5 (SD 1.3) Gender/sex: 50.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1670 Comparator type: non-active intervention Comparison group participants: 1465 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long-term (4 years)

Marcus 2009 *(Continued)*

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN96347873 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by grants from Stockholm County Council, Swedish Council for working life and social research, Swedish Research Council, Freemason's in Stockholm Foundation for Children's Welfare and Signhild Engkvist Foundation" DOI: NR General notes: children who entered the study during their first school year in August 2001 participated in the programme for 4 years, whereas children who started school at a later year, participated in the programme for shorter-term time periods. Schools with children from high socioeconomic families were not included.

Marsigliante 2022

Study characteristics	
Methods	Study name: NR Study design: RCT (see notes) N of arms: 2 Unit of allocation: individual (see Notes) Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 398 Setting: secondary-level public schools located in 2 cities in Southern Italy Country: Italy Country income: high-income Recruitment: a sample of 398 children was selected from different schools. These schools are located in 2 cities with similar socioeconomic status and had not previously participated in health promotion programmes. % of eligible population enrolled: children: 100% (398/398) Age (years): mean: intervention girls: 9.4 (SD 0.7); intervention boys: (9.4 (SD 0.7); control girls: 9.5 (SD 0.7); control boys: 9.5 (SD 0.7) Gender/sex: 48.7% boys
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 198 Comparator type: non-active intervention Comparison group participants: 200 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: it is unclear whether the data reported are from BMI or percentile measurements and whether they reported a standard deviation or a standard error.
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry

Marsigliante 2022 *(Continued)*

	Writing and/or research independent from funder(s): yes Funding details: the authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: it is unclear if the study is an individual or cluster-RCT; the methods (flowchart and text) suggests that participants were individually randomised, but the authors stated "The control schools followed their regular curriculum" and "all teachers and parents in the intervention schools received on-site training". We have reported the study as a RCT and analysed the data according to a RCT design.

Martinez-Vizcaino 2014

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

Martinez-Vizcaino 2014 *(Continued)*

	ests. All authors declare that the following statements are true: they received no support from any organisation for the submitted work; they conducted no financial relationships with any organisations that might have an interest in the submitted work in the previous years; there were no other relationships or activities that could appear to have influenced the submitted work." DOI: "The authors declare no conflicts of interest. All authors declare that the following statements are true: they received no support from any organisation for the submitted work; they conducted no financial relationships with any organisations that might have an interest in the submitted work in the previous years; there were no other relationships or activities that could appear to have influenced the submitted work." General notes: NR

Martinez-Vizcaino 2020

Study characteristics	
Methods	Study name: Movi-Kids Study design: cluster-RCT (cross-over) N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 2407 Setting: 21 pre-school and primary schools in Cuenca and Ciudad Real provinces in the Castilla-La Mancha region Country: Spain Country income: high-income Recruitment: Quote: "Approval from directors and boards of governors was obtained to enlist schools, and all parents of children who were in the third preschool grade (4–5 years) and the first grade of primary school (aged 6–7 years) were invited to participate. Parents were asked to give their written informed consent to allow their child to participate in the study; this consent could be revoked by the parents or children at any time." % of eligible population enrolled: schools: 95% (21/22); children: 67% (1604/2407; number of children excluded because not eligible is not reported) Age (years): mean: intervention boys: 5.32 (SD 0.620); intervention girls: 5.38 (SD 0.64); control boys: 5.31 (SD 0.59); control girls: 5.39 (SD 0.62) Gender/sex: 50.1% boys
Interventions	Theory: Social Ecological Model Intervention type: activity Intervention group(s) participants: 1299 Comparator type: non-active intervention Comparison group participants: 1108 Comparison: activity vs control Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01971840 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Ministry of Economy and Competitiveness-Carlos III Health Institute and FEDER funds (FIS PI12/00761). Additional funding was obtained from

Martinez-Vizcaino 2020 *(Continued)*

	the Research Network on Preventative Activities and Health Promotion (RD12/0005/0009). DPP-C (FPU14/01370) and MG-M (FPU15/03847) are recipients of a predoctoral fellowship by the Spanish Ministry of Education, Culture and Sport. IC-R is supported by a postdoctoral grant (FPU13/01582) from Universidad de Castilla-La Mancha, Spain." DOI: competing interests: none General notes: this is a cross-over cluster-RCT in which in the second year the control group became the intervention group and the intervention group became the control group; outcome measured at the first year follow-up is reported in this article.

Martinez-Vizcaino 2022

Study characteristics	
Methods	Study name: MOVI-daFIT! Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 to 9 months
Participants	Participants: 923 Setting: 10 schools from 10 towns in the Province of Cuenca Country: Spain Country income: high-income Recruitment: Quote: "The Department of Education and Science of the Junta de Communities of Castilla- La Mancha (Spain) sent a letter informing each school that agreed to participate about the study. After that MOVI-daFIT! researchers provided information about the objectives and methods of the study to the head teacher, the school board, and the physical education teachers of the schools. The consent of the school Council, board of community participating in school management, was required to participate in MOVI-daFIT!. Finally, 10 schools from 10 towns in the province in Cuenca, Spain, agreed to participate. In all schools, all children belonging to the fourth and fifth grades of primary school (9–11 years old) were invited to participate. Parents were invited to a meeting in which researchers provided complete information about the objectives and procedures of the study. Signed informed consent from parents was compulsory for the children whose parents decided that they will participate in MOVI-daFIT!. Parents were encouraged to take children's opinion into consideration for this decision." % of eligible population enrolled: schools: 100% (10/10); children: 61% (562/923) Age (years): mean: intervention boys: 9.89 (SD 0.71); intervention girls: 10.03 (SD 0.69); control boys: 10.12 (SD 0.69); control girls: 10.04 (SD 0.72) Gender/sex: 47.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 518 Comparator type: non-active intervention Comparison group participants: 405 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (8 to 9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03236337 Funder(s) type: non-industry

Martinez-Vizcaino 2022 *(Continued)*

	Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Ministry of Economy and Competitiveness Carlos III Health Institute and FEDER funds (FIS PI19/01919). Additional funding was obtained from the Research Network on Preventative Activities and Health Promotion (RD12/0005/0009) to VM-V. The authors declare that they have no competing interests." DOI: "The authors declare that they have no competing interests." General notes: NR

Meng 2013 (Beijing)

Study characteristics	
Methods	Study name: NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China) Study design: cluster-RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 1776 Setting: nine schools in Beijing Country: China Country income: upper-middle-income Recruitment: Quote: "This study is a multi-center randomized controlled trial. Six centers included Beijing, Shanghai, Chongqing, Guangzhou, Jinan and Harbin were recruited. Two-step cluster sampling was used for subject selection. In the first step, 9 schools in Beijing were selected and assigned randomly to nutrition intervention (3 schools), physical activity (PA) intervention (3 schools) or control condition (3 schools). In the second step, 2 classes from each grade in each school were chosen randomly. The schools which meet the inclusion criteria (non boarding school; the students' overweight & obesity rate is over 10%; school feeding, and more than 50% of the student eat lunch at school. All of the students in the selected classes were enrolled in the trial, expect the students that were not eligible." % of eligible population enrolled: schools: NR; classes: NR; children: 96% (9327/9750) Age (years): 6 to 9.9: 69.7%; 10 to 13.9: 30.3% Gender/sex: 52.1% boys
Interventions	Theory: NR Intervention type: dietary/activity (multi-arm) Intervention group(s) participants: nutrition education intervention: 656 Happy 10 intervention: 635 Comparator type: non-active intervention Comparison group participants: 485 Comparison: dietary vs control activity vs control activity vs dietary Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-PRC-09000402 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes

Meng 2013 (Beijing) *(Continued)*

	Funding details: Quote: "This project has been funded by China Ministry of Science & Technology as “Key Projects in the National Science & Technology Pillar Program during the Eleventh Five-Year Plan Period”, grant number 2008BAI58B05. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." DOI: "The authors have declared that no competing interests exist." General notes: this is a two-step clustered RCT: first randomisation was at school level; second randomisation was at classroom level. Participants were selected from Beijing and 5 other cities (2 cohorts); data are analysed separately for the Beijing cohort and the other 5 cities cohorts. Data from all 5 arms are reported in both Meng 2013 and Xu 2017. From this study we only extracted data from the Beijing cohort (3 arms). The data from the 5 other cities cohort (2 arms) are extracted from the Xu 2017 study.

Morgan 2011

Study characteristics	
Methods	Study name: HDHK (Healthy Dads, Healthy Kids) Study design: cluster-RCT N of arms: 2 Unit of allocation: father + ≥ 1 child Unit of analysis: individual Intervention period: 3 months Follow-up time(s): 3 months; 6 months
Participants	Participants: 71 Setting: communities in Newcastle, New South Wales Country: Australia Country income: high-income Recruitment: Quote: "Overweight or obese men with a primary school child aged between 5 and 12 years of age were recruited from the local community through media releases, school newsletters and paid advertisements in local newspapers in August/ September 2008. Men were screened for eligibility through telephone interviews. All fathers needed to have Internet access and were asked to not participate in other weight loss programs during the study. Fathers completed a pre exercise risk assessment screening questionnaire and provided written informed consent, as well as child assent." % of eligible population enrolled: fathers: 90% (70/78); children: NR Age (years): mean: 8.2 (SD2.0) Gender/sex: 53.5% boys
Interventions	Theory: Social Cognitive Theory, Family Systems Theory Intervention type: dietary and activity Intervention group(s) participants: 39 Comparator type: non-active intervention Comparison group participants: 32 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12609000855224 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Hunter Medical Research Institute and the Gastronomic Lunch."

Morgan 2011 *(Continued)*

	DOI: "The authors declare no conflict of interest." General notes: the study targets men that are overweight or obese with a primary school child aged between 5 and 12 years of age

Morgan 2014

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

Morgan 2014 *(Continued)*

	the National Health and Medical Research Council of Australia. Anthony Okely is supported by a National Heart Foundation of Australia Career Development Fellowship." DOI: "The authors declare that they have no competing interests." General notes: the study targets men that are overweight or obese with a primary school child aged between 5 and 12 years of age. According to the study protocol, outcome was planned to be measured at 3, 6 and 12 months follow-up, but only 3 months is reported here.

Morgan 2019

Study characteristics	
Methods	Study name: DADEE (Dads And Daughters Exercising and Empowered) Study design: cluster-RCT N of arms: 2 Unit of allocation: family (father + ≥ 1 daughter) Unit of analysis: individual Intervention period: 8 weeks Follow-up time(s): 9 months
Participants	Participants: 153 Setting: communities in Newcastle, New South Wales Country: Australia Country income: high-income Recruitment: Quote: "All families were recruited from Newcastle in New South Wales, Australia over 11 weeks in 2015. The primary recruitment strategy was a University media release that was featured in several local news outlets (television, radio, newspaper). Fathers (including stepfathers and male guardians) could enroll with one or more daughters if they were aged 18–65 and passed a pre-exercise screening questionnaire (or provided a doctor's clearance to participate)." % of eligible population enrolled: families: 83% (115/139); children: NR Age (years): mean: 7.7 (SD 1.8) Gender/sex: 100% girls
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 74 Comparator type: non-active intervention Comparison group participants: 79 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12615000022561 2015 (ID8489); ACTRN12616001270404 2016 (ID8490) Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by project grants from Port Waratah Coal Services and the Hunter Children's Research Foundation to the Hunter Medical Research Institute. The funding bodies had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and de ci-sionto submit the manuscript for publication." DOI: "The authors declare no conflict of interest. All procedures, including the informed consent process, were conducted in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000"

Morgan 2019 *(Continued)*

	General notes: NR

Muller 2016

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

Muller 2019

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

Muller 2019 *(Continued)*

	HE + nutritional intervention (NU); 1 school assigned to NU and HE and 4 schools are control with no intervention; the author analysed the effect of PA and therefore the clustering for such analysis are 3 schools with PA and 5 schools without PA; the comparison is PA with or without NU and/or HE vs No PA (control with/without NU and HE).

Muzaffar 2019

Study characteristics	
Methods	Study name: PAWS (Peer-education About Weight Steadiness) Club Study design: cluster-RCT N of arms: 2 Unit of allocation: after-school programme (see Notes) Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 9 months
Participants	Participants: 109 Setting: 4 middle schools in East-central Illinois Country: United States Country income: high-income Recruitment: Quote: "The program was delivered as an afterschool club in 4 middle schools in east central Illinois in support of childhood obesity prevention. Early adolescents at each school enrolled in the program on the day of the week that was most convenient for their schedules. Each school had the day of the program randomized to either the adult-led or peer-led group. The intervention for both groups was identical in materials and content; the only difference was delivery mode (adult educators vs peer educators). Three of the 4 schools had both adult-led and peer-led programs. One of the 4 schools had only a peer-led program, as this school could only host the program one day per week due to logistics and staffing limitations./The project coordinator for the PAWS Club contacted the principals at each of the 4 participating schools and obtained approval to host the program in their respective schools. The first school adopted the PAWS Club in spring 2015, the second in fall 2015, the third in spring 2016, and the fourth school in fall 2016. Researchers participated in school orientation programs and club fairs, visited 6th and 7th grade classrooms, and organized meetings at each school to advertise the program and recruit participants." % of eligible population enrolled: children: 54% (109/201) Age (years): mean: intervention (peer-led) group: 11.6 (SD 0.7); control (adult-led) group: 11.6 (SD 0.7) Gender/sex: 33% boys
Interventions	Theory: Social Cognitive Theory, Stages of Change model Intervention type: dietary and activity Intervention participants: 56 Comparator type: dietary and activity intervention Comparison participants: 53 Comparison: dietary and activity vs dietary and activity Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (dietary and activity interventions)
Notes	Clinical Trial Registry: NCT02365324 Funder(s) type: non-industry

Muzaffar 2019 *(Continued)*

	Writing and/or research independent from funder(s): yes Funding details: Quote: "This material is based upon work that is supported by the National Institute of Food and Agriculture, US Department of Agriculture, under award number 2012-68001-22032. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the US Department of Agriculture." DOI: "All authors declare no conflicts of interest. None of the authors have benefitted financially from this work." General notes: participants were randomly allocated to either the peer-led or the adult-led after-school programme. Three of the 4 schools had both adult-led and peer-led programmes. Randomisation unit was days within the same after-school programme. One of the 4 schools had only a peer-led programme, as this school could only host the programme 1 day per week due to logistics and staffing limitations.

NCT00224887 2005

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

NCT02067728 2014

Study characteristics	
Methods	Study name: FNPA (Family Nutrition Physical Activity) Study design: cluster-RCT N of arms: 2 Unit of allocation: primary care clinics Unit of analysis: individual Intervention period: 1 childcare visit (1 with potential follow-up call/appointment); the intervention was ruled out at the practice for 6 months, however it is not reported how many times families attended the practice within this time Follow-up time(s): 6 months
Participants	Participants: 232 Setting: primary care clinics in Peoria, Illinois region Country: United States Country income: high-income Recruitment: Quote: "Practice Recruitment: Quote: "For 3 months, practice recruitment meetings will be held with offices from three healthcare networks during which the research protocol will be explained, roles and responsibilities of research staff and practices will be outlined, and written agreements signed." Subject Recruitment: "Subject recruitment will occur one month before implementation. Eligible subjects with scheduled well-child visits will receive a letter signed by their provider and the principal investigator. The letter will briefly describe the study and offer the opportunity to enroll. They will be given an opt-out phone number to call within one week of mailing this letter if they do not want to participate. If the research coordinator does not receive a call, he/she will contact the family by phone to answer questions and send a consent form to the family. The subject will be considered enrolled after obtaining a signed written consent from the family." % of eligible population enrolled: practices: NR; children: NR Age (years): mean: 10.6 (SD 4.1) (range 5 to 17 years) Gender/sex: 46.5% boys (of total participants age group 4 to 18)
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 210 (participants in age group 4 to 17 years) Comparator type: non-active intervention Comparison group participants: 220 (participants in age group 4 to 17 years) Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT0206772 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Sponsors and Collaborators: University of Illinois at Chicago; American Cancer Society, Inc.; Feinberg School of Medicine, Northwestern University; New York University; There is NOT an agreement between Principal Investigators and the Sponsor (or its agents) that restricts the PI's rights to discuss or publish trial results after the trial is completed." DOI: NR General notes: the trial was conducted on participants aged 4 to 17; results at follow-up are reported for all participants and for age group 4 to 10 and 11 to 17 separately; published data not found; baseline data and results extracted from trial registration; we have limited details on study characteristics and PROGRESS data.

Nemet 2011a

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 12 months
Participants	Participants: 795 Setting: schools in the Sharon area Country: Israel Country income: high-income Recruitment: NR % of eligible population enrolled: NR Age (years): mean: 5.2 (SE 0.02) Gender/sex: 53% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 417 Comparator type: non-active intervention Comparison group participants: 378 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI medium-term; BMI percentile medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Supported by a grant from The Rosalinde and Arthur Gilbert Foundation, and the Israel Heart Fund. The authors declare no conflicts of interest." DOI: "The authors declare no conflict of interest." General notes: NR

Nemet 2011b

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year Follow-up time(s): 12 months; 24 months
Participants	Participants: 342

Nemet 2011b *(Continued)*

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

Newton 2014

Study characteristics	
Methods	Study name: Parent-Targeted Mobile Phone Intervention Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 27 Setting: communities in Baton Rouge, Louisiana Country: United States Country income: high-income Recruitment: Quote: "Potential participants were recruited through advertisements placed in the newspaper, posted in local hospitals and schools, and delivered through a Pennington Biomedical Research Center email listserv targeting registered individuals interested in participating in research. Once self-identified, one parent completed an initial telephone screen to determine eligibility for themselves and their child. If the parent-child dyad was eligible following the phone screen, they attended a clinic screening visit at the Pennington Biomedical Research Center (Louisiana). The dyad was oriented to the study and then written informed consent was obtained from the parent and written assent was obtained from the targeted child. The baseline assessment (see Measures below) was then conducted. At the end of the clinic visit, the targeted child was fitted with a pedometer (New Lifestyles 1000/NL-1000), the parent was required to use their mobile phone

Newton 2014 *(Continued)*

	to respond to a text message sent from the study coordinator, and the parent had to access the study website. The dyad was sent home with the following instructions: the child was to engage in their normal level of activity and the parent was instructed to use their mobile phone to access the study website to record their child's step count each night after the child laid down to go to bed. This website was formatted for a mobile phone and contained a webpage to enter the date and the child's step count. Following the clinic visit, the dyad was sent home to begin the 7-day run-in period the following morning. The run-in period was designed to assess the targeted child's baseline physical activity levels and the parent's compliance with monitoring the child's step counts. The dyad was eligible for the study if girls averaged <9500 steps/day or boys averaged <12,500 steps/day (sex-specific cut points indicative of sedentary behavior in children) and parents entered at least 5 days of step counts into the study website across the 7-day run-in period (evidence of ability to comply with data recording requirements). The dyad was not made aware of these eligibility criteria so that they did not alter their behavior in order to qualify for the study." % of eligible population enrolled: dyads: 69% (27/39) Age (years): mean: 8.7 (SD 1.4) Gender/sex: 44% boys
Interventions	Theory: Social Cognitive Theory Intervention type: activity Intervention participants: 13 Comparator type: attention control Comparison participants: 14 Comparison: activity vs control Setting of the intervention: home Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short term; zBMI short term; BMI percentile short term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01551108 Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "RLNJr was supported by unrestricted funds from the Coca Cola Foundation. RM and WDJ were supported in part by 1 U54 GM104940 from the National Institute of General Medical Sciences of the National Institutes of Health, which funds the Louisiana Clinical and Translational Science Center." DOI: "An author developed the software that was used in the study." General notes: the study targets children with high sedentary levels

Nicholl 2021

Study characteristics	
Methods	Study name: Milky Way Study Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12.3 (SD 0.9) weeks (range: 11.5 to 15 weeks) Follow-up time(s): 3 months
Participants	Participants: 49 Setting: communities in Perth, Western Australia Country: Australia Country income: high-income

Nicholl 2021 *(Continued)*

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

Nollen 2014

Study characteristics	
Methods	Study name: MT (Mobile-Technology) intervention Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 51 Setting: after-school programmes in Kansas

Nollen 2014 *(Continued)*

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

Nyberg 2015

Study characteristics	
Methods	Study name: Healthy School Start Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 8 months; 12 months
Participants	Participants: 243 Setting: 8 schools in a municipality in Stockholm County Country: Sweden Country income: high-income Recruitment: Quote: "Schools were chosen from a municipality in Stockholm County, Sweden, with a population of low to medium term socio-economic status (SES) and with mixed types of housing (blocks of flats, semi-detached houses and detached houses). The schools included were within the school physician's administrational area. All families who had children in these pre-school classes

Nyberg 2015 *(Continued)*

	were invited to participate in the study, provided that at least one parent was able to communicate and understand the Swedish language." % of eligible population enrolled: schools: 53% (8/15); children: 40% (243/611) Age (years): mean: 6.2 (SD 0.3) Gender/sex: 51% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 131 Comparator type: non-active intervention Comparison group participants: 112 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI short-term (8 months) zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN32750699 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "ES and LSE received funding for this study from the Public Health Fund, Stockholm County Council. GN received funding from the Signhild Engkvist Foundation, the Martin Rind Foundation and the Lars Hierta Memorial Foundation. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. The authors have declared that no competing interests exist." DOI: "The authors have declared that no competing interests exist." General notes: the outcome is proportion of children with weight status classified as obesity; zBMI results reported narratively

Nyberg 2016

Study characteristics	
Methods	Study name: Healthy School Start Study II Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 8 months; 11 months
Participants	Participants: 378 Setting: 13 schools in a municipality in Stockholm County Country: Sweden Country income: high-income Recruitment: Quote: "Schools were chosen from low income areas in a municipality in Stockholm County, Sweden, with the highest prevalence of overweight and obesity among children in the county. These areas are characterised by a high proportion of foreign-born citizens. Of the 15 eligible schools in three low income areas, 13 schools and 31 pre-school classes participated. All families who had children in these classes were invited to participate in the study. The children were recruited in August to September 2012, the intervention started in October and lasted for six months (2012–2013). Pre-school class is not compulsory in Sweden but 90–95 % of all six-year-old children attend. "

Nyberg 2016 *(Continued)*

	% of eligible population enrolled: schools: 87% (13/15); pre-school classes: 82% (31/38); children: 47% (378/801) Age (years): mean: 6.3 (SD 0.3) Gender/sex: 49.5% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 185 Comparator type: non-active intervention Comparison group participants: 193 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (8 months) zBMI medium-term (11 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN39690370 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by Stockholm County Council Public Health Fund, the Martin Rind Foundation and the Sven Jerring Foundation" DOI: "The authors declare that they have no competing interests." General notes: NR

O'Connor 2020

Study characteristics	
Methods	Study name: PSNS (Papás Saludables Ninõs Saludables) Study design: cluster-RCT N of arms: 2 Unit of allocation: father + ≤ 3 children Unit of analysis: individual Intervention period: 10 weeks Follow-up time(s): 14.8 (SD 1.64) weeks (range 11.9 to 17.1 weeks)
Participants	Participants: 64 Setting: one of the Texas Children's Health Plan (TCHP) Center for Children and Women clinics in Houston, Texas Country: United States Country income: high-income Recruitment: Quote: "Families were recruited from the clinic and then screened by research staff for enrollment. Presentations about the study and program were made to the providers and staff at the clinic, who were asked to refer eligible patients to the study. Fliers were posted in the clinic and study staff spent time in the waiting room talking to interested families about the study and inviting them to be screened. The main messages promoted during recruitment were the focus on health promotion for the family, teaching fathers and children how to be healthier and more active, and providing an opportunity for fathers to spend time with his children. families could express interest in the study by calling the study staff, leaving their contact information with study staff, or completing contact forms and leaving it with the clinic receptionist for study staff to followup. Initial screening of the father and family took place by phone and then confirmed after consent was signed and initial data collected." % of eligible population enrolled: families: 100% (36/36); children: NR Age (years): mean: 8.5 (SD 2.12)

O'Connor 2020 *(Continued)*

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

Paineau 2008

Study characteristics	
Methods	Study name: ELPAS (Etude Longitudinale Prospective Alimentation et Santé) Study design: cluster-RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 8 months Follow-up time(s): 8 months
Participants	Participants: 1013 Setting: 54 elementary schools in Paris Country: France Country income: high-income Recruitment: Quote: "One thousand thirteen families were included in this 10-month, parallel, randomized intervention trial. In each family, one second- or third-grade pupil (aged 7-9 years) and one of his or her parents participated. Volunteers were recruited from 54 elementary schools in Paris, France, from March 2005 through June 2005. A mailing was performed in July 2005 to complete the recruitment with families from non-participating schools. All families were informed of the general nature of the intervention but were unaware of the primary hypothesis, eg, that nutritional changes would affect body mass index." % of eligible population enrolled: schools: NR; families: 96% (1013/1059) Age (years): mean: intervention A: 7.7 (SD 0.6); intervention B: 7.8 (SD 0.6); control 7.6 (SD 0.6) Gender/sex: 47.5% boys
Interventions	Theory: NR

Paineau 2008 *(Continued)*

	Intervention type: dietary Intervention participants: group A: 297; group B: 298 Comparator type: attention control Comparison participants: 418 Comparison: dietary vs control Setting of the intervention: school + home + community Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (8 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00456911 Funder(s) type: mixed Writing and/or research independent from funder(s): no Funding details: Quote: "Funding was provided by the French Ministry of Research (2002 Réseau Alimentation Référence Europe 31), and by the ELPAS study's private partners (Avenance Enseignement, the Centre d'Etudes et de Documentation du Sucre, and the Louis Bonduelle Foundation). The private partners did not participate in conduct of the study; collection, management, analysis, or interpretation of the data; or preparation, review, or approval of the manuscript. The Centre d'Etudes et de Documentation du Sucre participated in the study design." DOI: NR General notes: NR

Pena 2021

Study characteristics	
Methods	Study name: Juntos Santiago trial Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 4 months; 7 months
Participants	Participants: 2022 Setting: 24 public, private-subsidised, and private schools in the municipalities of Santiago and Estación Central in Santiago Country: Chile Country income: high-income Recruitment: Quote: "All types of schools (i.e., public, private-subsidized, and private schools) in Santiago were eligible for inclusion in the intervention and control arm (71 schools), whereas all types of schools in Estación Central were eligible for inclusion only in the control arm (27 schools). Within each arm, we invited schools sequentially to participate using a random sequence proportional to the total number of students, resulting in schools with more students being more likely to be invited. Recruitment took place between March and early May 2018." % of eligible population enrolled: schools: 27% (24/88); children 64% (2466/3872) Age (years): mean: intervention: 11.1 (SD 0.8); control: 11.2 (SD 0.8) Gender/sex: 66.8% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 1611 Comparator type: non-active intervention Comparison group participants: 411 Comparison: dietary and activity vs control

Pena 2021 *(Continued)*

	Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT03459742 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work was supported by the Mayors Challenge 2016, Bloomberg Philanthropies. The funder had no role in the study design, data collection, data analysis, data interpretation, or writing of the report. During the application phase of the Mayors Challenge 2016, the funder provided training in Design Thinking and behavioral economics and appointed a coach to support the planning team at the Municipality of Santiago. After awarding the grant, the funder appointed Delivery Associates to support the delivery of the implementation." DOI: "The authors declared no conflict of interest." General notes: the study included schools from 2 municipalities, but only schools in the Santiago municipality were randomised to intervention or control; schools from the other municipality were only assigned to control. In this review we only included data from the randomised schools as reported in the sensitivity analysis in the supplementary table.

Pindus 2015

Study characteristics	
Methods	Study name: FITKids2 (Fitness improves thinking in kids 2) Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months
Participants	Participants: 44 Setting: 7 schools in East-central Illinois Country: United States Country income: high-income Recruitment: Quote: "Eight to nine year-olds (grades 2 to 4) from seven schools in the east-central Illinois, USA were targeted for recruitment. Those who expressed interest were further screened for eligibility criteria." % of eligible population enrolled: children: 54% (44/82) Age (years): mean: intervention: 8.73 (SD 0.64); control: 8.55 (SD 0.52) Gender/sex: 38.9 boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 22 Comparator type: non-active intervention Comparison group participants: 22 Comparison: activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: n/a

Pindus 2015 *(Continued)*

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

Puder 2011

Study characteristics	
Methods	Study name: Ballabeina study Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 652 Setting: 40 public preschool classes in the German (city of St Gallen) and the French (urban surroundings of Lausanne, canton Vaud speaking) regions of Switzerland Country: Switzerland Country income: high-income Recruitment: Quote: "Classes from the German and French areas were separately selected after agreement of the school directors and the school health services. All children in Switzerland attend preschool." % of eligible population enrolled: classes: 56% (40/71); children: 90% (655/727) Age (years): mean: 5.1 (SD 0.7) Gender/sex: 50% boys
Interventions	Theory: Social Ecological Model Intervention type: dietary and activity Intervention group(s) participants: 342 (at baseline) Comparator type: non-active intervention Comparison group participants: 310 (at baseline) Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00674544 Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "The study was mainly supported by the Swiss National Science Foundation (grant No 3200B0-116837) and Health Promotion Switzerland (project No 2104). Additional funding was obtained from aresearch award for interdisciplinary research from the University of Lausanne, a Takeda research award, the Wyeth Foundation for the Health of Children and Adoles-

Puder 2011 *(Continued)*

	cents, the Freie Akademische Gesellschaft, and an unrestricted educational grant from Nestléé. The funding sources had no role in the study design,data collection, analysis, interpretation of data, in the writing of the report, and in the decision to submitthe article for publication." DOI: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work." General notes: the Ballabeina study is a cluster-randomised controlled trial conducted in 40 randomly selected public preschool classes in areas with a high migrant population from 2 different sociocultural and linguistic regions in Switzerland

Ramirez-Rivera 2021

Study characteristics	
Methods	Study name: Planet Nutrition Program Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 9 weeks Follow-up time(s): 6 months
Participants	Participants: 41 Setting: 1 public elementary school in Hermosillo, Sonora Country: Mexico Country income: upper-middle-income Recruitment: Quote: "Fifth grade students from one public elementary school in Hermosillo, Sonora, Mexico were invited to participate in the program. This school operated extended hours and the study was supported by the school authorities. The study nutrition team invited the children face to face in the classrooms to participate in March 2019. A printed invitation was delivered to the children to give to their parents, in addition to the informed consent and assent. A questionnaire was also distributed to collect personal data, including age, date of birth, history of disease, other interventions, and parents' level of schooling. / All 5th grade students from the chosen school (80 students) were invited to participate in the study." % of eligible population enrolled: children: 51% (41/80) Age (years): mean: 10.2 (SD 0.46) Gender/sex: 51.2% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 21 Comparator type: attention control Comparison participants: 20 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT04095910 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR

Ramirez-Rivera 2021 *(Continued)*

	Funding details: Quote: "The expenses incurred by this research study were covered by the University of Sonora (12613 Fund)." DOI: "The authors declare that they have no competing interests." General notes: NR

Razani 2018

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

Razani 2018 *(Continued)*

	Funding details: Quote: "This project was supported by grants from East Bay Regional Parks District, East Bay Regional Parks District Foundation, and National Recreation and Parks Administration and REI Foundation, all to NR. The funders had no role in writing this report or the decision to submit this article for publication." DOI: "The authors report that they have no conflicts of interest." General notes: BMI measurements were planned, but data are not reported. Based on the study protocol: "Body mass index (BMI)will be measured in clinic at baseline, one month, and three months out by using weight and an average of three measurements of height."

Rerksuppaphol 2017

Study characteristics	
Methods	Study name: Internet Based Obesity Prevention Program for Thai School Children Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 3 moths; 4 moths
Participants	Participants: 218 Setting: 2 public elemental schools in Portan township of Ongkharak district, Central Thailand Country: Thailand Country income: upper-middle-income Recruitment: Quote: "Two public elemental schools in Portan. All healthy children who were studying in Grade 1 to 6 of these schools were eligible for the study. The study purpose was explained to children verbally and a study information sheet was sent to their parents or guardians. Written informed consent and assent were obtained from children's parent or guardians and participating children, respectively, before they were recruited. From study protocol: In order to ensure diversity in the study population, recruitment is performed by stratifying the city into regions. Within each region, a complete list of schools, recreation centres, health care centres, children's recreation classes, outdoor markets and shopping malls are obtained and the same number of each type of facility in each region is randomly selected and contacted for recruitment. The authors recruited approximately 5–10 families per week with this strategy. Additionally they incorporated a participant in centive program for snowball recruitment. Any family who refers another family and they enroll in the study is eligible for a $25 grocery store gift card." % of eligible population enrolled: children: 83% (285/342) Age (years): mean: 10.7 (SD 3.1) Gender/sex: 49% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 111 Comparator type: non-active intervention Comparison group participants: 107 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term (4 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: TCTR20140926002 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes

Rerksuppaphol 2017 *(Continued)*

	Funding details: Quote: "This study was supported by grants from Srinakharinwirot University, Thailand. The study sponsor had no role in the planning, execution or analysis of the study." DOI: "Financial or other competing interests: None" General notes: NR

Rhodes 2019

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: parent(s) + 1 child Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 102 Setting: communities in Victoria, British Columbia Country: Canada Country income: high-income Recruitment: Quote: "Rolling recruitment began in June 2012 and was completed in April 2017. Participants were recruited through advertisements and booths at local markets and recreation centers, materials passed out at local schools, and referrals. Though all children aged 6–12 years in a family were invited to participate in the intervention, only one child was designated as the target child for measurement a priori (chosen at random in cases in which multiple children met inclusion criteria)." % of eligible population enrolled: children: 66% (102/154) Age (years): mean: 8.93 (SD 2.08) Gender/sex: 48% boys
Interventions	Theory: Health Action Process Approach and the Multi-Process Action Control Approach Intervention type: activity Intervention group(s) participants: 52 Comparator type: non-active intervention Comparison group participants: 50 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01882192 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study received funding from the Canadian Institute of Health Research. The funding ID is CIHR113798. The authors declare that they have no competing interests" DOI: "No financial disclosures were reported by the authors of this paper. " General notes: NR

Riiser 2020

Study characteristics	
Methods	Study name: Active Play in in After School Programs Study design: cluster-RCT N of arms: 2 Unit of allocation: after-school programme Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 7 months; 19 months
Participants	Participants: 456 Setting: 14 school health services in municipalities of 3 counties in Eastern Norway Country: Norway Country income: high-income Recruitment: Quote: "The first step of the study recruitment process was to engage school physiotherapists (PTs) because the study relied on their assistance in the implementation of the intervention as well as in the data collection process. School health services in municipalities of three counties in Eastern Norway were approached and, within the time limit defined for this first phase of recruitment (August 2016), PTs from 14 municipalities volunteered to participate. They assisted in recruiting the ASPs in schools within their area of responsibility. All schools were eligible. School administrators, who accepted the invitation, provided written consent. Following the allocation, all parents of first graders (5–6 years of age) in the participating ASPs were asked to provide written consent on behalf of their child. There were no exclusion criteria." % of eligible population enrolled: schools: 31% (14/45); children: 71% (456/643) Age (years): range 5 to 6 Gender/sex: 52.2% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 229 Comparator type: non-active intervention Comparison group participants: 227 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): proportion of children with BMI ≥ 25 Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data are reported as proportion of children with BMI ≥ 25
Notes	Clinical Trial Registry: NCT02954614 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project was funded by the Norwegian Fund for Postgraduate Training in Physiotherapy and OsloMet - Oslo Metropolitan University as part of the first author's postdoctoral fellowship. The funding body had no impact on the design of the study, nor the data collection, analysis, interpretation or in writing of the manuscript. Open access was funded by OsloMet." DOI: "The authors declare that they have no conflict of interest." General notes: data are reported as % of participants with BMI ≥ 25 and BMI < 25

Robinson 2003

Study characteristics	
Methods	Study name: Stanford GEMS (Girls health Enrichment Multisite Studies) Phase 1

Robinson 2003 *(Continued)*

	Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks
Participants	Participants: 61 Setting: communities in Stanford, California Country: United States Country income: high-income Recruitment: Quote: "Girls were recruited for the study through community centers and after-school programs; by community youth leaders; through presentations at schools; at community events and churches; and by posting fliers. To recruit low-income families, recruitment activities and intervention sites focused on low-income neighborhoods of Oakland, and East Palo Alto, California, with high proportions of African American." Further details regarding our recruitment strategies are described in Story et al. 2003b." % of eligible population enrolled: children: NR Age (years): mean: 9 (SD 1) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: activity Intervention participants: 28 Comparator type: dietary and activity intervention Comparison participants: 33 Comparison: activity vs dietary and activity Setting of the intervention: home + community/community (active intervention control group) Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (12 weeks) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by grant numbers UO1-HL62662, UO1-HL62663, UO1- HL62668, UO1-HL62732, and UO1- HL65160, from the National Heart, Lung, and Blood Institute. (Rochon 2003)" DOI: NR General notes: NR

Robinson 2010

Study characteristics	
Methods	Study name: Stanford GEMS (Girls health Enrichment Multisite Studies) Phase 2 Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 6 months; 12 months; 18 months; 24 months
Participants	Participants: 261

Robinson 2010 *(Continued)*

	Setting: communities in Oakland, California Country: United States Country income: high-income Recruitment: Quote: "To enroll a representative sample of lower socioeconomic status African-American girls, we recruited from schools, community centers, churches and community events in low- income, predominantly African-American neighborhoods in Oakland, CA." From study protocol: "To enroll African-American families with lower socioeconomic status, we focused recruitment in neighborhoods in Oakland, CA, around elementary schools most likely to be disproportionately serving this population; ie.,those with high African-American enrollments, high rates of free or reduced price meals and poor standardized test score performance. We performed all assessments in participants' homes, eliminating the need for families to come to a clinical research center. Recruitment strategies were based on the most successful methods from Phase 1,15, 18 making presentations and distributing fliers to girls and parents at existing after-school programs, schools, churches, and neighborhood and community events (e.g., street fairs, Juneteenth celebrations, African-American cultural events), and making individual presentations to parents and girls in commercial locations (e.g., food stores, new store openings). We also presented the project to school parent groups, church groups, and Parks and Recreation Department staff, to enhance the visibility of Stanford GEMS, especially among community opinion leaders, building upon relationships established during Phase 1. Interested families were given a description of the study and screened by telephone for inclusion and exclusion criteria. Potentially eligible families were scheduled for a home data collection visit to confirm eligibility, complete informed consent and assent, and conduct baseline assessments." % of eligible population enrolled: families: 83% (261/316) Age (years): mean: 9.4 (SD 0.9) Gender/sex: 100% girls
Interventions	Theory: Bandura's Social Cognitive Model Intervention type: activity Intervention participants: 134 Comparator type: dietary and activity intervention Comparison participants: 127 Comparison: activity vs dietary and activity Setting of the intervention: home + community/community (active intervention control group) Setting of the intervention in subgroup analyses: home
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: zBMI long-term; BMI long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00000615 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research was funded by a cooperative agreement UO1 HL62663 from the National Heart, Lung, and Blood Institute, National Institutes of Health. An NHLBI Program Officer (EO) was a member of the cooperative agreement Steering Committee and as a co-author on the manuscript, participated in interpretation of the data and preparation of the manuscript. The NHLBI Program Officer and other NHLBI scientific staff provided input on design and conduct of the study, but were not involved in collection, management or analysis of the data. The manuscript was reviewed and approved by NHLBI prior to submission. Dr. Robinson (Principal Investigator) had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis." DOI: NR General notes: effect reported as mean BMI changes per year

Rosario 2012

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

Rosenkranz 2010

Study characteristics	
Methods	Study name: SNAP (Scouting Nutrition & Activity Program) Study design: cluster-RCT (nested cohort design) N of arms: 2 Unit of allocation: girl scout troops Unit of analysis: individual Intervention period: 4 months Follow-up time(s): 6 months
Participants	Participants: 76

Rosenkranz 2010 *(Continued)*

	Setting: communities in 3 Midwestern towns, Kansas Country: United States Country income: high-income Recruitment: Quote: "Seven troops agreeing to participate completed a pretest time 1 assessment within a two-week period in October before randomization. To meet study inclusion criteria at the individual level, girls had to be attending members of Girl Scouts in one of our included troops. All girls of participating troops were included for direct observation variables, and those with parental consent were included for the individual variables under study." % of eligible population enrolled: troops: 64% (7/11); children: 75% (76/101) Age (years): mean: intervention: 10.5 (SD 1.1); control: 10.5 (SD 1.3) Gender/sex: 100% girls
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 34 Comparator type: non-active intervention Comparison group participants: 42 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI; BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI short-term; zBMI short-term; BMI percentile short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00949637 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "Funding for this project was provided, in part, by the Sunflower Foundation: Health Care for Kansans, a Topeka-based philanthropic organization with the mission to serve as a catalyst for improving the health of Kansans. The authors declare that they have no competing interests." DOI: "The authors declare that they have no competing interests." General notes: NR

Rush 2012

Study characteristics	
Methods	Study name: Project Energize Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 6456 Setting: 104 primary schools in the Waikato district Country: New Zealand Country income: high-income Recruitment: Quote: "A list of all primary schools in the Waitematā District Health Board (WDHB) catchment was provided by the Ministry of Education, characterised by location and size of school, ethnicity of students, and school decile. After randomisation, schools were approached for inclusion in the study without knowledge of whether they would be programme or control schools. Where a school declined involvement, the next randomised school was approached."

Rush 2012 *(Continued)*

	% of eligible population enrolled: schools: 44% (124/279); children: 47% (3034/6456) Age (years): 5 and 10 Gender/sex: 50.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 3263 Comparator type: non-active intervention Comparison group participants: 3193 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ACTRN12610000132044 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The Waikato District Health Board funds the Project Energize programme and its evaluation. The Ministry of Health, New Zealand has contributed to evaluation funding. The authors report no conflicts of interest. " DOI: NR General notes: NR

Sacchetti 2013

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 497 Setting: 26 3rd grade classes of primary schools in a province of the Emilia Romagna region Country: Italy Country income: high-income Recruitment: Quote: "Twenty-six 3rd-grade classes of primary schools in a province of the Emilia Romagna region (Italy) were randomly selected stratifying by geographic location (city, plain, hills). To recruit a sample in which the various geographic locations were equally represented in both control and intervention groups, the enrolled classes were randomly assigned to either treated and untreated group, separately per geographic area.Both the principal and the teachers of the enrolled schools were asked to sign a written consent and to complete a questionnaire for their classes." % of eligible population enrolled: classes: NR; children: 95% (497/521) Age (years): range 8 to 9 Gender/sex: 51.5% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 247 (at baseline)

Sacchetti 2013 *(Continued)*

	Comparator type: non-active intervention Comparison group participants: 250 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work was supported by funds provided by the Italian Ministry of University and Scientific Research-Local projects" DOI: NR General notes: NR

Safdie 2013

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 2 school years Follow-up time(s): 7 months; 11 months; 18 months
Participants	Participants: 886 Setting: 27 public elementary schools schools in Xochimilco, Tlalpan, Magdalena Contreras and Coyoacán administrative zones in a urban area in the south of Mexico City Country: Mexico Country income: upper-middle-income Recruitment: Quote: "Of a preliminary list of 1 283 schools located in the urban area of Mexico City, provided by the Federal Administration of Educational Services (Administración Federal de Servicios Educativos del Distrito Federal, AF SEDF), 274 schools located in the four “delegaciones” (administrative zones that comprise Mexico City) of interest (Xochimilco, Tlalpan, Magdalena Contreras and Coyoacán) were identified. From the 40 eligible schools that met the inclusion criteria and agreed to participate in the study by committing to accomplish the study needs (i.e. change food and PA school environment, permit evaluation and implementation activities during school day), 27 schools were randomly selected and assigned to one of three conditions. A total of 886 students from 4th and 5th grades (approximately 32 students per school) from these 27 schools were randomly selected for outcome evaluation from 1712 students who agreed to participate and whose parents had provided informed consent." % of eligible population enrolled: schools: 67.5% (27/40); children: 51% (886/1712) Age (years): mean: intervention plus: 9.7 (SD 0.7); intervention basic: 9.7 (SD 0.7); control: 9.8 (SD 0.8) Gender/sex: 50% boys
Interventions	Theory: Ecological Principles, Theory of Planned Behaviour, Social Cognitive Theory, Health Belief Model Intervention type: dietary and activity Intervention group(s) participants: basic programme: 262 Plus program: 264 Comparator type: non-active intervention

Safdie 2013 *(Continued)*

	Comparison group participants: 360 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (7 months) BMI medium-term (11 months) BMI long term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The project was supported by the Pan American Health Organization (PAHO), the HLHP program of the International Life Science Institute (ILSI), the Mexican Council for Science and Technology (Conacyt), and the Mexican Ministry of Health (SSa). This work was carried out with support from the Global Health Research Initiative (GHRI), a collaborative research funding partnership of the Canadian Institute of Health Research, the Canadian International Development Agency, Health Canada, the International Development Research Centre, and the Public Health Agency of Canada. The authors declare not to have conflict of interests." DOI: "The authors declare not to have conflict of interests." General notes: NR

Sahota 2001

Study characteristics	
Methods	Study name: APPLES (Active Programme Promoting Lifestyle in Schools) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (11 months) Follow-up time(s): 12 months
Participants	Participants: 636 Setting: 10 primary schools sited outside the inner city area of Leeds Country: United Kingdom Country income: high-income Recruitment: Quote: "Ten primary schools in Leeds were recruited and paired them according to size, ethnicity, and level of social dis advantage (as reflected by numbers of free school meals). All the participating schools were state primary schools sited outside the inner city area." % of eligible population enrolled: schools: NR; children: 96% (613/636; baseline/included) Age (years): mean: intervention: 8.36 (SD 0.63); control: 8.42 (SD 0.63) Gender/sex: 55% boys
Interventions	Theory: Health Promoting Schools Concept Intervention type: dietary and activity Intervention group(s) participants: 314 Comparator type: non-active intervention Comparison group participants: 322 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school

Sahota 2001 *(Continued)*

Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN61188203 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The research was funded by a grant from the Northern and Yorkshire Region Research and Development Unit." DOI: competing interests: none General notes: NR

Sahota 2019

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

Sahota 2019 *(Continued)*

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

Salmon 2008

Study characteristics	
Methods	Study name: Switch-Play Study design: cluster-RCT N of arms: 4 Unit of allocation: classroom Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months; 15 months; 21 months
Participants	Participants: 295 Setting: 3 government primary schools located on 4 campuses in low socioeconomic status suburbs in metropolitan Melbourne Country: Australia Country income: high-income Recruitment: Quote: "A convenience sample of three government primary schools located on four campuses in low socioeconomic status (SES) areas (based on socioeconomic index for areas scores) in metropolitan Melbourne was recruited to the study. Children attending schools in low SES areas were selected because of previously shown inverse associations between SES and TV viewing and between SES and adiposity among children. All grade 5 (approximately 10–11 years old) students (n=397) in the selected schools were eligible to participate and were invited to take part in the study." % of eligible population enrolled: schools: NR; classes: NR; children: 78% (311/397) Age (years): mean: 10.1 (SD 0.4) Gender/sex: 51% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory Intervention type: activity Intervention group(s) participants: Behavioural modification (BM) intervention: 66 Fundamental movement skills (FMS) intervention: 74 Behavioural modification (BM) + Fundamental movement skills (FMS): 93 (at baseline) Comparator type: non-active intervention Comparison group participants: 62 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: the definition of zBMI reported in the article is unclear
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Victorian Health Promotion Foundation. Jo Salmon is supported by a National Heart Foundation of Australia and Sanofi-Aventis Career Development Award. Kylie Ball is supported by a National Health and Medical Research Council/National Heart Foundation of Australia Career Development Award. David Crawford is supported by a Victorian Health Promotion Foundation Senior Research Fellowship." DOI: NR

Salmon 2008 *(Continued)*

	General notes: ineligible data, method of derivation of zBMI is unclear, and we are unsure how to interpret the effect estimate. Quote: "BMI was calculated and converted as recommended for analysis of long termitudinal adiposity data. This involves subtracting the sex–age population median (based on US data) from the child's raw BMI score. For convenience, these BMI units of difference from the sex–age population median will hereafter be referred to simply as BMI."

Salmon 2022

Study characteristics	
Methods	Study name: Transform-Us! Study design: cluster-RCT (2×2 factorial design) N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 30 months Follow-up time(s): 18 months; 30 months
Participants	Participants: 593 Setting: 20 government, Catholic and independent co-educational primary schools within 50 km of the Melbourne Central Business District Country: Australia Country income: high-income Recruitment: Quote: "Government, Catholic and Independent co-educational primary schools within 50 km of the Melbourne Central Business District in the first (low), third (mid) and fifth (high) quintiles of socioeconomic status (SES) areas according to the Australian Bureau of Statistics' Socio-Economic Index for Areas (suburb disadvantage score), with an enrolment exceeding 300 students and at least two Year 3 classes were eligible to be selected for the study (n=219 schools). All children in Year 3 at baseline (aged 8–9 years), apart from children in the control schools, received the programme." % of eligible population enrolled: schools: 15.7% (20 enrolled/127 attempted contacts); children: 37% (591/1606) Age (years): range 8 to 9 Gender/sex: 44.2% boys
Interventions	Theory: Social Cognitive Theory, Behavioural Choice Theory, Ecological Systems Theory Intervention type: activity Intervention group(s) participants: physical activity intervention (PA-I): 161 sedentary behaviour intervention (SB-I): 124 physical activity + sedentary behaviour intervention (PA-I + SB-I): 159 (at baseline) Comparator type: non-active intervention Comparison group participants: 149 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long-term (30 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ISRCTN83725066; ACTRN12609000715279 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "National Health and Medical Research Council (NHMRC) of Australia Project Grant (ID: 533815); Diabetes Australia Research Trust. The funders played no role in the design of the study, the collection, analysis or interpretation of the data, in the writing of the paper or the decision to submit for publication."

Salmon 2022 *(Continued)*

	DOI: competing interests: none General notes: BMI was measured at T2 (5 to 9 months), T3 (18 months) and T4 (30 months) but T2 data are not reported. Quote: "Children's height (cm) and weight (kg) were measured twice at each time point with a portable stadiometer."

Santos 2014

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

Santos 2014 *(Continued)*

	of Canada, and the Lawson Foundation and currently holding the Robert Wallace Cameron Chair in evidence based child health. No other disclosures were reported." General notes: zBMI data reported for the whole group (old and young) and in young and old groups separately.

Seguin-Fawler 2021

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

Sekhavat 2014

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: individual Unit of analysis: individual Intervention period: 5 to 10 minute counselling session during initial dental visit Follow-up time(s): 6 to 12 months after the initial baseline visit
Participants	Participants: 168 Setting: undergraduate paediatric dentistry clinic at the University of Toronto's Faculty of Dentistry, Toronto Country: Canada Country income: high-income Recruitment: Quote: "The study population was taken from the 168 children 6 to11 years of age, who were the first to attend the undergraduate pediatric dentistry clinic for their routine dental care at the University of Toronto's Faculty of Dentistry during the recruitment period. Information regarding the study was provided to all and they were given an opportunity to ask questions regarding the study. Informed consent was obtained by the student research investigator from the parent/caregiver for study participation and the patient identifier form was then completed. Although patients were encouraged to complete the study, any participant could withdraw from the study at any time for any reason with no effect on the their future care at the Faculty of Dentistry of the University of Toronto. Participants were assured that the information obtained from this study would be strictly confidential and secured." % of eligible population enrolled: children: 100% (168/168) Age (years): mean: 8.97 (SD 1.52) Gender/sex: 52.4% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 87 Comparator type: non-active intervention Comparison group participants: 81 Comparison: dietary and activity vs control Setting of the intervention: clinical setting Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (6 to 12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02637752 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: student project sponsored by the University of Toronto DOI: NR General notes: NR

Sgambato 2019

Study characteristics	
Methods	Study name: PAAPPAS (Parents, students, community health agents and teachers for healthy eating) Study design: cluster-RCT

Sgambato 2019 *(Continued)*

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

Sherwood 2019

Study characteristics	
Methods	Study name: Healthy Homes/Healthy Kids 5-10 Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months, 24 months
Participants	Participants: 421 Setting: community in the Greater Minneapolis-St. Paul area

Sherwood 2019 *(Continued)*

	Country: United States Country income: high-income Recruitment: Quote: "Electronic medical record was queried to identify age and BMI-eligible children with upcoming well-child visits. After review by study staff and the primary care provider, an invitation letter was sent to the parents of the child. Study staff conducted follow-up phone calls to assess interest and conduct a brief screening with parents/primary caregivers who were interested in participating." % of eligible population enrolled: children: 24% (421/1777) Age (years): mean: 6.6 (SD 1.7) Gender/sex: 50.6% boys
Interventions	Theory: Social Cognitive Theory, Motivational Interviewing principles Intervention type: dietary and activity Intervention participants: 212 Comparator type: attention control Comparison participants: 209 Comparison: dietary and activity vs control Setting of the intervention: clinical setting + telehealth Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI; BMI percentile Outcome(s) included in the meta-analysis: zBMI medium-term; BMI percentile medium-term (12 months) zBMI long-term; BMI percentile long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT01084590 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This work is supported by grants from the National Institute of Diabetes and Digestive and Kidney Diseases including 1R01DK084475, as well as P30DK050456 and P30DK092924. The funders had no role in the design, conduct, or reporting of this work." DOI: "No conflict of interest was declared" General notes: NR

Sichieri 2008

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (7 months) Follow-up time(s): 7 months
Participants	Participants: 1134 Setting: 22 public schools in the metropolitan city of Niterói, Rio de Janeiro of Niterói, Rio de Janeiro Country: Brazil Country income: upper-middle-income Recruitment: Quote: "A cluster randomised controlled trial of fourth graders from twenty-two public schools in the metropolitan city of Niterói, Rio de Janeiro, Brazil, was conducted from March to December 2005. Most students in the public schools are from families of low socio-economic level. Children go to school either in the morning (08.00–12.00 hours) or in the afternoon (13.00–17.00 hours). Only morning classes were included in the study. Families of fourth grade children (most of

Sichieri 2008 *(Continued)*

	them 10 and 11 years old) were informed of the study and only those children with informed consent given by the parents were included in the study." % of eligible population enrolled: schools: 10% (47/47); children: 97% (1134/1166) Age (years): mean: intervention: 10.9 (SD 0.81); control: 10.9 (SD 0.75) Gender/sex: intervention: 46.9% boys; control: 47.4% boys
Interventions	Theory: NR Intervention type: dietary Intervention participants: 526 Comparator type: attention control Comparison participants: 608 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (7 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02653352 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was supported by the Brazilian National Research Council – CNPq. Grant number: 500404/2003-8 – CNPq." DOI: conflict of interest: none declared General notes: NR

Siegrist 2013

Study characteristics	
Methods	Study name: JuvenTUM Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 826 Setting: 8 primary schools from 4 regions of Bavaria Country: Germany Country income: high-income Recruitment: Quote: "Sixty primary schools throughout Bavaria, Germany were invited by mail or telephone to take part in this project. Eight primary schools agreed to participate. In each of the four regions, one school was randomized to participate in the intervention, and another school served as a control. Intervention and control schools were comparable with regard to socioeconomic status of the population and the recreational environments." % of eligible population enrolled: schools: 13% (8/60); children: 92% (826/902) Age (years): mean: 8.4 (SD 0.7) Gender/sex: 51.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 486 Comparator type: non-active intervention

Siegrist 2013 *(Continued)*

	Comparison group participants: 340 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study received a research grant by the Bavarian State Ministry of the Environment and Public Health (Gesund. Leben. Bayern.) (321g-G8203.1-2005/68-36)." DOI: NR General notes: NR

Siegrist 2018

Study characteristics	
Methods	Study name: JuvenTUM 3 Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 18 months Follow-up time(s): 18 months
Participants	Participants: 792 Setting: 15 schools in the greater Munich area Country: Germany Country income: high-income Recruitment: recruitment of participating schools was based on the willingness of schools to take part in the study prior to being randomised into either an intervention or control school. In total, 15 schools with 32 classes agreed to take part in the study. % of eligible population enrolled: schools: 22% (15/68); children: 74.2% (588/792; examined at baseline/randomised) Age (years): mean: 11.1 (SD 0.6) Gender/sex: 57% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary and activity Intervention group(s) participants: 426 Comparator type: non-active intervention Comparison group participants: 366 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: BMI long-term (18 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00988754

Siegrist 2018 *(Continued)*

	Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This work has been funded by a grant from the Bavarian State Ministry of Public Health and Care Services (Gesund.Leben.Bayern.) (LP 00001-FA 08)." DOI: "The authors declared they do not have anything to disclose regarding conflict of interest with respect to this manuscript." General notes: subjects selected were these with a zBMI between the 70th and the 95th percentile

Simon 2008

Study characteristics	
Methods	Study name: ICAPS (Intervention Centered on Adolescents' Physical activity and Sedentary behavior) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 4 years Follow-up time(s): 1 year; 2 years; 3 years; 4 years; 6.5 years
Participants	Participants: 954 Setting: 8 public middle schools of the Department of Bas-Rhin Country: France Country income: high-income Recruitment: Quote: "Eight schools out of the 77 public middle-schools of the department of the Bas-Rhin (Eastern France) were randomly selected. In order to have a broad socioeconomic context, randomisation was carried out after stratification on sociogeographical criteria: communes of less than 50 000 inhabitants in the north or the south of the department (one pair of schools in each) and greater Strasbourg, a city of 450 000 inhabitants (two pairs, with one pair located in a low economic environment). All initially first-level students (corresponding to US sixth-graders) of these schools were eligible to participate." % of eligible population enrolled: schools: 10% (8/77); children: 91% (954/1048) Age (years): mean: 11.6 (SD 0.6) Gender/sex: intervention: 46.3% boys; control: 51.8% boys
Interventions	Theory: Behaviour Change, Social Ecological Model Intervention type: activity Intervention group(s) participants: 479 Comparator type: non-active intervention Comparison group participants: 475 Comparison: activity vs control Setting of the intervention: school + community Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term (1 year) BMI long term; zBMI long-term (6.5 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT00498459 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by grants from The Regional Health Insurance of Alsace-Moselle; National Program of Research in Human Nutrition (INSERM and INRA); French Public Authorities within the National Nutritional Health Program and through the Youth and Sports Department; Conseil General du Bas-Rhin; Municipalities of Drusenheim, Illkirch-Graffenstaden,

Simon 2008 *(Continued)*

	Obernai and Schiltigheim and The International Longevity Centre. The funding sponsors had no role in the design and protocol development of the study, in data collection analysis and interpretation or in manuscript preparation." DOI: NR General notes: the outcome data are reported for the whole population (4 years follow-up) and stratified by being non-overweight or overweight at baseline (all follow-up times); from the stratified analysis we have extracted only data from the non-overweight group.

Spiegel 2006

Study characteristics

Methods	Study name: WAY (Wellness, Academics & You) Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 1191 Setting: schools in Delaware, Florida, Kansas and North Carolina Country: United States Country income: high-income Recruitment: Quote: "Teachers were recruited through coordination with local and state education officials. The four states were selected based on existing networks and infrastructure to recruit schools and collect and report data. In each of the four states, school administrators and teachers were sent information about the program. Teachers completed an application form to participate in the study. The model for sampling was stratified at the district level to ensure a diverse and representative sample of a national population." % of eligible population enrolled: classes: 75% (70/93); children: NR Age (years): mean: 9 to 10 (4th and 5th school graders) Gender/sex: NR
Interventions	Theory: Theory of Reasoned Action, Constructivism Intervention type: dietary and activity Intervention group(s) participants: 572 Comparator type: non-active intervention Comparison group participants: 619 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was commissioned by the Institute for America's Health, a not-for-profit 501(c)3 organisation striving to enhance the health of all Americans through research and education (www.healthy-america.org)." DOI: NR General notes: NR

Stettler 2015

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

Stolley 1997

Study characteristics	
Methods	Study name: NR Study design: RCT N of arms: 2 Unit of allocation: mother/daughter dyad Unit of analysis: individual Intervention period: 12 weeks Follow-up time(s): 12 weeks; 12 months
Participants	Participants: 65 Setting: local tutoring programme in inner city Chicago, Illinois Country: United States Country income: high-income Recruitment: Quote: "Subjects were 65 African American girls and their mothers who live in Chicago's inner city and attend a local tutoring program. Subjects were recruited in three ways: (1) an advertisement published in the tutoring newsletter requested the participation of 7- to 12-year-old girls and their mothers in one of two preventive health programs, (2) letters were sent to all mothers of children registered in the tutoring program, and (3) the first author made a short term presentation about the research and health programs to parents at the orientation for the tutoring program. As potential subjects signed up or called to be involved in the study, they were screened for appropriate age of daughter and informed of the details of the project." % of eligible population enrolled: dyads: NR Age (years): mean: intervention: 9.9 (SD 1.3); control: 10 (SD 1.5) Gender/sex: 100% girls
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 32 Comparator type: attention control Comparison participants: 33 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (12 weeks) BMI medium term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by a grant from the American Heart Association of Metropolitan Chicago" DOI: NR General notes: NR

Story 2003

Study characteristics	
Methods	Study name: Minnesota GEMS (Girls health Enrichment Multi-site Studies) pilot study Study design: RCT

Story 2003 *(Continued)*

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

Story 2012

Study characteristics	
Methods	Study name: Bright Start Study design: cluster-RCT N of arms: 2

Story 2012 *(Continued)*

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

Tanskey 2017

Study characteristics	
Methods	Study name: FLEX (Fueling Learning through Exercise) Study Study design: cluster-RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 12 months (data analysed by linear regression to give 12 months data only)
Participants	Participants: 769 Setting: 16 schools in Massachusetts Country: United States Country income: high-income Recruitment: Quote: "The FLEX team recruited school districts where more than 40% of students were eligible for free or reduced-price lunch and more than 40% of students were non-Caucasian.

Tanskey 2017 *(Continued)*

	Third and fourth grade students in participating schools were invited to enroll in the FLEX Study. Recruitment packets were sent from home to school with students. The packets included an informational flyer describing the study, plain language parent consent and child assent forms, and a demographic survey to be completed by the child's parent or guardian. Recruitment materials were provided in the following languages, as requested by participating schools: English, Spanish, Portuguese, Hatian Creole, Arabic, Vietnamese, and Mandarin. Students were given at least one week to return their completed recruitment materials to school. In May–June 2015, children participating in Wave 1 of the FLEX Study were invited to participate in a separate pilot project on summer weight gain. Parents were asked to give permission for their child to participate in a post-summer height and weight measurement. To facilitate the largest possible sample for this aim, recruitment ran in conjunction with the main FLEX Study. Students in participating FLEX schools were invited to enroll during Fall 2015. Research staff worked with school liaisons to coordinate recruitment efforts in each school." % of eligible population enrolled: schools: 5.6% (16/286); children: NR for this subgroup Age (years): mean: 8.7 (SD 0.7) Gender/sex: 44% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 100 Miles club: 261 Just Move: 249 (at baseline) Comparator type: non-active intervention Comparison group participants: 259 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02810834 Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: ""I would like to express my sincere gratitude to the donors who funded the Bacow Fellowship that made my doctoral studies possible. Finally, I would like to thank the Vela Foundation, the American College of Sports Medicine Foundation, and The Boston Foundation for funding my doctoral research, and the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health, for funding Dr. Sacheck's FLEX Study (Award Number R01HD080180)." DOI: NR General notes: NR

Telford 2012

Study characteristics	
Methods	Study name: LOOK (Lifestyle Of Our Kids) Study Study design: cluster-RCT (nested cohort design) N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 620 Setting: 29 primary schools in Canberra

Telford 2012 *(Continued)*

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

Tessier 2008

Study characteristics	
Methods	Study name: REGU'LAPS (REGULarity of Physical ActivitieS) Study design: cluster-RCT N of arms: 2 Unit of allocation: classroom Unit of analysis: individual Intervention period: 31 weeks Follow-up time(s): 31 weeks
Participants	Participants: 1150 Setting: schools in Meurthe-et-Moselle and Vosges (District of Golbey) in the Lorraine region Country: France Country income: high-income Recruitment: Quote: "All principals and teachers in charge of classes from grade 2 to 5 in two counties (Meurthe-et-Moselle and Vosges [District of Golbey]) in the Lorraine region of France were con-

Tessier 2008 *(Continued)*

	tacted (i.e., 508 schools). Among these, 58 were interested (i.e., 88 classrooms). However, to be eligible, principals or teachers had to accept to modify the organisation of physical education sessions, and 52 teachers agreed to do so. " % of eligible population enrolled: schools: NR; children: 82% (939/1150) Age (years): mean: 9.1 (SD 1.2) Gender/sex: 51% boys
Interventions	Theory: NR Intervention type: activity Intervention participants: 578 Comparator type: activity intervention Comparison participants: 572 Comparison: activity vs activity Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the comparison is not eligible for meta-analysis: the reported results are from a comparison between groups that were allocated to the same type of interventions (activity interventions)
Notes	Clinical Trial Registry: NCT01161212 (from Speyer 2010) Funder(s) type: NR Writing and/or research independent from funder(s): NR Funding details: NR DOI: NR General notes: NR

Thivel 2011

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 6 months
Participants	Participants: 355 Setting: 19 public primary schools in Auvergne Country: France Country income: high-income Recruitment: 457 primary school children (6 to 10 years old) were recruited from the local public schools that agreed to participate in the study % of eligible population enrolled: schools: 59% (19/32); children: NR Age (years): range 6 to 10 Gender/sex: 49.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 229 (168 in the non-obese weight classification) Comparator type: non-active intervention Comparison group participants: 228 (187 in the non-obese weight classification)

Thivel 2011 *(Continued)*

	Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI short-term (6 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by grants from the French National Plan for Nutrition and Health (PNNS), the Comite Regional Executif des Actions de Sante d'Auvergne (CREAS), the Caisse Régionale d'Assurance Maladie d'Auvergne (CRAMA), the Appert Institutes, the town of Clermont-Ferrand, and the governing bodies of the Clermont-Ferrand school system." DOI: NR General notes: NR

Topham 2021

Study characteristics	
Methods	Study name: FISH (Families and Schools for Health) Study design: cluster-RCT N of arms: 5 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 4 months; 16 months; 28 months; 40 months
Participants	Participants: 538 Setting: 29 schools were within 90 miles from Oklahoma State University, Stillwater, OK Country: United States Country income: high-income Recruitment: Quote: "Thirty-seven rural schools within a 90-mile radius of the researchers' university were approached. All schools where both superintendents and principals agreed to participate were included in the study. All families with a 1st grade child (ages 6–7) in consented schools were invited to participate. Parents were recruited at kindergarten graduations, 1st-grade registration, and back-to-school events, as well as via letters in children's backpacks. Families were recruited into a "healthy lifestyles" program and children were told the researchers wanted "to learn more about their eating habits"." % of eligible population enrolled: schools: 78% (29/37); children: 29% (538/1854; assessed for eligibility for subsample inclusion/eligible within the assessed for eligibility for sample inclusion) Age (years): range 6 to 7 (1st grader children) Gender/sex: 51.7% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: Family Lifestyle (FL) intervention: 117 Family Lifestyle (FL) + Family Dynamics (FD) intervention: 87 Family Dynamic (FD) + Peer Group (PG) intervention: 124 Family Lifestyle (FL) + Family Dynamic (FD) + Peer Group (PG) intervention: 129 Comparator type: non-active intervention Comparison group participants: 81 Comparison: dietary and activity vs control Setting of the intervention: school + community/community (multi-arm study)

Topham 2021 *(Continued)*

	Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI long-term (40 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02659319 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: ""This research was funded by the National Institute of Food and Agriculture, U. S. Department of Agriculture, under Agreement No. 05545; Oklahoma Center for the Advancement of Science & Technology, Grant #HR07-044, AH; Oklahoma Agricultural Experiment Station, Grant #2744. T. Swindle is supported by the NIH NIDDK (K01 DK110141), the NIH NCATS (UL1 TR003107), and NIH NCI (R21 CA237985). T. Swindle and J.M. Rutledge are supported by NIH NIDDK (R03 DK117197) and NIH NIGMS (P20 GM109096) The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH."" DOI: "The authors declare no conflict of interest." General notes: the study included children with BMI > 75th percentile but we only extracted outcome data for the at-risk group (75th < BMI < 85th percentile)

Treviño 2004

Study characteristics	
Methods	Study name: Beinestar Health Program Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 7 months Follow-up time(s): 8 months (outcome measurement was planned, but it is not reported if it was measured)
Participants	Participants: 1993 Setting: 27 schools in San Antonio, Texas Country: United States Country income: high-income Recruitment: Quote: "After the 27 schools were identified, Bienestar staff sent parents a letter and a consent/assent form. These documents explained to parents that their children's schools could be assigned to receive either a health examination alone or a health examination and a school health program. The documents also explained to parents that students would receive $5 at baseline and $5 at follow-up for participating in the health examination. Only children who returned written informed consent forms signed by their parent or guardian and who assented to the study participated in program evaluation, and all children participated in program implementation." % of eligible population enrolled: schools: 61% (27/44); children: 64% (1993/3096) Age (years): mean: intervention: 9.79 (SD 0.53); control 9.77 (SD 0.49) Gender/sex: intervention 50% boys; control 51% boys
Interventions	Theory: Social Cognitive Theory, Socio-Ecological Framework Intervention type: dietary and activity Intervention group(s) participants: 969 Comparator type: non-active intervention Comparison group participants: 1024 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school

Treviño 2004 *(Continued)*

Outcomes	Measured outcome(s): BMI (planned) Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: measurement of the outcome at follow-up was planned, but results are not reported (there is no evidence that it was measured)
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "National Institutes of Health-National Institute of Diabetes and Digestive and Kidney Disease" DOI: NR General notes: BMI was measured and used to derive body fat measure but BMI data are not reported at follow-up. Quote: "Body fat was measured using bioelectric impedance analysis (Tanita Corporation of America Inc, Arlington Heights, Ill) and body mass index. Bioelectric impedance analysis was used for body fat measurement because body fatness has been shown to relate closely to atherogenic and diabetogenic risk factors in children and because body mass index may not represent true body fatness in prepubertal children. The children, in indoor clothing, were asked to remove their shoes and socks and step on the metal box. Within 30 seconds, the instrument prints out percentage of body fat and weight. Students, in indoor clothing and barefooted, also had their height measured using a wall stop measuring tape (stadiometer) (Seca Bodymeter 206; Seca Corp, Hanover, Md). Body mass index was calculated as weight in kilograms divided by the square of height in meters using the Quetelet Index measure."

van de Berg 2020

Study characteristics	
Methods	Study name: Texas, Grow! Eat! Go! Study design: cluster-RCT N of arms: 4 Unit of allocation: school Unit of analysis: individual Intervention period: 6 months Follow-up time(s): 1 school year
Participants	Participants: 1326 Setting: south and central Texas Country: United States Country income: high-income Recruitment: Quote: "All third grade students at the 28 study schools received the respective interventions. However, only the students recruited into the study participated in the data collections. Students and their parents were recruited by sending Texas, Grow! Eat! Go! (TGEG) study packets home to parents." % of eligible population enrolled: NR Age (years): children aged 7 to 8: 70.6%; children aged 9 to 11: 29.4% Gender/sex: 49.2% boys
Interventions	Theory: Social Cognitive Theory Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention group(s) participants: Walk Across Texas (WAT!) intervention: 336 Learn!Grow! Eat!Go! (LGEG!) intervention: 347 Walk Across Texas (WAT!) + Learn!Grow! Eat!Go! (LGEG!) intervention: 358 (at baseline) Comparator type: non-active intervention Comparison group participants: 285 (at baseline) Comparison: dietary vs control activity vs control

van de Berg 2020 *(Continued)*

	dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school + home Setting of the intervention in subgroup analyses: school + home
Outcomes	Measured outcome(s): BMI percentile Outcome(s) included in the meta-analysis: BMI percentile medium-term (1 school year) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: Texas, Grow! Eat! Go! (TGEG) Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This material is based on work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2011-68001- 30138. This study was partially funded by the Michael & Susan Dell Foundation through resources provided by the Michael & Susan Dell Center for Healthy Living, The University of Texas (UTHealth) School of Public Health at Austin Campus." DOI: "No competing financial interests exist." General notes: NR

Viggiano 2018

Study characteristics	
Methods	Study name: Kaledo Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 20 weeks Follow-up time(s): 8 months; 18 months
Participants	Participants: 1313 Setting: classes III, IV and V from 10 primary schools in Campania Country: Italy Country income: high-income Recruitment: Quote: "We enrolled 1313 children (aged 7–11 years) from classes III, IV, and V from ten primary schools in Campania, Italy." % of eligible population enrolled: schools: NR; children: NR Age (years): range 7 to 11 Gender/sex: 52% boys (measured at 8 months folow-up)
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 837 Comparator type: non-active intervention Comparison group participants: 476 Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (8 months) zBMI long-term (18 months)

Viggiano 2018 *(Continued)*

	Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded by the Second University of Naples, Associazione Culturale Kaledo, Regione Campania, Provincia di Napoli, and Provincia di Salerno" DOI: "The authors declare that they have no conflict of interest." General notes: NR

Vizcaino 2008

Study characteristics	
Methods	Study name: MOVI Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 24 weeks Follow-up time(s): 9 months
Participants	Participants: 1409 Setting: 20 schools in 20 towns in the Province of Cuenca Country: Spain Country income: high-income Recruitment: Quote: "We selected 20 schools in 20 towns in the Province of Cuenca, Spain. In towns with two or more schools, only one was chosen at random to avoid contamination of the intervention. The Boards of Governors (community participatory organ in each school) and the children's parents were informed of the study's aims and methods, and consented to their children's participation in writing. Similarly, the study was presented classroom-by-classroom to the children and their oral consent was obtained. Participation in the Movi program was promoted by presenting it separately to physical education teachers, the children's parents and the Board of Governors of each intervention school. Good adherence to the Movi program was encouraged with a system of rewards (T-shirts, caps, board games, and so on, with the program logo) for the children and their parents." % of eligible population enrolled: schools: 100% (20/20); children: 79% (1119/1409) Age (years): mean: intervention boys: 9.4 (SD 0.7); intervention girls: 9.4 (SD 0.7); control boys: 9.5 (SD 0.7); control girls: 9.4 (SD 0.6) Gender/sex: 50.6% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 691 Comparator type: non-active intervention Comparison group participants: 718 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI Outcome(s) included in the meta-analysis: BMI medium-term (9 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR

Vizcaino 2008 *(Continued)*

	Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This study was funded mainly by La Consejería de Sanidad de Castilla-La Mancha (grant GC03060-00). Additional funding was obtained from the Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III, Red de Investigación en Actividades Preventivas y de Promoción de Salud (grant RD06/0018/ 0038)." DOI: NR General notes: NR

Wang 2012

Study characteristics	
Methods	Study name: NR Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 12 months Follow-up time(s): 12 months
Participants	Participants: 1003 Setting: 6 primary schools from Jinan City, Shandong Province Country: China Country income: upper-middle-income Recruitment: Quote: "Six primary schools were chosen from Jinan City, Shandong Province, China. Each two were selected from schools with large (>1000 students), middle (500-1000 students), and small (<500) population. In each study school, two classes were randomly chosen from each grade of grades 2-5. All students in the selected classes were invited into the study." % of eligible population enrolled: schools: NR; children: NR Age (years): range 7 to 11 (grades 2 to 5) Gender/sex: NR
Interventions	Theory: NR Intervention type: dietary and activity Intervention participants: 476 Comparator type: NR Comparison participants: 527 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: zBMI medium-term (12 months) Outcome self-reported: NR Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The study was funded by Key Projects in the National Science & Technology Pillar Program during the Twelfth Five-year Plan Period (project number: 2008BAI58B05)" DOI: NR General notes: article published in Chinese

Wang 2018

Study characteristics	
Methods	Study name: HLP-YOG (Health Legacy Project of the 2nd Summer Youth Olympic Games) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 10 months Follow-up time(s): 10 months
Participants	Participants: 10091 Setting: 32 primary and 16 junior high schools in 8 urban districts of Nanjing, China Country: China Country income: upper-middle-income Recruitment: Quote: "Thirty-two primary and 16 junior high schools were selected in total, and all of the 4th and 7th graders in the selected participating schools were eligible study subjects, resulting in 10 447 students in the baseline survey." % of eligible population enrolled: schools: NR; children: 97% (10091/10447) Age (years): mean: 10.5 (SE 0.02) Gender/sex: intervention: 53.2% boys; control: 52.8% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 5400 Comparator type: non-active intervention Comparison group participants: 4691 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (10 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTRERC-11001819 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "The study (both the research project and intervention) was supported by Nanjing Medical Science and Technique Foundation (ZDX12019), China. Zhengqi Tan, Drs Youfa Wang and Hong Xue's efforts were partially supported by the National Institute of Health (NIH, U54 HD070725). Professor Neville Owen was supported by NHMRC Centre of Research Excellence Grant #1057608, NHMRC Senior Principal Research Fellowship #1003960 and by the Victorian Government's Operational Infrastructure Support Program. From xu 2016: The content of this abstract is solely the responsibility of the authors and does not necessarily represent the offi cial views of the funders." DOI: "The authors declare no conflict of interest." General notes: NR

Warren 2003

Study characteristics	
Methods	Study name: Be Smart! Study design: RCT N of arms: 4 Unit of allocation: individual

Warren 2003 *(Continued)*

	Unit of analysis: individual Intervention period: 4 school terms (20 weeks) Follow-up time(s): 14 to 16 months
Participants	Participants: 218 Setting: 3 primary schools in Headington, Oxford Country: United Kingdom Country income: high-income Recruitment: Quote: "All children in years 1 and 2 (aged 5–7 years) from three primary schools in Oxford were targeted in January 2000. The primary schools were selected on the basis of previous links to the Nutrition and Food Science Department at Oxford Brookes University and their close proximity to the University. Parents/carers were given a slip and a fact sheet. Canvassing in the school playground during mornings and afternoons was a successful means of enhancing recruitment, along term with parent meetings held in the schools. Children were recruted in three phases." % of eligible population enrolled: children: NR Age (years): mean: 6.1 (SD 0.6) Gender/sex: 50.9% boys
Interventions	Theory: Social Learning Theory Intervention type: dietary/activity/dietary and activity (multi-arm) Intervention participants: Eat Smart intervention: 56 Play Smart intervention: 54 Eat and Play Smart intervention: 54 Comparator type: attention control Comparison participants: Be Smart intervention: 54 Comparison: dietary vs control activity vs control dietary and activity vs control activity vs dietary dietary and activity vs dietary dietary and activity vs activity Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): proportion of children living with overweight or obesity Outcome(s) included in the meta-analysis: n/a Outcome self-reported: no Reason for exclusion from the meta-analysis: the results are reported as percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means.
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "This research was funded by the UK Food Standards Agency" DOI: NR General notes: data are reported as percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means.

Wendel 2016

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

Wendel 2016 *(Continued)*

	Unit of allocation: classroom Unit of analysis: individual Intervention period: 2 years Follow-up time(s): 2 years
Participants	Participants: 173 Setting: 24 schools in Texas Country: United States Country income: high-income Recruitment: the authors approached 24 teachers in 3 Texas schools (8 in each school), informed them the study's purpose and protocol, and offered them a financial incentive for their participation. All 24 teachers consented to take in the study. In August 2011, research staff members attended the parent orientation events held at each of the schools and presented study information to parents. % of eligible population enrolled: teachers; 100% (24/24); children: 79% (380/480) Age (years): mean: 8.8 Gender/sex: 49.7% boys
Interventions	Theory: NR Intervention type: activity Intervention group(s) participants: 101 (at baseline) Comparator type: non-active intervention Comparison group participants: 72 (at baseline) Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): BMI; BMI percentile Outcome(s) included in the meta-analysis: BMI long-term; BMI percentile long-term (2 years) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: mixed Writing and/or research independent from funder(s): yes Funding details: Quote: "This study was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Devel- opment (grant 5R21HD068841). M. E. Benden declares a financial conflict of interest associated with this research since his US patented designsfor standing height school desks have been licensed by Texas A&M University to Stand2Learn LLC, a faculty led startup company, of which he owns stock and whose desks were included in the treatment groups used in this study. M. E. Benden's COI is managed by a TAMU approved plan and his involvement was at the experimental design stage and not the data collection or analysis phases. The conclusions presented are those of the authors and do not necessarily represent the official position of the National Institutes of Health." DOI: "One author declares a financial conflict of interest associated with this research since his US patented designs for standing height school desks have been licensed by Texas A&M University to Stand2Learn LLC, a faculty led startup compnay, of which he owns stock and whose desks were included in the treatment group used in this study. His COI is managed by a TAMU approved plan and his involvement was at the experimental design stage and not the data collection or analysis phases. " General notes: data were analysed according to an intention-to-treat plan; data from the TT and TC groups were merged and analysed as intervention group; data from the CC and CT groups were merged and analysed as control group

White 2019

Study characteristics

White 2019 *(Continued)*

Methods	Study name: iCook 4-H Study Study design: RCT N of arms: 2 Unit of allocation: parent/child dyad Unit of analysis: individual Intervention period: 24 months Follow-up time(s): 4 months; 12 months; 24 months
Participants	Participants: 228 Setting: communities in 6 counties in Maine, Nebraska, South Dakota, Tennessee and West Virginia Country: United States Country income: high-income Recruitment: Quote: "Recruitment occurred at youth-oriented organizations and clubs, schools and home schools, town halls, churches, pediatrician offices, grocery stores, 4-H and other Extension e-mail listservs, demonstrations at fairs and day camps, and news releases and other media outlets. Model flyers, media scripts, and letters to community organizations were used across states. Recruited adults received phone calls from researchers to confirm study eligibility, review the consent form, and set appointment times for assessments." % of eligible population enrolled: dyads: NR Age (years): mean: 9.35 (SD 0.67) Gender/sex: 45% boys
Interventions	Theory: Social Cognitive Theory, Experiential 4-H Learning Model Intervention type: dietary and activity Intervention group(s) participants: 151 Comparator type: non-active intervention Comparison group participants: 77 Comparison: dietary and activity vs control Setting of the intervention: community Setting of the intervention in subgroup analyses: other
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI short-term (4 months); zBMI medium-term (12 months); zBMI long-term (24 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "Other funding for this material is from US Department of Agriculture Experiment Stations in Maine, Nebraska, South Dakota, and West Virginia. The funding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results." DOI: "The authors have not stated any conflicts of interest." General notes: NR

Williamson 2012

Study characteristics	
Methods	Study name: Louisiana (LA) Health Study design: cluster-RCT N of arms: 3 Unit of allocation: school Unit of analysis: individual Intervention period: 28 months

Williamson 2012 *(Continued)*

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

Xu 2015

Study characteristics	
Methods	Study name: CLICK-Obesity Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 1182 Setting: 8 schools in the Jianye urban district of Nanjing Country: China

Xu 2015 *(Continued)*

	Country income: upper-middle-income Recruitment: Quote: "Eight schools were randomly selected from thirteen primary schools within Jianye district based on estimates of sample size required and the average class size for primary schools. All the fourth graders within the eight chosen schools were eligible to participate. Written informed consent regarding baseline and follow-up surveys as well as participation in the lifestyle intervention were obtained from parents/guardians and the schools prior to the baseline survey." % of eligible population enrolled: schools: 61.5% (8/13); children: 86.5% (1182/1225) Age (years): mean: intervention: 10.2 (SD 0.51); control: 10.2 (SD 0.52) Gender/sex: intervention: 53.9% boys; control: 59.2% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 638 Comparator type: non-active intervention Comparison group participants: 544 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-ERC-11001819 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This research work was funded by the Nanjing Municipal Science and Technique Foundation (200901088), Medical Science and Technique Development Foundation (2009-ZKX09034) The Young Medical Experts Project of Nanjing Medical Science and technique Development Foundation (QRX11038) and Nanjing Municipal Center for Disease Control and Prevention (Nanjing CDC), China. The research (Dr. Youfa Wang) was also supported in part by U.S. National Institutes of Health (NIH,U54HD070725). The funder had no role in the decision to collect data, data analysis, or reporting of the results." DOI: NR General notes: NR

Xu 2017 (5 other cities)

Study characteristics	
Methods	Study name: NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China) Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 9 months Follow-up time(s): 12 months
Participants	Participants: 7717 Setting: 30 schools from Shanghai, Chongqing, Guangzhou, Jinan and Harbin Country: China Country income: upper-middle-income Recruitment: Quote: "This study was a multi-center cluster randomized control trial. Six centers, including Shanghai, Chongqing, Guangzhou, Jinan, Harbin and Beijing, were recruited (note: we are including data from all the cities but Beijing, as data from the Beijing schools are reported in Meng 2013); Two-step cluster sampling method was used for subjects' selection. Firstly, 8 schools from Beijing and 6 schools from each other city were randomly chosen into the trial. The select-

Xu 2017 (5 other cities) *(Continued)*

	ed schools were randomly divided into two groups in each other city (3 schools for comprehensive intervention and 3 schools for control). In total, there were 15 comprehensive intervention schools, 15 control schools. Secondly, 2 classes from each grade (1st to 5th) were selected randomly in every school." % of eligible population enrolled: schools: NR; children: 92% (7077/7717) Age (years): mean: 9 (SD 1.4) Gender/sex: intervention: 50.9% boys; control: 50.6% boys
Interventions	Theory: NR Intervention type: dietary and activity Intervention group(s) participants: 3773 Comparator type: non-active intervention Comparison group participants: 3944 Comparison: dietary and activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI; BMI Outcome(s) included in the meta-analysis: BMI medium-term; zBMI medium-term (12 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: ChiCTR-PRC-09000402 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "This project has been funded by China Ministry of Science & Technology as “Key Projects in the National Science & Technology Pillar Program during the Eleventh Five-Year Plan Period”, grant number 2008BAI58B05. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript." From Meng 2013" DOI: "We declare that the authors have no competing interests." General notes: this is a two-step clustered RCT: first randomisation was at school level; second randomisation was at classroom level. Participants were selected from Beijing and 5 other cities (2 cohorts); data are analysed separately for the Beijing cohort and the other 5 cities cohorts. Data from all 5 arms are reported in both Meng 2013 and Xu 2017. From this study we only extracted data from the 5 other cities (Shanghai, Chongqing, Guangzhou, Jinan, Harbin). The data from the Beijing cohort (3 arms) are extracted from Meng 2013 (Beijing).

Yin 2012

Study characteristics	
Methods	Study name: Fitkid - Georgia Fitkid Project Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 3 years Follow-up time(s): 9 months; 13 months; 20 months; 24 months; 33 months
Participants	Participants: 1187 Setting: 18 schools in Augusta, Richmond County, Georgia Country: United States Country income: high-income Recruitment: Quote: "Participant recruitment took place from late spring in 2nd grade students to early fall in 3rd grade students in 2003. Additional recruitment occurred at the beginning of years 2 and 3 in schools with low enrollment. In early spring 2003, the FitKid research team identified 18 schools from 22 interested schools that met the selection criteria. To assure that similar types of schools were present in both the intervention and control arms, we first stratified schools on the

Yin 2012 *(Continued)*

	basis of geographic location (urban, suburban, and rural). In May 2003, our research staff visited all second-grade students in the 18 selected schools during PE periods and explained the project to them. Students who expressed interest in the study were asked to take a packet, including a letter describing the study, consent and assent forms, and a prepaid envelope to their parents. All third graders who attended intervention schools were invited to enroll in the 3-year FitKid program. " % of eligible population enrolled: schools: 69% (18/29); children: 52% (614/1187) Age (years): mean: 8.7 (SD 0.5) Gender/sex: 47% boys
Interventions	Theory: Environmental Change Intervention type: activity Intervention group(s) participants: 603 Comparator type: non-active intervention Comparison group participants: 584 Comparison: activity vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): zBMI Outcome(s) included in the meta-analysis: zBMI medium-term (13 months) zBMI long-term (33 months) Outcome self-reported: no Reason for exclusion from the meta-analysis: n/a
Notes	Clinical Trial Registry: NCT02793024 Funder(s) type: non-industry Writing and/or research independent from funder(s): yes Funding details: Quote: "None of the authors has a known conflict of interest, financial or otherwise that would affect the analysis or interpretation of the data presented within this manuscript. This study was funded by the National Institutes of Health (DK063391)." DOI: "No financial disclosures are reported by the authors of this paper. None of the authors has a known conflict of interest, financial or otherwise that would affect the analysis or interpretation of the data presented within this manuscript." General notes: NR

Zota 2016

Study characteristics	
Methods	Study name: DIATROFI Program Study design: cluster-RCT N of arms: 2 Unit of allocation: school Unit of analysis: individual Intervention period: 1 school year (9 months) Follow-up time(s): 9 months
Participants	Participants: 21,261 Setting: 146 schools in Attica, Thessaloniki and the rest of Greece Country: Greece Country income: high-income Recruitment: Quote: "After establishing initial contacts with all schools in low socioeconimic status areas, a total of 1053 schools' principals, corresponding to 140,468 students, declared their willingness to participate for the 2013–2014 school year and completed the relevant application form. Depending on funding availability, a set of criteria was used to prioritize the schools that applied. All students of participating schools were offered the opportunity to receive the free meal, irrespective of their socioeconomic status, so as to avoid stigmatization. Parents who did not wish their child to participate provided a signed statement."

Zota 2016 *(Continued)*

	% of eligible population enrolled: schools: 36% (146/406); children: 35% (21261/61506) Age (years): range 4 to 18 years Gender/sex: multicomponent intervention: 50.7% boys; environmental intervention: 48.8%
Interventions	Theory: NR Intervention type: dietary Intervention group(s) participants: 10,561 (participants in age group 5 to 18 years) Comparator type: non-active intervention Comparison group participants: 10,700 (participants in age group 5 to 18 years) Comparison: dietary vs control Setting of the intervention: school Setting of the intervention in subgroup analyses: school
Outcomes	Measured outcome(s): odds ratio of changing from a weight status of overweight or obesity to a normal weight status Outcome(s) included in the meta-analysis: n/a Outcome self-reported: yes Reason for exclusion from the meta-analysis: the results are not eligible for meta-analysis: data reported as odd ratios of changing the weight status from overweight or obese classification to normal weight
Notes	Clinical Trial Registry: NR Funder(s) type: non-industry Writing and/or research independent from funder(s): NR Funding details: Quote: "The DIATROFI Program was funded by the Stavros Niarchos Foundation and has been approved and runs under the auspices of the Greek Ministry of Education and Religious Affairs" DOI: conflict of interest: none declared General notes: participants were children (4 to 11 years old) and adolescents (12 to 18 years old); only data from the children group are included in this review; narrative only in previous review. Data reported as probability of improving the weight status of adolescents.

Abbreviations
BMI: body mass index; DOI: declarations of interest; IQR: interquartile range; NR: not reported; n/a: not applicable; RCT: randomised controlled trial; SD: standard deviation; SE: standard error; SES: socioeconimic status; zBMI: body mass index standardised for age and sex

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Allender 2021	Ineligible study design (cross-sectional study)
Beets 2014	Ineligible study design (repeated cross-sectional group randomised controlled trial)
Braun 2016	Outcome of interest was not measured
Braun 2019	Outcome of interest was not measured (follow-up time < 12 weeks)
Christiansen 2013	Outcome of interest was not measured
Coleman 2005	Outcome of interest was not measured
De Oliveira 2015	Ineligible study design (not a RCT)
Dominguez-Munoz 2021	Ineligible aim of the intervention

Study	Reason for exclusion
Dong 2021	Ineligible study design (non-randomised study)
Fernald 2009	Ineligible population (children's age was < 5 years at baseline)
Gruber 2015	Ineligible study design (non-randomised study)
Herscovici 2013	Ineligible study design (< 3 clusters/group)
Jones 2020	Ineligible study design (cross-sectional study)
Lubans 2011	Ineligible study design (< 3 clusters/group)
Madsen 2015	Ineligible study design (< 3 clusters/group)
Madsen 2021	Ineligible aim of the intervention
Mattos 2018	Ineligible study design (non-randomised study)
Meng 2020	Ineligible study design (the control groups is non-randomised)
Muckelbauer 2010	Ineligible study design (< 3 clusters/group)
NCT00061165 2003	Outcome of interest was not measured
NCT01845480 2013	Ineligible population (target population were children with obesity or overweight)
NCT03069274 2017	Ineligible study design (< 3 clusters/group)
NCT03422926 2018	Outcome of interest was not measured
NCT03469752 2018	Outcome of interest was not measured
NCT03479658 2018	Outcome of interest was not measured
NCT03885115 2019	Outcome of interest was not measured
NCT04863040 2021	Outcome of interest was not measured
NCT04864574 2021	Outcome of interest was not measured
NCT05358444 2022	Ineligible study design (non-randomised)
NCT05417347 2022	Outcome of interest was not measured
NCT05468216 2022	Outcome of interest was not measured
Nezami 2020	Outcome of interest was not measured
Parkinson 2015	Ineligible aim of the intervention
Perry 2021	Ineligible study design (< 3 clusters/group)
Polonsky 2019	Ineligible aim of the intervention
Prina 2014	Ineligible aim of the intervention

Study	Reason for exclusion
Reed 2008	Ineligible study design (< 3 clusters/group)
Robbins 2006	Ineligible study design (< 3 clusters/group)
Sallis 1993	Ineligible study design (< 3 clusters/group)
Sevinc 2011	Ineligible study design (< 3 clusters/group)
Waters 2017	Ineligible study design (repeated cross-sectional design with nested longitudinal subsample)
Zafiropulos 2015	Outcome of interest was not measured

RCT: randomised controlled trial

Characteristics of studies awaiting classification *[ordered by study ID]*

Kornilaki 2022

Methods	Study name: NR Study dates: November 2016 to May 2017 Study design: cluster-RCT Unit of allocation: nursery school Unit of analysis: individual
Participants	Setting: 15 nursery schools in the Heraklion region of Crete Country: Greece Age (years): intervention: 5.03 (SD 0.54); control: 5.05 (SD 0.54)
Interventions	Intervention type: dietary and activity Setting of the intervention: school Brief description: educational curriculum activities that increased young children's healthy eating habits, raised children's environmental consciousness and provided physical activity opportunities, while engagingtheir popular culture interests
Outcomes	Measured outcome(s): BMI (height and weight); proportion of children with overweight and living with obesity
Notes	Trial registration: NR Funding: NR DOI: no potential conflict of interest was reported by the author(s) General notes: NR

Larruy-Garcia 2022

Methods	Study name: MELIPOP (MEditerranean LIfestyle in Pediatric Obesity Prevention) Study dates: March 2018 (starting date) Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: primary health centres in Córdoba, Santiagode Compostela and Zaragoza Country: Spain Age (years): 3 to 6

Larruy-Garcia 2022 *(Continued)*

Interventions	Intervention type: dietary and activity Setting of the intervention: community (primary care) Brief description: education on Mediterranean lifestyle (Mediterranean diet and physical activity promotion), combined with the provision of extra-virgin olive oil and fish, in order to be consumed at least 3 times per week. Physical activity sessions with a physical activity monitor will also be offered for free to the children (2 sessions of 60 minutes of moderate-vigorous physical activity, per week). The participants' degree of compliance with the intervention will be periodically monitored.
Outcomes	Measured outcome(s): BMI
Notes	Trial registration: NCT04597281 Funding: NR DOI: NR General notes: eligible participants were children > 3 years and < 7 years, with at least one parent having a BMI ≥ 25 kg/m^2, with no disease responsible for the high BMI. Children from families having dietary habits not fitting with the characteristics of the dietary intervention were not eligible. It is unclear whether the mean age of the participants is > 5 years, and thus whether the study is eligible for inclusion in our review, and we were unable to obtain such information from the authors (the authors were contacted on 13 February 2023, but they were unable to clarify the age of the participants).

Widhalm 2022

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

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

Characteristics of ongoing studies *[ordered by study ID]*

ACTRN12620001101976 2020

Study name	PPDP (Pasifika Preventing Diabetes Programme)

ACTRN12620001101976 2020 *(Continued)*

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

ACTRN12622000906752 2022

Study name	HRWP (He Rourou Whai Painga)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: communities (4 research centres across New Zealand) Country: New Zealand Country income: high-income Age (years): 11 and older
Interventions	Intervention type: dietary Intervention setting: community Brief description: this is a randomised controlled trial of food provision and dietary change support (Group A) compared with a self-selected habitual dietary intake (Group B) for 12 weeks
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	20 June 2022 (recruitment start date)
Contact information	Dr Martin Gagnon (martin.gagnon@otago.ac.nz)
Notes	Trial registration: ACTRN12622000906752

ACTRN12622000906752 2022 *(Continued)*	Funding: High Value Nutrition National Science Challenge (New Zealand) DOI: NR General notes: index participants will be adults at risk of metabolic and cardiovascular disease and up to 5 members of their household/whanau will be invited to also take part in the study

Andino 2022

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

Barragan 2022

Study name	Abriendo Caminos
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households from 4 sites (Illinois, California, Texas and Iowa) Country: USA Country income: high-income Age (years): 6 to 18
Interventions	Intervention type: dietary and activity

Barragan 2022 *(Continued)*

	Intervention setting: community Brief description: family-based approach to delivering culturally tailored nutrition education, family wellness and physical activity workshops
Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	Fall of 2015 (start of recruitment)
Contact information	Margarita Teran-Garcia (teranmd@illinois.edu)
Notes	Trial registration: NCT03505658 Funding: "This research was funded by the U.S Department of Agriculture—National Institute of Food and Agriculture, 2015-68001-23248. This research project is supported by the Agriculture and Food Initiative Competitive grant (No. 2015-68001-23248) from the U.S. Department of Agriculture." DOI: "The authors declare no conflict of interest." General notes: the intervention was designed for Mexican and Puerto Rican families

Brooks 2022

Study name	Strong Families
Methods	Study design: cluster-RCT Unit of allocation: postcode Unit of analysis: individual
Participants	Setting: families in the Greater Western Suburbs of Sydney Country: Australia Country income: high-income Age (years): 5 to 11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: "The face-to-face behavioural parenting and lifestyle (BPL) intervention will comprise of 6 x 90 min weekly group sessions (plus 2 x 45 min boosters at 3 months follow-up), incorporating the parenting and healthy lifestyle components trialled. The 2 booster sessions will occur 3 months after completing the 6 intervention sessions."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	23 February 2022 (date of first enrolment)
Contact information	Prof Andre M.N. Renzaho (andre.renzaho@westernsydney.edu.au)
Notes	Trial registration: NR Funding: National Health and Medical Research Council DOI: NR General notes: eligible participants are either Australian born or migrants (predominantly speaking Arabic, Hindi and Punjabi) that live in socioeconomically disadvantaged areas (< 1000 index of socioeconomic disadvantage). For households with 2 or more eligible children, the child who had the most recent birthday will be included. Randomisation conducted by postcode (as a cluster).

Bustos 2016

Study name	KIND

Bustos 2016 *(Continued)*

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

Byrd-Bredbenner 2022

Study name	HomeStyles-2
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households Country: USA Country income: high-income Age (years): 6 to 11
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: "... the intervention has 8 brief instructional electronic guides for parents, with a different guide provided each week of the intervention. Each guide focuses on strategies parents can use in partnership with their middle childhood-age kids to re-shape one aspect of the home environment and lifestyle (i.e., overview of parenting school-age kids for good health, 5 guides addressed to diet (fruits/vegetables, sugarsweetened beverages, portion size control, family meals, breakfast) and 1 guide each on physical activity. and sleep). A second component of the intervention is a 1-page online tracker that encourages parents to set goals for re-shaping their home environment and lifestyles, monitor their progress, and reward themselves and their family for progress toward the goal. A third intervention component is a 1-page guide designed especially for kids that coordinates and supports the messaging in the parent guides."

Byrd-Bredbenner 2022 *(Continued)*

Outcomes	Measured (or planned) outcome(s): zBMI; BMI percentile
Starting date	2022 (recruitment year)
Contact information	Carol Byrd-Bredbenner (bredbenner@sebs.rutgers.edu)
Notes	Trial registration: NCT04802291 Funding: "This work was supported by the National Institute of Food and Agriculture, United States Department of Agriculture award number 2017–680001-26351." DOI: "The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper." General notes: eligible participants were parents that are the primary food gatekeeper in the household (i.e. makes all or most decisions related to family food choices), have regular Internet access, read English and/or Spanish, and reside in the United States

Cespedes 2021

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

ChiCTR-IOR-16009997 2016

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

ChiCTR-IOR-16009997 2016 *(Continued)*

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

ChiCTR-PRC-08000053 2008

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

ChiCTR-TRC-12001880 2012

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

ChiCTR2000033945 2020

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

ChiCTR2000033945 2020 *(Continued)*

	General notes: NR

CTRI/2020/10/028700 2020

Study name	V-CaN (Vitalizing Community against Non-communicable diseases)
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools Country: India Country income: lower-middle-income Age (years): 10 to 30
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the 3 interventions are with school students as change agents, with Village Health Nutrition and Sanitation Committees (VHNSC) members as change agents and with Women's Self-help group (SHG) members as change agents in addition to the existing government programmes for non-communicable diseases (NCDs). The population in control arm will continue to receive routine care through the existing government programmes and no additional activities will be conducted in the control arm. If proven effective, the health promotion strategy will also be implemented in the control PHC at the end of project. Intervention 1: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of school students will be done through monthly contact sessions for developing a NCD specific health action plan for their area/school, formation of V-CaN clubs and conduction of community-based events. Intervention 2: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of VHNSC members will be done through monthly contact sessions for developing a NCD specific health action plan for their village, formation of V-CaN clubs and conduction of community-based events. Intervention 3: the participatory health promotion strategy that will evolve through the project will be implemented. Capacity building of Women's SHG members will be done through monthly contact sessions for developing a NCD specific health action plan for their village, formation of V-CaN clubs and conducting of community-based events.
Outcomes	Measured (or planned) outcome(s): proportion of children classified with pre-obesity and obesity
Starting date	1 January 2021 (date of first enrolment)
Contact information	Dr. Sushila Nayar (abhishekvraut@gmail.com)
Notes	Trial registration: CTRI/2020/10/028700 Funding: Indian Council of Medical Research DOI: NR General notes: NR

Cunha 2017

Study name	PAAPAS Nudge
Methods	Study design: cluster-RCT Unit of allocation: school

Cunha 2017 *(Continued)*

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

DRKS00023824 2020

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

DRKS00023824 2020 *(Continued)*

	General notes: NR

DRKS00025515 2021

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: primary schools in Klagenfurt Country: Austria Country income: high-income Age (years): 8 to 12
Interventions	Intervention type: activity Intervention setting: school Brief description: in the intervention classes, all physical activity and sports lessons are led by external trainers, and the planning of the lesson designs is carried out uniformly by the project management. In an innovative concept, movement elements are additionally implemented into the classroom and the school's daily routine every day. The planning, design and formulation of these focal points is taken over by a primary school teacher and passed on to all primary school teachers involved.
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	10 June 2021 (date of first enrolment)
Contact information	Mireille van Poppel (mireille.van-poppel@uni-graz.at)
Notes	Trial registration: DRKS00025515 2021 Funding: österreichischem Bundesministerium für Kunst, Kultur, öffentlicher Dienst und Sport DOI: NR General notes: NR

Dukhi 2020

Study name	i-SPAN
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 16 government-funded primary schools in the iLembe district of KwaZulu-Natal Country: South Africa Country income: upper-middle-income Age (years): 9 to 15
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: school-based diet and physical activity classroom and outdoor activities and Health Promotion Toolkit, which consists of the learner pamphlet, the educator manual and sports box

Dukhi 2020 *(Continued)*

Outcomes	Measured (or planned) outcome(s): zBMI; proportion of children and adolescents classified as overweight and with obesity
Starting date	August 2018 (school randomisation)
Contact information	Natisha Dukhi (Dukhin@ukzn.ac.za)
Notes	Trial registration: PACTR201711002699153 Funding: "This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors." DOI: "The authors declare that they have no competing interests." General notes: NR

Elinder 2018

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

Elinder 2021

Study name	IMPROVE
Methods	Study design: cluster-RCT Unit of allocation: school

Elinder 2021 *(Continued)*

	Unit of analysis: individual
Participants	Setting: 30 schools in 2 municipalities in the greater Stockholm area Country: Sweden Country income: high-income Age (years): 5 to 7
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: head-to-head comparison between 2 dietary and activity interventions including Healthy School Start (see Elinder 2018); schools randomly assigned to group 1 will receive bundle 1 (Basic) and group 2 will receive bundle 1 + 2 (Enhanced). Bundle 2 consists of external facilitation, fidelity monitoring and feedback strategies.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	Two cohorts starting in 2021 and 2022, respectively
Contact information	Liselotte Schäfer Elinder (liselotte.schafer-elinder@ki.se)
Notes	Trial registration: NCT04984421 Funding: funding for this study has been received from the Swedish Research Council for Health, Working Life and Welfare (FORTE) grant number 2020–01198 DOI: the authors declare that they have no competing interests General notes: NR

Friedrich 2015

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

Gerber 2020

Study name	KaziAfya
Methods	Study design: cluster-RCT (2x2 factorial) Unit of allocation: school Unit of analysis: individual
Participants	Setting: public primary schools in the area of Taabo in south-central Côte d'Ivoire, in Port Elizabeth in the Eastern Cape Province of South Africa, and in Ifakara in the Kilombero district of Tanzania Country: Côte d'Ivoire, South Africa and Tanzania Country income: lower-middle-income (Côte d'Ivoire and Tanzania); upper-middle income (South Africa) Age (years): 6 to 12
Interventions	Intervention type: dietary; activity; dietary and activity (multi-arm study) Intervention setting: school Brief description: the 4 intervention arms are (i) physical activity: physical activity opportunities are incorporated into the main school curriculum, including daily in-class activity breaks as well as one weekly 40-min playful physical education lesson and one 40-min moving-to-music lesson.; (ii) multi-micronutrient supplementation: a daily chewable tablet containing vitamins and trace elements; (iii) physical activity plus multi-micronutrient supplementation; and (iv) no specific interventions, which will serve as the control
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2018
Contact information	Marcus Gerber (markus.gerber@unibas.ch)
Notes	Trial registration: ISRCTN29534081 Funding: "The study is funded by the Fondation Botnar (Basel, Switzerland; project number 6071 'Physical activity and multi-micronutrient supplementation'), covering research expenses, staff salaries, study equipment and laboratory analyses. In-kind contributions are provided by all involved parties. The multi-micronutrient supplementation and the placebo products are sponsored by DSM Nutritional Products Ltd. (Basel, Switzerland). The KaziAfya teaching material is based on (or an extension of) the development of the KaziKidz teaching material, an initiative financially and technically supported by the Novartis Foundation since 2017. The funding sources had no further role in the study design, collection, analysis, interpretation of data, writing of this report, and in the decision to submit this paper for publication. The authors alone are responsible for the content and writing of the paper." DOI: "The authors declare that they have no competing interests." General notes: NR

Gittelsohn 2017

Study name	OPREVENT2
Methods	Study design: cluster-RCT Unit of allocation: household Unit of analysis: individual
Participants	Setting: households from 6 Native American communities in the Southwest and Midwest Country: USA Country income: high-income Age (years): 6 to 13 (school grades 2 to 6)

Gittelsohn 2017 *(Continued)*

Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: OPREVENT2 worked with worksites, food stores, schools (grades 2 to 6), through social media and mailings, and with a local community action committee, in each of the 3 intervention communities, and was implemented in 6 phases
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	June 2017
Contact information	J Gittelsohn (jgittel1@jhu.edu)
Notes	Trial registration: NCT02803853 Funding: "This work was supported by the National Heart, Lung, and Blood Institute (R01HL122150 to J.G.)." DOI: none declared General notes: NR

Glazebrook 2012

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

IRCT2014042315797N3 2014

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

IRCT20160126260 78N2 2016

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: kindergarten dependent on the well-being organisation of Behbahan city Country: Iran Country income: lower-middle-income Age (years): 4 to 6
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: in the intervention group (mothers), educational intervention (training classes) will be received. Educational intervention will be based on social cognitive theory and the theory of family systems (parenting skills and practices). Content, methods and number of training sessions will be according to the analysis of the results of pre-test measure on mothers' preventive behaviours of obesity in children (daily: 2 hours of physical activity, eating 5 portions of fruit and vegetables, eating sugar-free drinks and watching less than 2 hours of TV)

IRCT20160126260 78N2 2016 *(Continued)*

Outcomes	Measured (or planned) outcome(s): BMI
Starting date	20 January 2016 (recruitment start date)
Contact information	Elham Nejadsadeghi (nejadsadeghi_e@razi.tums.ac.ir)
Notes	Trial registration: IRCT20160126260 78N2 2016 Funding: Vice Chancellor for Education of Tehran University of Medical Sciences DOI: NR General notes: NR

ISRCTN06248443 2014

Study name	Obesity Prevention Tailored (OPT) for Health II
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: patients of the Kaiser Permanente Southern California Medical Care Program Country: USA Country income: high-income Age (years): 10 to 12
Interventions	Intervention type: dietary and activity Intervention setting: community (primary care) Brief description: one in-person meeting with a health coach, 4 newsletters for the parent, 4 newsletters for the child, 5 telephone calls to the parent and 2 collaborative family activities. All programme activities were designed to encourage and/or produce diet and physical activity change.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	Recruitment between June 2010 and November 2011
Contact information	Dr Kim Reynolds
Notes	Trial registration: ISRCTN06248443 2014 Funding: National Cancer Institute (USA); National Institute of Diabetes and Digestive and Kidney Diseases (USA); National Institutes of Health (USA) DOI: NR General notes: eligible participants are patients from the Kaiser Permanente Southern California Medical Care Program with a 10- to 12-year-old child living in the home

ISRCTN11371954 2020

Study name	VisezEau® (ReachforWater)
Methods	Study design: cluster-RCT (stepped wedge) Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools Country: Canada

ISRCTN11371954 2020 *(Continued)*

	Country income: high-income Age (years): 6 to 10
Interventions	Intervention type: dietary Intervention setting: school + home Brief description: the intervention is a multi-level (school and home) theory-based intervention to be deployed according to the randomised trial design. The intervention is designed to improve the beverage consumption profile of participating children as a means of improving their body composition.
Outcomes	Measured (or planned) outcome(s): BMI; prevalence of overweight and obesity
Starting date	School year 2019
Contact information	Michel Lucas (michel.lucas.1@ulaval.ca)
Notes	Trial registration: ISRCTN11371954 2020 Funding: Ministère de la Santé et des Services Sociaux du Québec [Ministry of Health and Social Services of Québec]; Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec [Ministry of Sustainable Development, Environment, and Fight Against Climate Change of Quebec] DOI: NR General notes: NR

ISRCTN12378125 2021

Study name	MapMe
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: primary schools in England Country: UK Country income: high-income Age (years): reception and Year 6 pupils (usual age 4 to 5 years and 10 to 11 years)
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the MapMe intervention includes body image scales (BIS) of known weight status for 4 to 5 and 10- to 11-year-old children based on the same British growth reference clinical thresholds that are used by the National Child Measurement Programme (NCMP) to inform parents of their child's weight status. The BIS are designed to tap into the visual methods by which parents determine OW in children, to help them understand what a child with OW/OB looks like. The web-based format of MapMe shows parents the BIS and asks them to choose the image most resembling their child. Parents then enter their child's height and weight (both provided in the NCMP letter), sex and date of birth (DOB); they are then shown the 3D image and weight status that matches that data, thus facilitating parental acknowledgement of weight status. Parents are also shown a 3D image of an adult in the same weight category as their child's current category and given information about health risks of childhood OW, tapping into parental concerns of future OW in their child and raising awareness of potential health consequences. Information is included to support parents to prevent or address unhealthy weight gain in their child including brief advice on healthy eating, physical activity and signposts to sources of information and professional support, which include motivational and volitional materials for goal setting, practice, action and coping planning in family-based dietary and physical activity changes, positive family approaches focused on lifestyle rather than weight and positive family discussions focused on lifestyle rather than weight.

ISRCTN12378125 2021 *(Continued)*

Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	March 2020 (overall study start date)
Contact information	Dr Laura Basterfield (Laura.Basterfield@newcastle.ac.uk)
Notes	Trial registration: ISRCTN12378125 2021 Funding: NIHR Evaluation, Trials and Studies Co-ordinating Centre (NETSCC); National Institute for Health Research (NIHR) (UK) DOI: NR General notes: participants are registered with a school in a Local Authority carrying out the National Child Measurement Programme (NCMP), and part of the MapMe trial and not opted out of the NCMP by parent or carer

ISRCTN52180050 2022

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: government primary schools in Badulla District Country: Sri Lanka Country income: lower-middle-income Age (years): 9 to 10 (grade 5)
Interventions	Intervention type: activity Intervention setting: school Brief description: classroom-based physical activity breaks programme. Intervention schools will receive 5-minute physical activity breaks at least 3 times per day by the classroom teachers for 12 weeks. This is a pre-post-test intervention only. There will be no treatment during the follow-up period. Control schools will not receive any treatments.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2022 (start of the study)
Contact information	Ms Hashi Peiris (hashi_peiris@life.hkbu.edu.hk)
Notes	Trial registration: ISRCTN52180050 2022 Funding: Hong Kong Baptist University (Hong Kong Ph.D. Fellowship Scheme) DOI: NR General notes: NR

ISRCTN76013675 2014

Study name	PESSOA
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 14 high schools in the Oeiras Municipality

ISRCTN76013675 2014 *(Continued)*

	Country: Portugal Country income: high-income Age (years): 10 to 12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: the intervention group was provided with 90 min additional weekly sessions with health and weight educational programme and physical activities, in addition to the standard general information regarding eating and physical activity behaviours provided to the control group
Outcomes	Measured (or planned) outcome(s): body composition assessed by dual-energy X-ray absorptiometry (DXA) and by standard anthropometric procedures
Starting date	1 September 2010 (date of first enrolment)
Contact information	Luis Sardinha
Notes	Trial registration: ISRCTN76013675 Funding: Portuguese Foundation for Science and Technology (Portugal) DOI: NR General notes: eligible participants were boys and girls without contraindications for physical activity enrolled in the 5th, 6th and 7th grades

JPRN-UMIN000014896 2014

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

JPRN-UMIN000014992 2014

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

JPRN-UMIN000036544 2019

Study name	Yui Kenko Project 2
Methods	Study design: RCT (cross-over) Unit of allocation: individual Unit of analysis: individual
Participants	Setting: elementary school children in Okinawa prefecture Country: Japan Country income: high-income Age (years): 6 and older
Interventions	Intervention type: dietary Intervention setting: school Brief description: nutrition survey and information intervention of dietary habit
Outcomes	Measured (or planned) outcome(s): BMI

JPRN-UMIN000036544 2019 *(Continued)*

Starting date	19 June 2013 (date of first enrolment)
Contact information	nknkyu@to.jim.u-ryukyu.ac.jp
Notes	Trial registration: JPRN-UMIN000036544 Funding: Okinawa Prefecture DOI: NR General notes: NR

JPRN-UMIN000039773 2020

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

Lane 2018

Study name	Wellness Champions for Change
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 30 low- or middle-income schools (15 elementary and 15 middle) in 5 Maryland school districts Country: USA Country income: high-income Age (years): 8 to 11 (3rd or 6th grade)
Interventions	Intervention type: dietary and activity Intervention setting: school

Lane 2018 *(Continued)*

	Brief description: multi-arm study: Wellness Champions for Change (WCC), a training and technical assistance curriculum to support teacher wellness teams and (2) Wellness Champions for Change-Student (WCC-S), a yearlong curriculum to support Student Leaders on wellness teams.
Outcomes	Measured (or planned) outcome(s): zBMI; BMI percentile
Starting date	Fall 2016 (recruitment start date of Cohort 1)
Contact information	Hannah G. Lane (hlane@som.umaryland.edu)
Notes	Trial registration: NR Funding: "This study is funded primarily by a United States Department of Agriculture AFRI Childhood Obesity grant (ID: 2016-68001-24927), with additional funding from a National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health post-doctoral training grant (ID: F32DK115146), and Seed grant research funding from the Program in Health Disparities and Population Health, University of Maryland School of Medicine Department of Epidemiology and Public Health and from the Mid-Atlantic Nutrition Obesity Research Center (NIH NIDDK ID: 30DK072488)." DOI: NR General notes: economic evaluation reported in Lane 2022

Laroche 2020

Study name	NR
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: parent/child dyads in Iowa Country: USA Country income: high-income Age (years): 6 to 12 (mean 8.6)
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: "Participants in the education only group receive educational materials on healthy family diet and activity and quarterly newsletters. In addition, they receive basic resource screenings at baseline and 6 months, follow-up phone calls, and referrals to appropriate basic-needs resources. Those in the health coach group receive guidance from a health coach, with up to 5 in-person visits and 4 phone visits within a 12-month period. Motivational interviewing is used during these sessions to help families set goals based on their health needs and priorities. Health coach group participants receive the same basic resource screening and newsletters as the education only group, as well as additional resources based on their goals chosen with the health coach."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	NR
Contact information	Linda Snetselaar
Notes	Trial registration: NCT02425046 Funding: "This work is supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health [R01HL119882]. Office space and the Research Electric Data Capture (REDCap) data management tool utilized by the Living Well Together team was provided by the Institute for Clinical and Translational Science at the University of Iowa. The ICTS at the University of Iowa is

Laroche 2020 *(Continued)*

	supported through the NIH CTSA program grant [UL1TR002537]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funding agencies were not involved in the study design, collection, analysis and interpretation of data, or in writing the manuscript. Community team staff space is supported by Primary Health Care and the Evelyn K. Davis Center for Working Families." DOI: NR General notes: the study targeted low-income families where one parent has a BMI ≥ 30 and a child aged 6 to 12 years

Leung 2018

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

Magalhaes 2020

Study name	HEP-S (Healthy Eating Promotion through Self-regulation)
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: school Country: Portugal Country income: high-income

Magalhaes 2020 *(Continued)*

	Age (years): 10 to 12 (children from the 5th and 6th grades)
Interventions	Intervention type: dietary Intervention setting: school Brief description: online preventive intervention programme. This programme is designed to promote and develop a set of transversal skills and strategies, related to self-regulation, on the healthy eating domain among school-aged children.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	January 2020 (planned start of recruitment)
Contact information	Paula Magalhães (pcsmagalhaes@gmail.com)
Notes	Trial registration: NCT04099498 Funding: "This study was conducted at the Psychology Research Centre (PSI/01662), School of Psychology, University of Minho, sponsored by University of Minho, and supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education (UID/PSI/01662/2019), through the national funds (PIDDAC). Additionally, this study was supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education through national funds (PTDC/PSI-GER/28302/2017), and co-financed by FEDER through COMPETE2020 under the PT2020 Partnership Agreement (POCI-01-0145-FEDER-028302). This study was also supported by the Portuguese Foundation for Science and Technology and the Portuguese Ministry of Science, Technology and Higher Education, through the national funds, within the scope of the Transitory Disposition of the Decree No. 57/2016, of 29th of August, amended by Law No. 57/2017 of 19 July. Lastly, BP and GF were supported by research scholarships and CS was supported by a Post-Doctoral research grant the three awarded by the project “In-person and Online Healthy Eating Promotion through Self-regulation: Assessing the Efficacy of a Narrative-based Intervention” (POCI-01-0145-FEDE R-028302)." DOI: "All authors declare that they have no competing interests." General notes: NR

Marcos-Pasero 2022

Study name	GENYAL
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 6 schools in Madrid Country: Spain Country income: high-income Age (years): 6 to 8
Interventions	Intervention type: dietary Intervention setting: school Brief description: "For the implementation of the nutritional education programme in the “intervention schools”, three different kinds of guides were designed aimed at parents, children and teachers. All this information was developed and adapted to the participants’ age by the nutritionists from the IMDEA Food Foundation. This material is sent to parents and educational centers in different modules adapted to parents, students, and teachers. The same modules include different activities and topics each year according to the children’s growth."
Outcomes	Measured (or planned) outcome(s): BMI

Marcos-Pasero 2022 *(Continued)*

Starting date	2017 (baseline data collection)
Contact information	Viviana Loria-Kohen (vloria@ucm.es)
Notes	Trial registration: NCT03419520 Funding: "This study was supported by Conserjería de Educación, Universidades y Ciencia de la Comunidad de Madrid, Dirección General de Educación Infantil, Primaria y Secundaria." DOI: "The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest." General notes: "The GENYAL study (is) aiming to design and validate a predictive model, considering both environmental and genetic factors, that identifies children who would benefit most from actions aimed at reducing the risk of obesity and its complications."

Marrero 2021

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

McWhannell 2018

Study name	A-CLASS (Active City of Liverpool Active Schools and SportsLinx
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 8 schools in Liverpool

McWhannell 2018 *(Continued)*

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

Mehdizadeh 2018

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

Mehdizadeh 2018 *(Continued)*

	General notes: although the authors state that the background to the intervention is prevention of obesity, the conclusions talk about the general issue of the double burden of malnutrition

Metayer 2018

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

Moreno 2021

Study name	Water First
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 26 public elementary schools staggered across different school districts in the San Francisco Bay Area of California Country: USA Country income: high-income Age (years): 9 to 10 (4th grade students)

Moreno 2021 *(Continued)*

Interventions	Intervention type: dietary Intervention setting: school Brief description: school environment changes that increase the accessibility of safe and appealing drinking water to promote consumption
Outcomes	Measured (or planned) outcome(s): zBMI; BMI percentile
Starting date	Fall 2016
Contact information	Anisha Patel (anipatel@stanford.edu)
Notes	Trial registration: NCT03181971 Funding: "The National Heart, Lung, and Blood Institute of the National Institutes of Health under award number R01HL129288 supported this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. We would like to thank the Water First Community Advisory Board for their input on the study, research associates that have assisted with intervention implementation and evaluation, and the schools, students, and families that participated in this study." DOI: NR General notes: NR

Moreno 2022

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

NCT00005750 2000

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 14 ethnically diverse elementary schools Country: USA Country income: high-income Age (years): 8 to 12
Interventions	Intervention type: dietary and activity Intervention setting: school + home Brief description: "... the intervention included activities in the school, and the home, and a clinically oriented component for high-risk children. The school component included: a computer-based classroom curriculum; a physical education curriculum; and a school lunch intervention. The home component included correspondence materials and a videotape for parents. Children identified as "high risk" were eligible to enroll in an intensive intervention. In addition, several innovative approaches were included: interventions to influence food preferences and television viewing, interventions promoting health advocacy, and computer-assisted instruction."
Outcomes	Measured (or planned) outcome(s): anthropometric measures
Starting date	April 1996
Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00005750 Funding: National Institute of Health DOI: NR General notes: NR

NCT00185770 2005

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

NCT00185770 2005 *(Continued)*

	Funding: National Institute of Health DOI: NR General notes: NR

NCT00185978 2005

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

NCT00476775 2007

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 6 public elementary schools serving low-income Latino communities in northern California Country: USA Country income: high-income Age (years): 7 to 9
Interventions	Intervention type: activity Intervention setting: school (ASP) Brief description: after-school ethnic dance programme plus a culturally tailored, home-based screen time reduction intervention to reduce weight gain (body mass index) among lower socioeconomic status, pre-adolescent Latina girls. The control group will receive an "active-placebo" information-based health education intervention.
Outcomes	Measured (or planned) outcome(s): BMI

NCT00476775 2007 *(Continued)*

Starting date	May 2007
Contact information	Thomas N. Robinson
Notes	Trial registration: NCT00476775 Funding: National Institute of Health DOI: NR General notes: NR

NCT00747513 2008

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

NCT00787709 2008

Study name	Pathways obesity prevention program
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 24 elementary schools from 2 of the largest districts in Orange County, CA Country: USA Country income: high-income

NCT00787709 2008 *(Continued)*

	Age (years): 9 to 10 (4th grade students)
Interventions	Intervention type: unclear (see intervention brief description) Intervention setting: school Brief description: revised version of 2 nationally recognised programmes for drug prevention for use with children in grades 4 to 6 with the express purpose of obesity prevention. The current study will attempt to promote emotion regulation, neuro-cognitive function and social competence in order to prevent obesity.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	May 2007
Contact information	Mary Ann Pentz
Notes	Trial registration: NCT00787709 Funding: National Institute of Health DOI: NR General notes: NR

NCT00797615 2008

Study name	GEMAS
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: girl-parent dyads in Nashville, TN Country: USA Country income: high-income Age (years): 8 to 10
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: 12-week family-based weight gain intervention programme focused on dietary intake and physical activity for 8- to 10-year old Hispanic girls and their parents (girl-parent dyads)
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	November 2008
Contact information	Bettina M. Beech
Notes	Trial registration: NCT00797615 Funding: NR DOI: NR General notes: the parent or guardian must identify that the girl is at or above the 25th percentile of age- and sex-specific BMI based on the 2000 CDC growth charts or one parent/caregiver must have BMI > 25 kg/m^2

NCT00944164 2009

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

NCT01373307 2011

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: church Unit of analysis: individual
Participants	Setting: churches in 6 Appalachian counties Country: USA Country income: high-income Age (years): 9 and older
Interventions	Intervention type: dietary and activity Intervention setting: community (church) Brief description: faith-placed lay health advisor intervention aimed at increasing fruit and vegetable intake and physical activity among intergenerational Appalachian individuals and families. Based on We Can! and Media Smart Youth curricula.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2010 (date of first enrolment)
Contact information	Nancy Schoenberg
Notes	Trial registration: NCT01373307 Funding: National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) DOI: NR

NCT01373307 2011 *(Continued)*

	General notes: NR

NCT01513343 2012

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

NCT01626807 2012

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

NCT01626807 2012 *(Continued)*

Contact information	Jason A Mendoza
Notes	Trial registration: NCT01626807 Funding: NR DOI: NR General notes: NR

NCT02104973 2014

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

NCT02161809 2014

Study name	Turn up the HEAT (Healthy Eating and Activity Time)
Methods	Study design: cluster-RCT Unit of allocation: summer camp Unit of analysis: individual
Participants	Setting: summer day camps Country: USA Country income: high-income Age (years): 6 to 14

NCT02161809 2014 *(Continued)*

Interventions	Intervention type: dietary; activity (multi-arm study) Intervention setting: community (summer camp) Brief description: the Healthy Eating and Physical Activity (HEPA) intervention aims to increase the quality of foods and beverages and physical activity opportunities in summer day camps. Physical Activity Intervention: "This arm (10 summer day camps) will receive the Physical Activity intervention the first year and both healthy eating and physical activity the second and thrid years." Healthy EAting Intervention: " This arm (10 summer day camps) will receive the Healthy Eating intervention the first year and both healthy eating and physical activity the second and thrid years."
Outcomes	Measured (or planned) outcome(s): BMI; cost-effectiveness
Starting date	January 2015
Contact information	Michael W Beets
Notes	Trial registration: NCT02161809 Funding: NR DOI: NR General notes: summer camps were eligible if they operated for at least 10 weeks during the summer, did not have any primary focus such as sports, art or tutoring (must be a general camp, enrolment was at least 40 campers, operation hours were at least 8 hours)

NCT02197390 2014

Study name	Our Choice
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: schools in 3 designated cities Country: USA Country income: high-income Age (years): 2 to 11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: the Health Care intervention involves the implementation of an obesity care model within a Federally Qualified Health Center (FQHC) and includes a Family Wellness Program delivered by Community Health Workers (CHWs). The Public Health intervention involves working with early care and education centres, schools, community recreation organisations and restaurants to promote 4 health behaviours: fruit and vegetable consumption, physical activity, water consumption and quality sleep.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	May 2012
Contact information	Guadalupe X Ayala
Notes	Trial registration: NCT02197390 Funding: National Institutes of Health DOI: NR General notes: study partners included a federally qualified health centre (including 3 clinics), 26 early care and education centres, 2 elementary school districts (and 20 elementary schools), 3 community recreation centres and 3 restaurants

NCT02425046 2014

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

NCT02721602 2016

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

NCT02721602 2016 *(Continued)*

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

NCT03186508 2018

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

NCT03524183 2018

Study name	Virtual Fitness Buddy Ecosystem
Methods	Study design: cluster-RCT Unit of allocation: YMCA Unit of analysis: individual
Participants	Setting: YMCA of Metropolitan Atlanta Country: USA Country income: high-income Age (years): 6 to 10

NCT03524183 2018 *(Continued)*

Interventions	Intervention type: activity Intervention setting: community (YMCA) Brief description: virtual pet that functions as a personalised fitness buddy to encourage children to set and meet physical activity goals, promote physical activity self-efficacy, and foster mutually supportive relationships among children, parents and the virtual pet. Concurrently, the kiosk sends a text message to parents on the child's physical activity progress. Parents are then able to send words of encouragement and communicate with their children via the kiosk, using the text messaging feature of their mobile phones. Parents will also receive text messages from the kiosk with a security code to access a website that provides detailed records of the child's physical activity over time.
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	August 2018
Contact information	Sun Joo (Grace) Ahn
Notes	Trial registration: NCT03524183 Funding: NR DOI: NR General notes: NR

NCT03766191 2018

Study name	NR
Methods	Study design: RCT (cross-over) Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Dartmouth-Hitchcock Medical Center Country: USA Country income: high-income Age (years): 8 to 12
Interventions	Intervention type: dietary Intervention setting: home Brief description: exposure to food ads embedded in an age-appropriate TV programme
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	January 2019
Contact information	Reina K Lansigan (reina.k.lansigan@dartmouth.edu)
Notes	Trial registration: NCT03766191 Funding: National Institutes of Health (NIH) DOI: NR General notes: NR

NCT03805295 2019

Study name	BOKS (Build Our Kids' Success)

NCT03805295 2019 *(Continued)*

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

NCT03817021 2019

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

NCT03817021 2019 *(Continued)*

Notes	Trial registration: NCT03817021 Funding: National Institutes of Health (NIH) DOI: NR General notes: eligible children must be enrolled in a participating Head Start centre

NCT03980262 2019

Study name	EHF (Empowering Healthy Families)
Methods	Study design: cluster-RCT Unit of allocation: church Unit of analysis: individual
Participants	Setting: 24 churches Country: USA Country income: high-income Age (years): 6 to 10
Interventions	Intervention type: dietary and activity Intervention setting: community (church) Brief description: "HCHF+ integrates healthful eating and physical activity with parenting education (parent role modeling and child feeding practices) and was recently shown to improve parent and child nutrition behaviors for participants in the Expanded Food and Nutrition Education (EFNEP) program. OrganWise Guys (OWG) will be used for children in first and second grades (ages 6-8). Choose Health: Food, Fun and Fitness (CHFF), developed by Cornell University, will be used for children in grades three through five (ages 8-10). HCHF+ includes 9 sessions to be delivered weekly."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February 2019
Contact information	Kathryn W Hosig (khosig@vt.edu)
Notes	Trial registration: NCT03980262 Funding: NR DOI: NR General notes: NR

NCT03996109 2019

Study name	LiGHT (Living Green and Healthy for Teens)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: community in Hamilton, Ontario Country: Canada Country income: high-income Age (years): 10 to 16
Interventions	Intervention type: dietary and activity Intervention setting: community

NCT03996109 2019 *(Continued)*

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

NCT04072549 2018

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

NCT04072549 2018 *(Continued)*

Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	August 2019
Contact information	Michael Beets (beets@mailbox.sc.edu)
Notes	Trial registration: NCT04072549 Funding: NR DOI: NR General notes: NR

NCT04608188 2020

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

NCT04644224 2020

Study name	RE-AIM framework
Methods	Study design: cluster-RCT Unit of allocation: household Unit of analysis: individual
Participants	Setting: households recruited from allocated churches

NCT04644224 2020 *(Continued)*

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

NCT04772859 2021

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: a public elementary school in Hermosillo, Sonora Country: Mexico Country income: upper-middle income Age (years): 9 to 12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: online lifestyle intervention: "Nutrition education: presentations based on the Planet Nutrition program, a dedicated website, and the Zoom application, will be used to deliver the intervention. The website will be used to upload the nutrition materials and the recorded sessions. Participants will work on self-monitoring of different health behaviors. Physical activity: The classes will be delivered by the Physical Activity team through the Zoom application. A website will be used to upload the recorded sessions. Parents participation. The same website and a private Facebook group will be used to upload nutrition information once a week."
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	February 2019
Contact information	Rolando Giovanni Díaz Zavala (giovanni.diaz@unison.mx)
Notes	Trial registration: NCT04772859 Funding: NR DOI: NR

NCT04772859 2021 *(Continued)*

	General notes: NR

NCT04886817 2021

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

NCT04905966 2021

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: public or private schools of the 22 districts of Caaguazú Department Country: Paraguay Country income: upper-middle-income Age (years): NR (children)
Interventions	Intervention type: activity; dietary and activity (multi-arm study) Intervention setting: school Brief description: nutrition education sessions and physical activity classes: "An additional 45 minute weekly physical education class and 5 weekly active break sessions of 10 minutes each will be added to the provisions of the children's curriculum. In addition, schools will receive high intensity nutrition education, that is, 3 weekly nutrition education classes of one hour in each session over a period of 6 months. Schools receiving a lower intensity nutrition education served as

NCT04905966 2021 *(Continued)*

	control. This group received 3 sessions of 1 hour with a total of 3 educational sessions over the 6 month period. The educational material was the same as the intervention group but the development of lessons was not as specific and deep as the intervention group."
Outcomes	Measured (or planned) outcome(s): zBMI; proportion of children classified as undernourished, normal, overweight and with obesity (according to WHO standards)
Starting date	June 2018
Contact information	Patricia Rios
Notes	Trial registration: NCT04905966 Funding: NR DOI: NR General notes: NR

NCT04915092 2021

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

NCT04971044 2021

Study name	COACH (Competency Based Approaches for Community Health) 2

NCT04971044 2021 *(Continued)*

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

NCT05112185 2021

Study name	Healthy Drinks, Healthy Futures
Methods	Study design: cluster-RCT Unit of allocation: childcare Unit of analysis: individual
Participants	Setting: 14 childcare centres in California Country: USA Country income: high-income Age (years): preschool-age children
Interventions	Intervention type: dietary Intervention setting: community (childcare centre) Brief description: "The Healthy Drinks, Healthy Futures intervention consists of increased access to healthy beverages in childcare centers and education directed to children and their families to increase the intake of healthy beverages, including motivational beverage counseling for families and lessons for children in childcare centers. Intervention group will receive BPA-free self-serve pitchers and cups for serving water at mealtimes, individualized education to help families set healthy drinks goals for their family, and a curricula focused on increasing intake of water and healthy beverages."
Outcomes	Measured (or planned) outcome(s): zBMI

NCT05112185 2021 *(Continued)*

Starting date	October 2022
Contact information	Anisha Patel (anipatel@stanford.edu)
Notes	Trial registration: NCT05112185 Funding: National Institutes of Health DOI: NR General notes: NR

NCT05334420 2022

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

NCT05350267 2022

Study name	HALO-2 (Health and Lifestyle Behaviors in Offspring)
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: households in Cincinnati Country: USA Country income: high-income

NCT05350267 2022 *(Continued)*

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

NCT05395364 2022

Study name	BeE-school (Be Empowered in school)
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 6 TEIP schools Country: Portugal Country income: high-income Age (years): 6 to 12
Interventions	Intervention type: dietary and activity Intervention setting: school Brief description: "intervention program based on the promotion of health literacy and lifestyles, specifically on children's: 1-health literacy and infodemic resilience; 2- lifestyles (e.g. dietary intake, 24h-movement behaviour); 3-overweight and obesity; 4-blood pressure."
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	March 2022
Contact information	Rafaela D Rosário
Notes	Trial registration: NCT05395364 Funding: NR DOI: NR General notes: TEIP: Territórios Educativos de Intervenção Prioritária (Programme for Priority Intervention Educational Areas)

NCT05424107 2022

Study name	INTKIDMEDPRED

NCT05424107 2022 *(Continued)*

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

NCT05461703 2022

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

NCT05461703 2022 *(Continued)*

	General notes: NR

NCT05482165 2022

Study name	NR
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 6 primary schools in Ningbo City, Zhejiang Province Country: China Country income: upper-middle-income Age (years): 8 to 10
Interventions	Intervention type: unclear (see intervention brief description) Intervention setting: school Brief description: the students of this group will receive multi-faceted intervention activities toward weight management
Outcomes	Measured (or planned) outcome(s): BMI; zBMI
Starting date	September 2022
Contact information	Li Li 9 (lilyningbo@163.com)
Notes	Trial registration: NCT05482165 Funding: NR DOI: NR General notes: NR

Porter 2019

Study name	Growing Resilience
Methods	Study design: cluster-RCT Unit of allocation: household Unit of analysis: individual
Participants	Setting: households in the Wind River Indian Reservation Country: USA Country income: high-income Age (years): 5 and older
Interventions	Intervention type: dietary Intervention setting: home Brief description: 2 years of support designing, installing and maintaining a home food garden of at least 80 square feet (approximately 7 square metres). Families randomly assigned to intervention will receive a full gardening support package for 2 years.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	February 2016

Porter 2019 *(Continued)*

Contact information	Professor Ashley Adamson (ashley.adamson@ncl.ac.uk)
Notes	Trial registration: ISRCTN91136472 Funding: "The trial is funded by the National Prevention Research Initiative, website (http://www.npri.org.uk). The Funding Partners are: Alzheimer's Research Trust; Alzheimer's Society; Biotechnology and Biological Sciences Research Council; British Heart Foundation; Cancer Research UK; Chief Scientist Office, Scottish Government Health Directorate; Department of Health; Diabetes UK; Economic and Social Research Council; Health and Social Care Research and Development Division of the Public Health Agency (HSC R&D Division); Medical Research Council; The Stroke Association; Wellcome Trust; Welsh Assembly Government; and World Cancer Research Fund." DOI: the authors declare that they have no competing interests. General notes: NR

Ramírez-Rivera 2021

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

Rashid 2022

Study name	i-MaCHeL (Interactive Malaysian Childhood Healthy Lifestyle (i-MaCHeL) intervention programme)
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual

Rashid 2022 *(Continued)*

Participants	Setting: preschools in the state of Terengganu, located on the East Coast of Peninsular Malaysia. There are 8 districts of Terengganu, and this study will only include 2 districts: Kuala Terengganu and Kuala Nerus. Country: Malaysia Country income: upper-middle-income Age (years): 5 to 6
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: a web-based, theory-driven, 3-month, health promotion intervention to change weight-related behaviour in preschool child-parent dyads. Intervention consists of i-MaCHeL classroom activities (13 modules), while the parents will access the i-MaCHeL web-based educational programme and numerous parent-child home-based online activities. The children in the control group will continue with any existing health-related activities, while the parents will receive the link to the general health newsletters.
Outcomes	Measured (or planned) outcome(s): BMI-z, HRQOL
Starting date	March 2022
Contact information	Sharifah Wajihah Wafa (sharifahwajihah@unisza.edu.my)
Notes	Trial registration: NCT04711525 Funding: NR DOI: NR General notes: the parent/guardian of the preschool children are eligible for the study if they can read and understand either English or Malay; are aged between 25 and 49 years; have regular internet access via a tablet device, mobile phone or computer/laptop; have regular access to a phone with texting capability; have WhatsApp accounts or agree to create the accounts and are comfortable to read/view materials on electronic devices

RBR-9crqgt

Study name	NR
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Ifal Murici and Satuba campus from Monsenhor Clóvis Duarte de Barros State School, União dos Palmares Country: Brazil Country income: upper-middle-income Age (years): 10 to 19
Interventions	Intervention type: dietary Intervention setting: school Brief description: the intervention group will receive information on healthy eating through internet-based techniques, e.g. text messaging, quiz and virtual games. The control group will receive information on healthy eating through conventional nutrition education techniques, e.g. Rack Cards.
Outcomes	Measured (or planned) outcome(s): body weight and height
Starting date	1 February 2017 (date of first enrolment)

RBR-9crqgt *(Continued)*

Contact information	Nassib Bezerra Bueno (nassib.bueno@fanut.ufal.br)
Notes	Trial registration: RBR-9crqgt Funding: Instituto Federal de Alagoas; Universidade Federal de Alagoas DOI: NR General notes: NR

Sanchez-Lopez 2019

Study name	MOVI-da10!
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: 8 schools (rural and urban areas) from Cuenca province, Spain Country: Spain Country income: high-income Age (years): 4 to 6
Interventions	Intervention type: activity Intervention setting: school Brief description: 3 arms intervention: MOVI-da10-Enriched! intervention, MOVI-da10-Standard! intervention and the control group. MOVI-da10-Enriched! group performed enriched PA integrated into the academic curriculum, including 2 active breaks lasting 10 min, 5 days/week. The children belonging to the MOVI-da10-Standard! group performed PA breaks (with low cognitive demand, where curricular contents were not reinforced) including 2 active breaks lasting 10 min, 5 days/week. In the control group, regular PA continued.
Outcomes	Measured (or planned) outcome(s): BMI
Starting date	September 2017
Contact information	Abel Ruiz-Hermosa (Abel.RuizHermosa@uclm.es)
Notes	Trial registration: NR Funding: "This study was funded by the Ministry of Economy and Competitiveness-Carlos III Health Institute (FIS PI19/01919). ARH is supported by a grant from the the Regional government (3A2400/NL38532). ASC and ART are supported by a grant from the University of Castilla-La Mancha (Fi17/332 and 2018-CPUCLM-7813, respectively)." DOI: the authors declare that they have no competing interests General notes: "The intervention period lasted one academic year (from October 2017 to May 2018), during which children in the two intervention groups received on average two breaks/day lasting 10 min in the classroom every school day. The breaks did not require specific material."

Swindle 2022

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

Swindle 2022 *(Continued)*

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

Szeszulski 2020

Study name	Athletes for life
Methods	Study design: RCT Unit of allocation: parent/child dyad Unit of analysis: individual
Participants	Setting: parent/child dyad from a community centre in Phoenix, Arizona Country: USA Country income: high-income Age (years): 6 to 11
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: children will participate in 12 weeks of semiweekly sports skill programming and nutrition sessions. Concurrently, parents will participate in sports-focused activity and behaviour change sessions that focus on nutrition, chronic disease prevention and healthy eating.

Szeszulski 2020 *(Continued)*

Outcomes	Measured (or planned) outcome(s): BMI percentile
Starting date	July 2016
Contact information	Noe C Crespo (ncrespo@sdsu.edu)
Notes	Trial registration: NCT03761589 Funding: "This work was funded by American Heart Association Grant 14SDG20490382, awarded to Dr. Crespo. Preparation of this manuscript was funded in part by The National Cancer Institute/NIH Grant-National Cancer Institute/NIH Grant T32/CA057712, awarded to the University of Texas Health Science Center at Houston School of Public Health Cancer Education and Career Development Program. Partial funding was provided by the Michael & Susan Dell Center for Healthy Living for Jacob Szeszulski for his contribution. None of the funding agencies played any role in the design, data collection, analysis, interpretation, or reporting of data from this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute or the National Institutes of Health." DOI: the authors declare that they have no competing interests General notes: NR

Sánchez-Gómez 2012

Study name	Savinghearts project
Methods	Study design: cluster-RCT Unit of allocation: school Unit of analysis: individual
Participants	Setting: public primary schools in the Madrid Region Country: Spain Country income: high-income Age (years): 7 to 8
Interventions	Intervention type: dietary Intervention setting: school Brief description: "Intervention arm 1: Group 'MC' (music concert): children attend a music concert that delivers obesity-preventing/cardiovascular health messages; Intervention arm 2: Group 'HB' (healthy breakfast): the children will attend a participatory class providing the same information but involving the description and making of a healthy breakfast and then eating it in the session."
Outcomes	Measured (or planned) outcome(s): reduction in BMI percentile among children deemed overweight/obese prior to the interventions
Starting date	January 2012
Contact information	Blanca Novella
Notes	Trial registration: NCT01418872 Funding: NR DOI: the authors declare they have no competing interests General notes: NR

Takehara 2019

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

Thompson 2013

Study name	Butterfly Girls and the Quest for Founder's Rock
Methods	Study design: RCT Unit of allocation: individual Unit of analysis: individual
Participants	Setting: Texas Country: USA Country income: high-income Age (years): 8 to 10
Interventions	Intervention type: dietary and activity Intervention setting: home Brief description: an 8-episode online programme delivered as an animated, interactive comic, which promotes healthy diet and physical activity
Outcomes	Measured (or planned) outcome(s): BMI change, BMI percentile
Starting date	November 2012
Contact information	Deborah Thompson (deborah.thompson@usda.gov)

Thompson 2013 *(Continued)*

Notes	Trial registration: NCT01481948 Funding: "This project was supported by the National Institute on Minority Health and Health Disparities grant #MD005814 (to Dr. Thompson). This work is also a publication of the USDA/ARS, Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas, and funded in part with federal funds from the USDA/ARS under Cooperative Agreement No. 58-6250-0-008. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organizations imply endorsement from the U.S. government. We would like to thank the expert panel members who participated in this research." DOI: "The authors declare that they have no competing interest." General notes: the intervention is delivered online and the location of recruitment is not stated (the authors are based in Texas). "Eligibility criteria are: an 8 to 10 year-old African American girl with a personal email address, internet access, and a parent or legal guardian who allows their child to participate and is willing to participate in the parent component."

Trost 2021

Study name	The Healthy Conversations @ Playgroup
Methods	Study design: cluster-RCT Unit of allocation: community playgroup Unit of analysis: individual
Participants	Setting: 60 community playgroups operating in 3 states across Australia: Queensland, South Australia and Western Australia Country: Australia Country income: high-income Age (years): 1 and older
Interventions	Intervention type: dietary and activity Intervention setting: community Brief description: playgroups receive 5 fortnightly face-to-face sessions for 10 weeks (one school term) on-site at weekly scheduled playgroup meetings. Each session consists of two 10- to 15-minute 'healthy conversations' led by a trained peer facilitator. The 5 'Healthy Conversation' topics focus on mealtimes, limiting screens, supporting movement skills, bedtime routines and celebrating achievements.
Outcomes	Measured (or planned) outcome(s): zBMI
Starting date	April 2021
Contact information	Prof Stewart Trost (s.trost@qut.edu.au)
Notes	Trial registration: ACTRN12621000055808 Funding: "This project is funded by the Medical Research Future Fund (MRFF) Preventative Public Health Research Initiative (2019; APP1200764). The MRFF has not contributed to the design of the study, nor will it have a role in data collection, management, analysis, and interpretation, nor in the dissemination of findings." DOI: "The authors declare that they have no competing interests." General notes: NR

Walters 2012

Study name	Həli?dx(w)/Healthy Hearts Across Generations project

Walters 2012 *(Continued)*

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

Wang 2021

Study name	H2GO!
Methods	Study design: cluster-RCT Unit of allocation: after-school club Unit of analysis: individual
Participants	Setting: 10 Massachusetts Alliance of Boys and Girls Clubs Country: USA Country income: high-income Age (years): 9 to 12
Interventions	Intervention type: dietary Intervention setting: community (after-school clubs) Brief description: weekly group-based interactive health sessions delivered by trained Boys and Girls Clubs staff. The primary objectives are to decrease SSB intake among young people and to promote water intake.
Outcomes	Measured (or planned) outcome(s): zBMI

Wang 2021 *(Continued)*

Starting date	October 2020
Contact information	Monica L Wang (mlwang@bu.edu)
Notes	Trial registration: NR Funding: "This study is funded by the National Institutes of Health (NIH) National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Grant # R01DK120713-01A1 (PI: Wang). MW, LSM, JW, SL, and MR are supported by NIDDK Grant # R01DK120713-01A1. JW is additionally supported by NIH, National Center for Complementary and Integrative Health Grant # 1UG3AT010621–01 and NIH, National Center for Advancing Translational Sciences Grant #1UL1TR001430." DOI: "The authors declare that they have no competing interests." General notes: NR

Whelan 2022

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

ASP: after-school programme; BMI: body mass index; CDC: Centers for Disease Control and Prevention; DOI: declaration of interest; HRQOL: health-related quality of life; NR: not reported; OB: obesity; OW: overweight; PA: physical activity; RCT: randomised controlled trial; SSB:

sugar-sweetened beverage; WHO: World Health Orgaization; YMCA: Young Men's Christian Association; zBMI: age and gender standardised BMI

RISK OF BIAS

Legend: ✓ Low risk of bias ✗ High risk of bias ~ Some concerns

Risk of bias for analysis 1.1 BMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Chai 2019	✓	✓	✗	✓	~	✗
Hendrie 2011	✓	✓	✓	✓	~	~
Nicholl 2021	✓	✓	~	✓	~	~
Paineau 2008	✓	✓	✓	✓	~	~
Sichieri 2008	~	✓	~	✓	~	~

Risk of bias for analysis 1.2 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Cunha 2013	~	✓	~	✓	~	~
Davis 2021	✗	✓	~	✓	~	✗
James 2004	✓	~	~	✓	~	~
Keshani 2016	✗	✗	✗	✓	~	✗
Lent 2014	~	✓	~	✓	~	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗
NCT00224887 2005	~	✓	✓	✓	~	~
Stettler 2015	~	✓	~	✓	~	~

Risk of bias for analysis 1.3 BMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
James 2004	✓	~	~	✓	~	~
Lent 2014	~	✓	✗	✓	~	✗

Risk of bias for analysis 1.4 zBMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Chai 2019	✓	✓	✗	✓	~	✗
Damsgaard 2014	~	✓	~	✓	✓	~
Fulkerson 2010	~	~	✓	✓	~	~
Hendrie 2011	✓	✓	✓	✓	~	~
Nicholl 2021	✓	✓	~	✓	~	~
Paineau 2008	✓	✓	✓	✓	~	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Viggiano 2018	✗	✓	~	✓	~	✗
de Ruyter 2012	✓	✓	✓	✓	✓	✓

Risk of bias for analysis 1.5 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Coleman 2012	✗	✓	✗	✓	~	✗
Davis 2021	✗	✓	~	✓	~	✗
Fulkerson 2015	~	✓	~	✓	~	~
James 2004	✓	~	~	✓	~	~
Lent 2014	~	✓	~	✓	~	~
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗
Stettler 2015	~	✓	~	✓	~	~
de Ruyter 2012	✓	✓	~	✓	✓	~

Risk of bias for analysis 1.6 zBMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Coleman 2012	✗	✓	✗	✓	~	✗
Fulkerson 2015	~	✓	✓	✓	~	~
Han 2006	✗	✓	✓	✓	~	✗
James 2004	✓	~	~	✓	~	~
Lent 2014	~	✓	✗	✓	~	✗
Viggiano 2018	✗	✓	✗	✓	~	✗
de Ruyter 2012	✓	✓	~	✓	✓	~

Risk of bias for analysis 1.7 Percentile short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Fulkerson 2010	~	~	✓	✓	~	~
Nicholl 2021	✓	✓	~	✓	~	~
Seguin-Fawler 2021	✓	✓	~	✓	✓	~

Risk of bias for analysis 1.8 Percentile medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Davis 2021	✗	✓	~	✓	~	✗
Lent 2014	~	✓	~	✓	~	~
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 1.9 Percentile long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Ickovics 2019	~	✓	✗	✓	~	✗
Lent 2014	~	✓	✗	✓	~	✗

Risk of bias for analysis 2.1 BMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Clemes 2020	✓	✓	✓	✓	✓	✓
De Bock 2013	✓	✗	✗	✓	✗	✗
Diaz-Castro 2021	✓	~	~	✓	~	~
Drummy 2016	✗	✓	~	✓	~	✗
Ford 2013	~	✗	~	✓	~	✗
Ha 2021	✓	✓	✓	✓	~	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Ketelhut 2022	✓	✓	✗	✓	~	✗
Lau 2016	~	✓	✓	✓	~	~
Lazaar 2007	~	✓	✓	✓	~	~
Martinez-Vizcaino 2020	✗	✓	✓	✓	~	✗
Newton 2014	✓	✓	✓	✓	~	~
Rhodes 2019	✓	✓	~	✓	✓	~
Thivel 2011	~	✓	✗	✓	~	✗
de Greeff 2016	✓	✓	✓	✓	~	~

Risk of bias for analysis 2.2 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barbeau 2007	~	✓	✗	✓	~	✗
Barnes 2021	✓	✓	✓	✓	~	~
De Bock 2013	✓	✗	✗	✓	✗	✗
Farmer 2017	~	✓	~	✓	~	~
Ha 2021	✓	✓	~	✓	~	~
Howe 2011	~	✓	✓	✓	~	~
Khan 2014	✓	✓	✗	✓	~	✗

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Kriemler 2010	✓	✓	✓	✓	✓	✓
Li 2010	~	✓	~	✓	~	~
Martinez-Vizcaino 2014	~	✓	~	✓	✓	~
Martinez-Vizcaino 2022	✗	✓	✗	✓	✓	✗
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗
Simon 2008	~	✓	~	✓	✓	~
Tanskey 2017	✗	✗	✓	✓	✗	✗
Vizcaino 2008	~	✓	~	✓	~	~
Wang 2018	~	✓	✓	✓	~	~

Risk of bias for analysis 2.3 BMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Donnelly 2009	~	✓	✗	✓	✓	✗
Farmer 2017	~	✓	~	✓	~	~
Kriemler 2010	✓	✓	✗	✓	✓	✗
Li 2010	~	✓	~	✓	~	~
Sacchetti 2013	~	~	~	✓	~	~
Simon 2008	~	✓	~	✓	✓	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Telford 2012	✗	~	~	✓	~	✗
Wendel 2016	✗	~	~	✓	~	✗

Risk of bias for analysis 2.4 zBMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2015	✓	✓	✓	✓	~	~
Breheny 2020	✓	✓	~	✓	✓	~
Diaz-Castro 2021	✓	~	~	✓	~	~
Lazaar 2007	~	✓	✓	✓	~	~
Martinez-Vizcaino 2020	✗	✓	✓	✓	~	✗
Newton 2014	✓	✓	✓	✓	~	~

Risk of bias for analysis 2.5 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Breheny 2020	✓	✓	~	✓	✓	~
Farmer 2017	~	✓	~	✓	~	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Khan 2014	✓	✓	✗	✓	~	✗
Li 2010	~	✓	~	✓	~	~
Martinez-Vizcaino 2022	✗	✓	✗	✓	✓	✗
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗
Morgan 2019	✓	✓	~	✓	~	~
Muller 2016	~	✓	✓	✓	~	~
Muller 2019	✗	✓	✗	✓	✓	✗
Tanskey 2017	✗	✗	✓	✓	✗	✗
Wang 2018	~	✓	✓	✓	~	~
Yin 2012	~	✓	~	✓	~	~

Risk of bias for analysis 2.6 zBMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Farmer 2017	~	✓	~	✓	~	~
Kovalskys 2016	✗	~	✗	✓	~	✗
Li 2010	~	✓	~	✓	~	~
Salmon 2022	✓	✓	~	✓	✓	~
Simon 2008	~	✓	~	✓	✓	~

	Bias					
Study	Randomisation process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results	Overall
Yin 2012	~	✓	✗	✓	~	✗

Risk of bias for analysis 2.7 Percentile short-term

	Bias					
Study	Randomisation process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results	Overall
Newton 2014	✓	✓	✓	✓	~	~

Risk of bias for analysis 2.8 Percentile medium-term

	Bias					
Study	Randomisation process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results	Overall
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 2.9 Percentile long-term

	Bias					
Study	Randomisation process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported results	Overall
Ickovics 2019	~	✓	✗	✓	~	✗
Muller 2016	~	✓	~	✓	~	~
Wendel 2016	✗	~	~	✓	~	✗

Risk of bias for analysis 3.1 BMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Annesi 2016	✗	✓	~	✓	~	✗
Annesi 2017	✗	✓	~	✓	~	✗
Baranowski 2003	~	✓	✓	✓	~	~
Beech 2003	✓	✓	✓	✓	~	~
Brown 2013	~	✓	~	✓	~	~
Chen 2010	✓	✓	✗	✓	~	✗
De Heer 2011	~	✓	✓	✓	~	~
Duncan 2019	~	✓	~	✓	~	~
Fairclough 2013	~	✓	✗	✓	~	✗
Gentile 2009	~	✗	~	✓	~	✗
Habib-Mourad 2014	~	✓	✓	✓	~	~
Hopper 2005	✗	✓	~	✓	~	✗
Hull 2018	✓	✓	✗	✓	✓	✗
Jansen 2011	✗	✓	~	✓	~	✗
Kipping 2008	~	✓	✗	✓	~	✗
Liu 2019	~	✓	✓	✓	~	~
Liu 2022	✓	✓	✓	✓	✓	✓
Morgan 2014	✓	✓	~	✓	✓	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Nollen 2014	~	✓	~	✗	~	✗
Pena 2021	✗	✓	~	✓	~	✗
Rerksuppaphol 2017	~	✓	✓	✓	~	~
Rosario 2012	✓	✓	~	✓	~	~
Rosenkranz 2010	~	✓	✓	✓	~	~
Safdie 2013	~	~	✓	✓	~	~
Sgambato 2019	✓	✓	✓	✓	~	~
Stolley 1997	~	~	✗	✓	~	✗
Story 2003	✓	✓	✓	✓	~	~

Risk of bias for analysis 3.2 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Annesi 2016	✗	✓	~	✓	~	✗
Annesi 2017	✗	✓	~	✓	~	✗
Barnes 2021	✓	✓	✓	✓	~	~
Elder 2014	~	✓	~	✓	~	~
Gentile 2009	~	✗	✗	✓	~	✗
Kain 2014	✗	✓	✗	✗	~	✗

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Klesges 2010	~	✓	~	✓	✓	~
Kobel 2017	~	✓	✗	✓	~	✗
Kubik 2021	~	✓	~	✓	✓	~
Liu 2019	~	✓	✓	✓	~	~
Liu 2022	✓	✓	✓	✓	✓	✓
Nemet 2011a	~	~	✓	✓	~	~
Nemet 2011b	~	~	~	✓	~	~
Puder 2011	✓	✓	✓	✓	✓	✓
Safdie 2013	~	~	✓	✓	~	~
Sekhavat 2014	~	✓	~	✓	~	~
Siegrist 2013	~	✓	~	✓	~	~
Stettler 2015	~	✓	~	✓	~	~
Stolley 1997	~	~	✗	✓	~	✗
Xu 2015	~	✓	✓	✓	✓	~
Xu 2017 (5 other cities)	~	✓	✓	✓	~	~

Risk of bias for analysis 3.3 BMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Brandstetter 2012	~	✓	~	✓	~	~
Caballero 2003	~	✓	~	✓	~	~
Elder 2014	~	✓	~	✓	~	~
Foster 2008	✗	✓	✗	✓	~	✗
Greve 2015	~	✗	~	✓	~	✗
Grydeland 2014	~	✗	~	✓	~	✗
Hull 2018	✓	✓	✗	✓	✓	✗
Klesges 2010	~	✓	~	✓	✓	~
Kubik 2021	~	✓	~	✓	✓	~
Llargues 2012	~	✓	~	✓	~	~
Lloyd 2018	✓	✓	✓	✓	✓	✓
Magnusson 2012	✗	✓	✗	✓	~	✗
Nemet 2011b	~	~	✗	✓	~	✗
Safdie 2013	~	~	✓	✓	~	~
Siegrist 2018	~	✓	~	✓	✓	~
Story 2012	~	✓	✗	✓	~	✗

Risk of bias for analysis 3.4 zBMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Baranowski 2011	✗	✓	~	✓	~	✗
Bohnert 2013	✗	✓	✗	✓	~	✗
Brown 2013	~	✓	~	✓	~	~
Choo 2020	✗	✓	~	✓	~	✗
Fairclough 2013	~	✓	✗	✓	~	✗
Griffin 2019	✓	✓	✗	✓	~	✗
Haire-Joshu 2010	✗	✓	✗	✓	~	✗
Hull 2018	✓	✓	✗	✓	✓	✗
Kipping 2014	~	✓	✓	✓	✓	~
Kocken 2016	✗	✗	~	✓	~	✗
Levy 2012	~	~	✓	✓	~	~
Liu 2019	~	✓	✓	✓	~	~
Liu 2022	✓	✓	✓	✓	✓	✓
Morgan 2011	✓	✓	✗	✓	~	✗
Morgan 2014	✓	✓	~	✓	✓	~
NCT02067728 2014	✗	✗	✗	✓	✓	✗
Nyberg 2015	~	✓	~	✓	✓	~
Nyberg 2016	~	✓	~	✓	✓	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
O'Connor 2020	~	✓	~	✓	✓	~
Pena 2021	✗	✓	~	✓	~	✗
Ramirez-Rivera 2021	✓	~	~	✓	~	~
Rerksuppaphol 2017	~	✓	✓	✓	~	~
Rosario 2012	✓	✓	~	✓	~	~
Rosenkranz 2010	~	✓	✓	✓	~	~
Spiegel 2006	✗	~	~	✓	~	✗
White 2019	~	✓	✗	✓	~	✗

Risk of bias for analysis 3.5 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Cao 2015	~	✓	~	✓	~	~
Crespo 2012	~	✓	~	✓	~	~
Elder 2014	~	✓	~	✓	~	~
Fulkerson 2022	~	✓	✗	✓	~	✗
Kain 2014	✗	✓	✗	✗	~	✗
Keller 2009	~	✗	✗	✓	~	✗

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Kubik 2021	~	✓	~	✓	✓	~
Li 2019	✓	✓	✓	✓	✓	✓
Lichtenstein 2011	✗	✓	✓	✓	~	✗
Liu 2019	~	✓	✓	✓	~	~
Liu 2022	✓	✓	✓	✓	✓	✓
Nyberg 2015	~	✓	~	✓	✓	~
Nyberg 2016	~	✓	~	✓	✓	~
Sahota 2001	~	~	~	✓	~	~
Santos 2014	✓	✓	~	✓	~	~
Sekhavat 2014	~	✓	~	✓	~	~
Sherwood 2019	✓	✓	~	✓	✓	~
Siegrist 2013	~	✓	~	✓	~	~
Stettler 2015	~	✓	~	✓	~	~
Wang 2012	✗	~	~	✗	~	✗
White 2019	~	✓	✗	✓	~	✗
Xu 2015	~	✓	✓	✓	✓	~
Xu 2017 (5 other cities)	~	✓	✓	✓	~	~

Risk of bias for analysis 3.6 zBMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Adab 2018	+	+	~	+	+	~
Cao 2015	~	+	~	+	~	~
Crespo 2012	~	+	-	+	~	-
Elder 2014	~	+	~	+	~	~
Foster 2008	-	+	-	+	~	-
Grydeland 2014	~	-	~	+	~	-
HEALTHY Study Group 2010	~	+	~	+	+	~
Habib-Mourad 2020	-	+	-	+	~	-
Hull 2018	+	+	-	+	+	-
Kipping 2014	~	+	+	+	+	~
Kocken 2016	-	-	-	+	~	-
Kubik 2021	~	+	~	+	+	~
Lichtenstein 2011	-	+	~	+	~	-
Lloyd 2018	+	+	+	+	+	+
Marcus 2009	-	+	~	+	~	-
Rush 2012	-	~	-	+	+	-
Sahota 2019	~	+	~	+	~	~
Sherwood 2019	+	+	~	+	+	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Story 2012	~	✓	✗	✓	~	✗
Topham 2021	✗	✓	✗	✓	✗	✗
White 2019	~	✓	✗	✓	~	✗
Williamson 2012	~	✓	~	✓	✓	~

Risk of bias for analysis 3.7 Percentile short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Baranowski 2011	✗	✓	~	✓	~	✗
Brown 2013	~	✓	~	✓	~	~
De Heer 2011	~	✓	✓	✓	~	~
Hendy 2011	~	~	✓	✓	~	~
Rosenkranz 2010	~	✓	✓	✓	~	~

Risk of bias for analysis 3.8 Percentile medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Annesi 2016	✗	✓	~	✓	~	✗
Crespo 2012	~	✓	~	✓	~	~

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Elder 2014	~	✓	~	✓	~	~
Kobel 2017	~	✓	✗	✓	~	✗
Nemet 2011a	~	~	✓	✓	~	~
Nemet 2011b	~	~	~	✓	~	~
Sherwood 2019	✓	✓	~	✓	✓	~
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 3.9 Percentile long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Crespo 2012	~	✓	✗	✓	~	✗
Elder 2014	~	✓	~	✓	~	~
Ickovics 2019	~	✓	✗	✓	~	✗
Nemet 2011b	~	~	✗	✓	~	✗
Sherwood 2019	✓	✓	~	✓	✓	~

Risk of bias for analysis 4.1 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗

Risk of bias for analysis 4.2 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Meng 2013 (Beijing)	✗	✓	✗	✓	~	✗

Risk of bias for analysis 4.3 Percentile medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 4.4 Percentile long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Ickovics 2019	~	✓	✗	✓	~	✗

Risk of bias for analysis 5.1 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Stettler 2015	~	✓	~	✓	~	~

Risk of bias for analysis 5.2 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Stettler 2015	~	✓	~	✓	~	~

Risk of bias for analysis 5.3 Percentile medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 5.4 Percentile long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Ickovics 2019	~	✓	✗	✓	~	✗

Risk of bias for analysis 6.1 BMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Jones 2015	✓	✓	✓	✓	~	~
Robinson 2003	✓	✓	✓	✓	~	~

Risk of bias for analysis 6.2 BMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Jones 2015	✓	✓	~	✓	~	~

Risk of bias for analysis 6.3 BMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Robinson 2010	~	✓	✗	✓	✓	✗

Risk of bias for analysis 6.4 zBMI short-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Jones 2015	✓	✓	✓	✓	~	~

Risk of bias for analysis 6.5 zBMI medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Barnes 2021	✓	✓	✓	✓	~	~
Jones 2015	✓	✓	~	✓	~	~

Risk of bias for analysis 6.6 zBMI long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Robinson 2010	~	✓	✗	✓	✓	✗

Risk of bias for analysis 6.7 Percentile medium-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
van de Berg 2020	✗	~	✗	✓	✓	✗

Risk of bias for analysis 6.8 Percentile long-term

	Bias					
Study	**Randomisation process**	**Deviations from intended interventions**	**Missing outcome data**	**Measurement of the outcome**	**Selection of the reported results**	**Overall**
Ickovics 2019	~	✓	✗	✓	~	✗

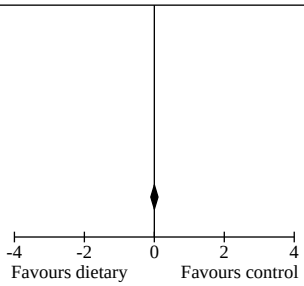
DATA AND ANALYSES

Comparison 1. Dietary vs control (all studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 BMI short-term	5		Mean Difference (IV, Random, 95% CI)	0.00 [-0.10, 0.10]
1.2 BMI medium-term	9		Mean Difference (IV, Random, 95% CI)	-0.01 [-0.15, 0.12]
1.3 BMI long-term	2		Mean Difference (IV, Random, 95% CI)	-0.17 [-0.48, 0.13]
1.4 zBMI short-term	8		Mean Difference (IV, Random, 95% CI)	-0.06 [-0.13, 0.01]
1.5 zBMI medium-term	9		Mean Difference (IV, Random, 95% CI)	-0.04 [-0.10, 0.02]
1.6 zBMI long-term	7		Mean Difference (IV, Random, 95% CI)	-0.05 [-0.10, 0.01]
1.7 Percentile short-term	3		Mean Difference (IV, Random, 95% CI)	1.90 [-3.44, 7.24]
1.8 Percentile medium-term	3		Mean Difference (IV, Random, 95% CI)	-0.94 [-2.65, 0.78]
1.9 Percentile long-term	2		Mean Difference (IV, Random, 95% CI)	-1.49 [-4.80, 1.82]

Analysis 1.1. Comparison 1: Dietary vs control (all studies), Outcome 1: BMI short-term

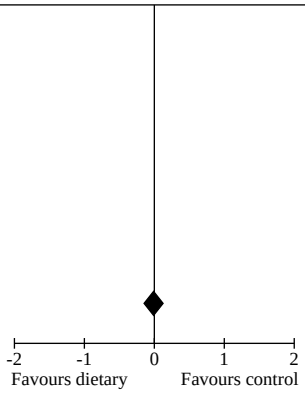
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Chai 2019	0.14264	1.478678		Not estimable		+ + − + ? −
Hendrie 2011	-0.1	0.184784379		Not estimable		+ + + + ? ?
Nicholl 2021	0.1	0.141421356		Not estimable		+ + ? + ? ?
Paineau 2008	-0.059108	0.072559		Not estimable		+ + + + ? ?
Sichieri 2008	0.1	0.101394774		Not estimable		? + ? + ? ?
Total (95% CI)			**100.0%**	**0.00 [-0.10 , 0.10]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.2. Comparison 1: Dietary vs control (all studies), Outcome 2: BMI medium-term

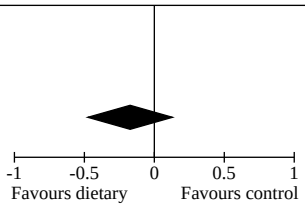
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0.02	0.176358365		Not estimable		+ + + + ? ?
Cunha 2013	0.054	0.023145676		Not estimable		? + ? + ? ?
Davis 2021	-0.02	0.252356395		Not estimable		− + ? + ? −
James 2004	-0.09	0.09824172		Not estimable		+ ? ? + ? ?
Keshani 2016	0.55	0.234805267		Not estimable		− − − + ? −
Lent 2014	-0.1	0.250365868		Not estimable		? + ? + ? ?
Meng 2013 (Beijing)	0.02	0.453155602		Not estimable		− + − + ? −
NCT00224887 2005	-0.14	0.17078629		Not estimable		? + + + ? ?
Stettler 2015	-0.8	0.351059205		Not estimable		? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.01 [-0.15 , 0.12]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.3. Comparison 1: Dietary vs control (all studies), Outcome 3: BMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
James 2004	-0.26	0.160816113		Not estimable		+ ? ? + ? ?
Lent 2014	0.1	0.304608104		Not estimable		? + − + ? −
Total (95% CI)			**100.0%**	**-0.17 [-0.48 , 0.13]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						

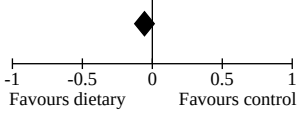


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.4. Comparison 1: Dietary vs control (all studies), Outcome 4: zBMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Chai 2019	0.015618	0.339583		Not estimable	+	+	−	+	?	−
Damsgaard 2014	0.01	0.007653061		Not estimable	?	+	?	+	+	?
de Ruyter 2012	-0.099	0.008858529		Not estimable	+	+	+	+	+	+
Fulkerson 2010	0.04	0.301511345		Not estimable	?	?	+	+	?	?
Hendrie 2011	-0.07	0.064079987		Not estimable	+	+	+	+	?	?
Nicholl 2021	0.15	0.120415946		Not estimable	+	+	?	+	?	?
Paineau 2008	-0.052462	0.052933		Not estimable	+	+	+	+	?	?
Viggiano 2018	-0.16	0.036708271		Not estimable	−	+	?	+	?	−
Total (95% CI)			**100.0%**	**-0.06 [-0.13 , 0.01]**						

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.5. Comparison 1: Dietary vs control (all studies), Outcome 5: zBMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Barnes 2021	0	0.05791636		Not estimable	+	+	+	+	?	?
Coleman 2012	-0.029971484	0.042438399		Not estimable	−	+	−	+	?	−
Davis 2021	-0.02	0.079802099		Not estimable	−	+	?	+	?	−
de Ruyter 2012	-0.134	0.008861876		Not estimable	+	+	?	+	+	?
Fulkerson 2015	0.03	0.04		Not estimable	?	+	?	+	?	?
James 2004	-0.02	0.038335374		Not estimable	+	?	?	+	?	?
Lent 2014	0	0.044463864		Not estimable	?	+	?	+	?	?
Meng 2013 (Beijing)	0	0.19694754		Not estimable	−	+	−	+	?	−
Stettler 2015	-0.13	0.049719445		Not estimable	?	+	?	+	?	?
Total (95% CI)			**100.0%**	**-0.04 [-0.10 , 0.02]**						

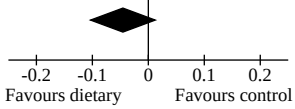
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.6. Comparison 1: Dietary vs control (all studies), Outcome 6: zBMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Coleman 2012	-0.039262469	0.045252874		Not estimable		− + − + ? −
de Ruyter 2012	-0.13	0.032783919		Not estimable		+ + ? + + ?
Fulkerson 2015	0.07	0.05		Not estimable		? + + + ? ?
Han 2006	0.008564411	0.03074811		Not estimable		− + + + ? −
James 2004	-0.11	0.053315895		Not estimable		+ ? ? + ? ?
Lent 2014	-0.1	0.049221982		Not estimable		? + − + ? −
Viggiano 2018	0	0.07183193		Not estimable		− + − + ? −
Total (95% CI)			**100.0%**	**-0.05 [-0.10 , 0.01]**		

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

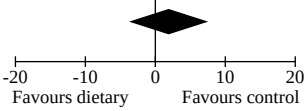


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.7. Comparison 1: Dietary vs control (all studies), Outcome 7: Percentile short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Fulkerson 2010	2.1	8.713677858		Not estimable		? ? + + ? ?
Nicholl 2021	5.9	2.969848481		Not estimable		+ + ? + ? ?
Seguin-Fawler 2021	-1.03	1.859273937		Not estimable		+ + ? + + ?
Total (95% CI)			**100.0%**	**1.90 [-3.44 , 7.24]**		

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

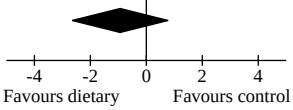


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.8. Comparison 1: Dietary vs control (all studies), Outcome 8: Percentile medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Davis 2021	-0.43	2.099265467		Not estimable	
Lent 2014	0.3	1.159193983		Not estimable	
van de Berg 2020	-2.22	1.070560601		Not estimable	
Total (95% CI)			**100.0%**	**-0.94 [-2.65 , 0.78]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 1.9. Comparison 1: Dietary vs control (all studies), Outcome 9: Percentile long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Ickovics 2019	-3.18	1.154101074		Not estimable	
Lent 2014	0.2	1.153863095		Not estimable	
Total (95% CI)			**100.0%**	**-1.49 [-4.80 , 1.82]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Comparison 2. Activity vs control (all studies)

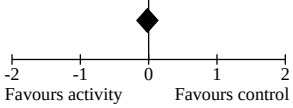
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
2.1 BMI short-term	14		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.17, 0.13]
2.2 BMI medium-term	16		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.18, -0.05]
2.3 BMI long-term	8		Mean Difference (IV, Random, 95% CI)	-0.07 [-0.24, 0.10]
2.4 zBMI short-term	6		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.07, 0.02]
2.5 zBMI medium-term	13		Mean Difference (IV, Random, 95% CI)	-0.05 [-0.09, -0.02]
2.6 zBMI long-term	6		Mean Difference (IV, Random, 95% CI)	-0.02 [-0.09, 0.04]

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

Analysis 2.1. Comparison 2: Activity vs control (all studies), Outcome 1: BMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Clemes 2020	0	0.137631458		Not estimable	+ + + + + +
De Bock 2013	0.11	0.053090164		Not estimable	+ − − + − −
de Greeff 2016	-0.12	0.07		Not estimable	+ + + + ? ?
Diaz-Castro 2021	-0.88	0.434476697		Not estimable	+ ? ? + ? ?
Drummy 2016	-0.1	0.198147635		Not estimable	− + ? + ? −
Ford 2013	0	0.180855351		Not estimable	? − ? + ? −
Ha 2021	0.59	0.169814205		Not estimable	+ + + + ? ?
Ketelhut 2022	-0.5	0.44790407		Not estimable	+ + − + ? −
Lau 2016	0.25	0.258444868		Not estimable	? + + + ? ?
Lazaar 2007	-0.35026738	0.047652576		Not estimable	? + + + ? ?
Martinez-Vizcaino 2020	-0.030377296	0.098856891		Not estimable	− + + + ? −
Newton 2014	1.14	0.404167847		Not estimable	+ + + + ? ?
Rhodes 2019	0.11	0.184874193		Not estimable	+ + ? + + ?
Thivel 2011	-0.3	0.04312279		Not estimable	? + − + ? −
Total (95% CI)			**100.0%**	**-0.02 [-0.17 , 0.13]**	

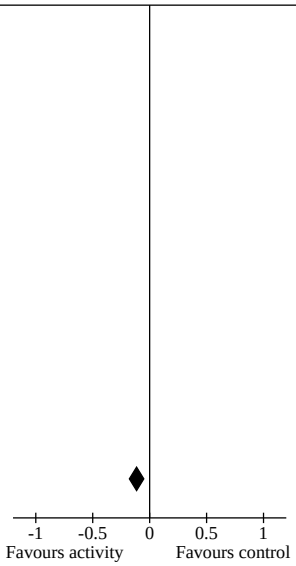
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.2. Comparison 2: Activity vs control (all studies), Outcome 2: BMI medium-term

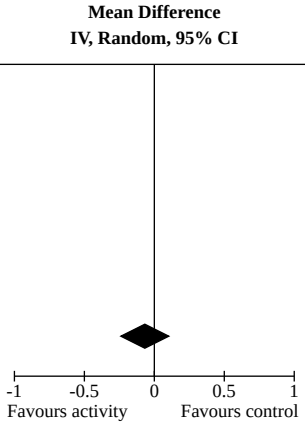
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barbeau 2007	-0.6	0.2579565		Not estimable	? + − + ? −
Barnes 2021	-0.26	0.181054833		Not estimable	+ + + + ? ?
De Bock 2013	0.02	0.065097164		Not estimable	+ − − + − −
Farmer 2017	0	0.109872355		Not estimable	? + ? + ? ?
Ha 2021	-0.11	0.198711268		Not estimable	+ + ? + ? ?
Howe 2011	-0.35	0.302249587		Not estimable	? + + + ? ?
Khan 2014	-0.29	0.149816805		Not estimable	+ + − + ? −
Kriemler 2010	-0.17	0.091915877		Not estimable	+ + + + + +
Li 2010	-0.16	0.206264449		Not estimable	? + ? + ? ?
Martinez-Vizcaino 2014	-0.139732869	0.126772373		Not estimable	? + ? + + ?
Martinez-Vizcaino 2022	-0.135422382	0.164189645		Not estimable	− + − + + −
Meng 2013 (Beijing)	0.04	0.448998886		Not estimable	− + − + ? −
Simon 2008	-0.04	0.069982951		Not estimable	? + ? + + ?
Tanskey 2017	-0.045036	0.138964		Not estimable	− − + + − −
Vizcaino 2008	-0.046149393	0.098023284		Not estimable	? + ? + ? ?
Wang 2018	-0.24	0.063796552		Not estimable	? + + + ? ?
Total (95% CI)			**100.0%**	**-0.11 [-0.18 , -0.05]**	
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Test for subgroup differences: Not applicable					



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.3. Comparison 2: Activity vs control (all studies), Outcome 3: BMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Donnelly 2009	0	0.098640765		Not estimable	? + − + + −
Farmer 2017	0.3	0.152019807		Not estimable	? + ? + ? ?
Kriemler 2010	0.1	0.175506762		Not estimable	+ + − + + −
Li 2010	-0.12	0.305495908		Not estimable	? + ? + ? ?
Sacchetti 2013	-0.5	0.150449316		Not estimable	? ? ? + ? ?
Simon 2008	-0.33	0.15694478		Not estimable	? + ? + + ?
Telford 2012	0.047094572	0.099447674		Not estimable	− ? ? + ? −
Wendel 2016	-0.106646006	0.165031346		Not estimable	− ? ? + ? −
Total (95% CI)			**100.0%**	**-0.07 [-0.24 , 0.10]**	
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Test for subgroup differences: Not applicable					

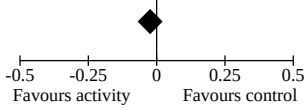


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.4. Comparison 2: Activity vs control (all studies), Outcome 4: zBMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2015	-0.06	0.092013718		Not estimable	+ + + + ? ?
Breheny 2020	0.01	0.02229346		Not estimable	+ + ? + + ?
Diaz-Castro 2021	-0.2	0.07436397		Not estimable	+ ? ? + ? ?
Lazaar 2007	-0.019919786	0.021172265		Not estimable	? + + + ? ?
Martinez-Vizcaino 2020	-0.014960128	0.066601024		Not estimable	− + + + ? −
Newton 2014	-0.016	0.06392389		Not estimable	+ + + + ? ?
Total (95% CI)			**100.0%**	**-0.02 [-0.07 , 0.02]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

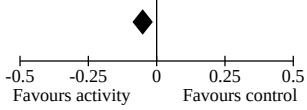


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.5. Comparison 2: Activity vs control (all studies), Outcome 5: zBMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.12	0.059995387		Not estimable	+ + + + ? ?
Breheny 2020	-0.01	0.02173291		Not estimable	+ + ? + + ?
Farmer 2017	-1.11022e-16	0.036140453		Not estimable	? + ? + ? ?
Khan 2014	-0.2	0.079696425		Not estimable	+ + − + ? −
Li 2010	-0.06	0.078995753		Not estimable	? + ? + ? ?
Martinez-Vizcaino 2022	-0.002663266	0.042168226		Not estimable	− + − + + −
Meng 2013 (Beijing)	0.01	0.195140975		Not estimable	− + − + ? −
Morgan 2019	-0.03	0.050636309		Not estimable	+ + ? + ? ?
Muller 2016	-0.06	0.072450201		Not estimable	? + + + ? ?
Muller 2019	-0.2	0.05229542		Not estimable	− + − + + −
Tanskey 2017	-0.003305	0.034437		Not estimable	− − + + − −
Wang 2018	-0.09	0.031898276		Not estimable	? + + + ? ?
Yin 2012	-0.03	0.031708569		Not estimable	? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.05 [-0.09 , -0.02]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

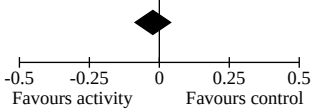


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.6. Comparison 2: Activity vs control (all studies), Outcome 6: zBMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Farmer 2017	0.04	0.038972075		Not estimable		? + ? + ? ?
Kovalskys 2016	-0.004	0.073025766		Not estimable		− ? − + ? −
Li 2010	-0.05	0.115754234		Not estimable		? + ? + ? ?
Salmon 2022	-0.106471	0.044891		Not estimable		+ + ? + + ?
Simon 2008	-0.11	0.06133069		Not estimable		? + ? + + ?
Yin 2012	0.04	0.034325163		Not estimable		? + − + ? −
Total (95% CI)			**100.0%**	**-0.02 [-0.09 , 0.04]**		

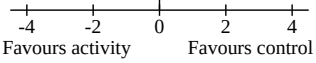
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.7. Comparison 2: Activity vs control (all studies), Outcome 7: Percentile short-term

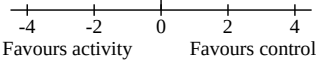
Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Newton 2014	-0.74	1.713344522	Not estimable		+ + + + ? ?



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

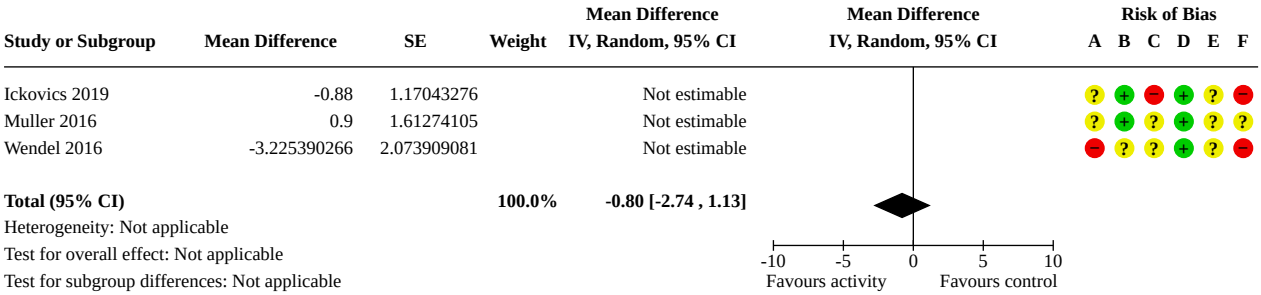
Analysis 2.8. Comparison 2: Activity vs control (all studies), Outcome 8: Percentile medium-term

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
van de Berg 2020	-2.26	1.10390217	Not estimable		− ? − + + −



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 2.9. Comparison 2: Activity vs control (all studies), Outcome 9: Percentile long-term



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

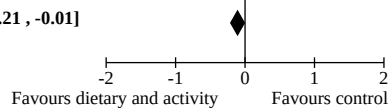
Comparison 3. Dietary and activity vs control (all studies)

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

Analysis 3.1. Comparison 3: Dietary and activity vs control (all studies), Outcome 1: BMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Annesi 2016	-0.12	0.13940871		Not estimable		-	+	?	+	?	-
Annesi 2017	-0.21	0.109401895		Not estimable		-	+	?	+	?	-
Baranowski 2003	0.5	0.381119536		Not estimable		?	+	+	+	?	?
Beech 2003	-0.4	0.244949		Not estimable		+	+	+	+	?	?
Brown 2013	0	0.246589642		Not estimable		?	+	?	+	?	?
Chen 2010	-0.22	0.240816042		Not estimable		+	+	-	+	?	-
De Heer 2011	-0.05	0.144895375		Not estimable		?	+	+	+	?	?
Duncan 2019	-0.01	0.004		Not estimable		?	+	?	+	?	?
Fairclough 2013	-0.47	0.285714286		Not estimable		?	+	-	+	?	-
Gentile 2009	0.1	0.288252574		Not estimable		?	-	?	+	?	-
Habib-Mourad 2014	0.18	0.216466205		Not estimable		?	+	+	+	?	?
Hopper 2005	-0.43	0.183619085		Not estimable		-	+	?	+	?	-
Hull 2018	0.504	0.626020408		Not estimable		+	+	-	+	+	-
Jansen 2011	-0.019370921	0.07131428		Not estimable		-	+	?	+	?	-
Kipping 2008	0.1	0.18622449		Not estimable		?	+	-	+	?	-
Liu 2019	3.55271e-15	0.136934972		Not estimable		?	+	+	+	?	?
Liu 2022	-0.28	0.095430955		Not estimable		+	+	+	+	+	+
Morgan 2014	-0.2	0.091978349		Not estimable		+	+	?	+	+	?
Nollen 2014	0.06	0.524995711		Not estimable		?	+	?	-	?	-
Pena 2021	-0.52	0.329081633		Not estimable		-	+	?	+	?	-
Rerksuppaphol 2017	-0.84	0.141237098		Not estimable		?	+	+	+	?	?
Rosario 2012	-0.4	0.140497044		Not estimable		+	+	?	+	?	?
Rosenkranz 2010	0.2	0.287866519		Not estimable		?	+	+	+	?	?
Safdie 2013	0.905294	0.246296		Not estimable		?	?	+	+	?	?
Sgambato 2019	0.1	0.09557333		Not estimable		+	+	+	+	?	?
Stolley 1997	-0.5	0.610323643		Not estimable		?	?	-	+	?	-
Story 2003	0.2	0.282842712		Not estimable		+	+	+	+	?	?
Total (95% CI)			**100.0%**	**-0.11 [-0.21 , -0.01]**							

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

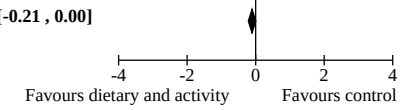


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.2. Comparison 3: Dietary and activity vs control (all studies), Outcome 2: BMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Annesi 2016	-0.43	0.180365223		Not estimable		-	+	?	+	?	-
Annesi 2017	-0.47	0.182340541		Not estimable		-	+	?	+	?	-
Barnes 2021	-0.07	0.178687757		Not estimable		+	+	+	+	?	?
Elder 2014	-0.05	0.129054784		Not estimable		?	+	?	+	?	?
Gentile 2009	0	0.127625818		Not estimable		?	-	-	+	?	-
Kain 2014	-0.363225284	0.096267192		Not estimable		-	+	-	-	?	-
Klesges 2010	0.1	0.197989899		Not estimable		?	+	?	+	+	?
Kobel 2017	0.07	0.081753919		Not estimable		?	+	-	+	?	-
Kubik 2021	-0.9	0.968756547		Not estimable		?	+	?	+	+	?
Liu 2019	0.12	0.143091594		Not estimable		?	+	+	+	?	?
Liu 2022	-0.3	0.095565721		Not estimable		+	+	+	+	+	+
Nemet 2011a	-0.07	0.068430013		Not estimable		?	?	+	+	?	?
Nemet 2011b	-0.3	0.104613575		Not estimable		?	?	?	+	?	?
Puder 2011	0.1	0.053328248		Not estimable		+	+	+	+	+	+
Safdie 2013	0.726938	0.253174		Not estimable		?	?	+	+	?	?
Sekhavat 2014	0.036792453	0.203268858		Not estimable		?	+	?	+	?	?
Siegrist 2013	0.1	0.090321488		Not estimable		?	+	?	+	?	?
Stettler 2015	-1.1	0.34176976		Not estimable		?	+	?	+	?	?
Stolley 1997	-3.55271e-15	0.698360273		Not estimable		?	?	-	+	?	-
Xu 2015	0	0.360768766		Not estimable		?	+	+	+	+	?
Xu 2017 (5 other cities)	-0.3	0.075900097		Not estimable		?	+	+	+	?	?
Total (95% CI)			**100.0%**	**-0.11 [-0.21 , 0.00]**							

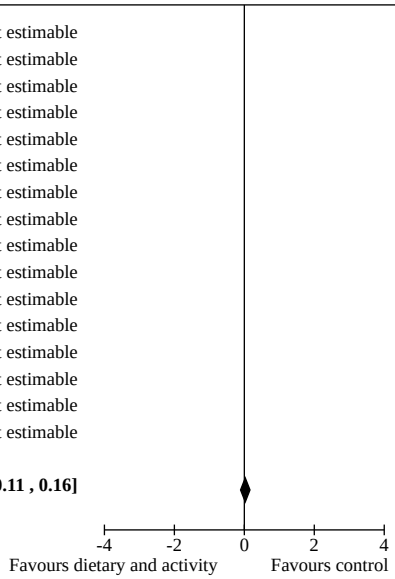
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.3. Comparison 3: Dietary and activity vs control (all studies), Outcome 3: BMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Brandstetter 2012	-0.01	0.068877551		Not estimable		?	+	?	+	?	?
Caballero 2003	-0.2	0.165816327		Not estimable		?	+	?	+	?	?
Elder 2014	0	0.164397081		Not estimable		?	+	?	+	?	?
Foster 2008	-0.04	0.117346939		Not estimable		−	+	−	+	?	−
Greve 2015	-0.113	0.092		Not estimable		?	−	?	+	?	−
Grydeland 2014	-0.1	0.074279732		Not estimable		?	−	?	+	?	−
Hull 2018	1.072	0.967346939		Not estimable		+	+	−	+	+	−
Klesges 2010	-0.1	0.261725047		Not estimable		?	+	?	+	+	?
Kubik 2021	-1.4	0.9950738		Not estimable		?	+	?	+	+	?
Llargues 2012	-0.68	0.340095862		Not estimable		?	+	?	+	?	?
Lloyd 2018	0.05	0.080163844		Not estimable		+	+	+	+	+	+
Magnusson 2012	0.6	0.151041901		Not estimable		−	+	−	+	?	−
Nemet 2011b	-0.4	0.146919892		Not estimable		?	?	−	+	?	−
Safdie 2013	0.945519	0.282174		Not estimable		?	?	+	+	?	?
Siegrist 2018	0.1	0.143449544		Not estimable		?	+	?	+	+	?
Story 2012	0.39	0.149532605		Not estimable		?	+	−	+	?	−
Total (95% CI)			**100.0%**	**0.03 [-0.11 , 0.16]**							
Heterogeneity: Not applicable											
Test for overall effect: Not applicable											
Test for subgroup differences: Not applicable											



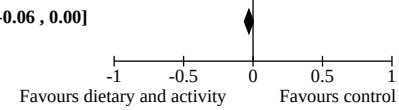
Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.4. Comparison 3: Dietary and activity vs control (all studies), Outcome 4: zBMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Baranowski 2011	0.03	0.036055513		Not estimable		−	+	?	+	?	−
Bohnert 2013	0.06	0.091908887		Not estimable		−	+	−	+	?	−
Brown 2013	0.21	0.241076007		Not estimable		?	+	?	+	?	?
Choo 2020	0.1	0.09000175		Not estimable		−	+	?	+	?	−
Fairclough 2013	-0.24	0.121683673		Not estimable		?	+	−	+	?	−
Griffin 2019	-0.135	0.164212227		Not estimable		+	+	−	+	?	−
Haire-Joshu 2010	-0.233	0.268739651		Not estimable		−	+	−	+	?	−
Hull 2018	0.408	0.258673469		Not estimable		+	+	−	+	+	−
Kipping 2014	0.01	0.018441697		Not estimable		?	+	+	+	+	?
Kocken 2016	0.1	0.028063021		Not estimable		−	−	?	+	?	−
Levy 2012	-0.01730404	0.02285821		Not estimable		?	?	+	+	?	?
Liu 2019	0	0.052779316		Not estimable		?	+	+	+	?	?
Liu 2022	-0.11	0.03572337		Not estimable		+	+	+	+	+	+
Morgan 2011	-0.1	0.091978349		Not estimable		+	+	−	+	?	−
Morgan 2014	-0.1	0.052342563		Not estimable		+	+	?	+	+	?
NCT02067728 2014	-0.09	0.146762197		Not estimable		−	−	−	+	+	−
Nyberg 2015	-0.05	0.056484766		Not estimable		?	+	?	+	+	?
Nyberg 2016	-0.03	0.051020408		Not estimable		?	+	?	+	+	?
O'Connor 2020	0.08	0.064874588		Not estimable		?	+	?	+	+	?
Pena 2021	-0.176	0.109693878		Not estimable		−	+	?	+	?	−
Ramirez-Rivera 2021	-0.08	0.074027022		Not estimable		+	?	?	+	?	?
Rerksuppaphol 2017	-0.161	0.071001992		Not estimable		?	+	+	+	?	?
Rosario 2012	-0.21	0.086382869		Not estimable		+	+	?	+	?	?
Rosenkranz 2010	1.11022e-16	0.064056356		Not estimable		?	+	+	+	?	?
Spiegel 2006	-0.056381503	0.0224218		Not estimable		−	?	?	+	?	−
White 2019	-0.03	0.05186521		Not estimable		?	+	−	+	?	−
Total (95% CI)			**100.0%**	**-0.03 [-0.06 , 0.00]**							

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

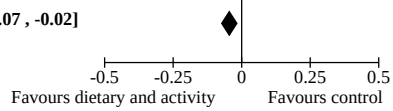


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.5. Comparison 3: Dietary and activity vs control (all studies), Outcome 5: zBMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A	B	C	D	E	F
Barnes 2021	-0.02	0.058125335		Not estimable	+	+	+	+	?	?
Cao 2015	-0.004	0.004813688		Not estimable	?	+	?	+	?	?
Crespo 2012	0.005638	0.03894		Not estimable	?	+	?	+	?	?
Elder 2014	0.007	0.033511851		Not estimable	?	+	?	+	?	?
Fulkerson 2022	-0.04	0.059407008		Not estimable	?	+	−	+	?	−
Kain 2014	-0.191498644	0.061984102		Not estimable	−	+	−	−	?	−
Keller 2009	-0.0283	0.023622995		Not estimable	?	−	−	+	?	−
Kubik 2021	-0.1	0.12676708		Not estimable	?	+	?	+	+	?
Li 2019	-0.12	0.048458283		Not estimable	+	+	+	+	+	+
Lichtenstein 2011	-0.13	0.038023276		Not estimable	−	+	+	+	?	−
Liu 2019	-0.04	0.052151424		Not estimable	?	+	+	+	?	?
Liu 2022	-0.2	0.034892844		Not estimable	+	+	+	+	+	+
Nyberg 2015	0.096057971	0.047483819		Not estimable	?	+	?	+	+	?
Nyberg 2016	0.013	0.051020408		Not estimable	?	+	?	+	+	?
Sahota 2001	0	0.051020408		Not estimable	?	?	?	+	?	?
Santos 2014	0.01	0.021646126		Not estimable	+	+	?	+	?	?
Sekhavat 2014	-0.086792453	0.079809395		Not estimable	?	+	?	+	?	?
Sherwood 2019	-0.02	0.017696763		Not estimable	+	+	?	+	+	?
Siegrist 2013	0.05	0.029797706		Not estimable	?	+	?	+	?	?
Stettler 2015	-0.16	0.0462155		Not estimable	?	+	?	+	?	?
Wang 2012	-0.105661855	0.041438109		Not estimable	−	?	?	−	?	−
White 2019	0.04	0.054037024		Not estimable	?	+	−	+	?	−
Xu 2015	0	0.10823063		Not estimable	?	+	+	+	+	?
Xu 2017 (5 other cities)	-0.16	0.036783783		Not estimable	?	+	+	+	?	?
Total (95% CI)			**100.0%**	**-0.05 [-0.07 , -0.02]**						

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

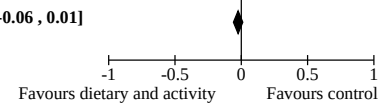


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.6. Comparison 3: Dietary and activity vs control (all studies), Outcome 6: zBMI long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Adab 2018	0.03	0.02940647		Not estimable	+ + ? + + ?
Cao 2015	-0.03	0.006789227		Not estimable	? + ? + ? ?
Crespo 2012	0.121325	0.048522		Not estimable	? + − + ? −
Elder 2014	-0.008	0.03542037		Not estimable	? + ? + ? ?
Foster 2008	-0.01	0.035714286		Not estimable	− + − + ? −
Grydeland 2014	-0.03	0.035931741		Not estimable	? − ? + ? −
Habib-Mourad 2020	-0.103	0.072249567		Not estimable	− + − + ? −
HEALTHY Study Group 2010	-0.04	0.018044788		Not estimable	? + ? + + ?
Hull 2018	0.368	0.32244898		Not estimable	+ + − + + −
Kipping 2014	0.05	0.019109879		Not estimable	? + + + + ?
Kocken 2016	0	0.030801952		Not estimable	− − − + ? −
Kubik 2021	-0.1	0.117640293		Not estimable	? + ? + + ?
Lichtenstein 2011	-0.26	0.048887188		Not estimable	− + ? + ? −
Lloyd 2018	-0.01	0.027301405		Not estimable	+ + + + + +
Marcus 2009	-0.31	0.03071497		Not estimable	− + ? + ? −
Rush 2012	0.015754438	0.019123882		Not estimable	− ? − + + −
Sahota 2019	0.19	0.255114796		Not estimable	? + ? + ? ?
Sherwood 2019	0	0.023570708		Not estimable	+ + ? + + ?
Story 2012	5.55112e-17	0.058309519		Not estimable	? + − + ? −
Topham 2021	-0.099327	0.091172		Not estimable	− + − + − −
White 2019	0.22	0.057532599		Not estimable	? + − + ? −
Williamson 2012	-0.034548	0.027966		Not estimable	? + ? + + ?
Total (95% CI)			**100.0%**	**-0.02 [-0.06 , 0.01]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

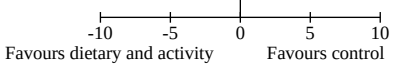


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.7. Comparison 3: Dietary and activity vs control (all studies), Outcome 7: Percentile short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Baranowski 2011	1.3	1.323102415		Not estimable	− + ? + ? −
Brown 2013	0.2	1.177164273		Not estimable	? + ? + ? ?
De Heer 2011	-1.41	1.668873804		Not estimable	? + + + ? ?
Hendy 2011	1.59	1.292705858		Not estimable	? ? + + ? ?
Rosenkranz 2010	1.9	1.904268301		Not estimable	? + + + ? ?
Total (95% CI)			**100.0%**	**0.73 [-0.50 , 1.97]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

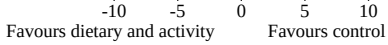


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.8. Comparison 3: Dietary and activity vs control (all studies), Outcome 8: Percentile medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Annesi 2016	-5	1.970605133		Not estimable		
Crespo 2012	1.142079	0.946842		Not estimable		
Elder 2014	0.42	0.917927609		Not estimable		
Kobel 2017	1.02	0.883084337		Not estimable		
Nemet 2011a	-0.5	1.368600258		Not estimable		
Nemet 2011b	-6.2	2.181192334		Not estimable		
Sherwood 2019	-0.6	0.513197724		Not estimable		
van de Berg 2020	-1.19	1.083743512		Not estimable		
Total (95% CI)			**100.0%**	**-0.64 [-1.85 , 0.56]**		

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

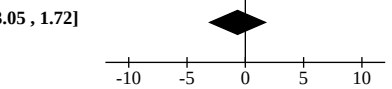


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 3.9. Comparison 3: Dietary and activity vs control (all studies), Outcome 9: Percentile long-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Crespo 2012	4.127558	1.303704		Not estimable		
Elder 2014	-0.22	0.967037607		Not estimable		
Ickovics 2019	-3.31	1.15090437		Not estimable		
Nemet 2011b	-5.9	2.811702816		Not estimable		
Sherwood 2019	-0.4	0.674707902		Not estimable		
Total (95% CI)			**100.0%**	**-0.67 [-3.05 , 1.72]**		

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

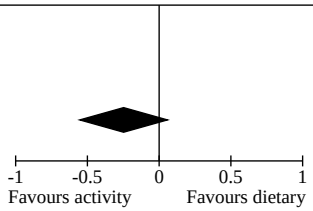
Comparison 4. Activity vs dietary (all studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4.1 BMI medium-term	2		Mean Difference (IV, Random, 95% CI)	-0.25 [-0.55, 0.06]
4.2 zBMI medium-term	2		Mean Difference (IV, Random, 95% CI)	-0.11 [-0.22, -0.00]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
4.3 Percentile medium-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4.4 Percentile long-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 4.1. Comparison 4: Activity vs dietary (all studies), Outcome 1: BMI medium-term

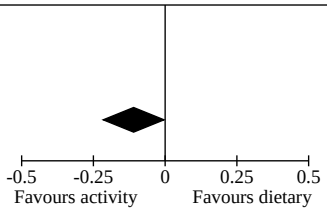
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.28	0.164972		Not estimable		+ + + + ? ?
Meng 2013 (Beijing)	0.02	0.474184		Not estimable		− + − + ? −
Total (95% CI)			**100.0%**	**-0.25 [-0.55 , 0.06]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 4.2. Comparison 4: Activity vs dietary (all studies), Outcome 2: zBMI medium-term

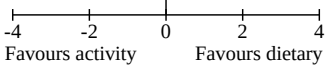
Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.12	0.056258		Not estimable		+ + + + ? ?
Meng 2013 (Beijing)	0.01	0.192902		Not estimable		− + − + ? −
Total (95% CI)			**100.0%**	**-0.11 [-0.22 , -0.00]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 4.3. Comparison 4: Activity vs dietary (all studies), Outcome 3: Percentile medium-term

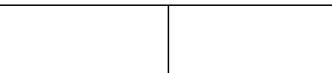
Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
van de Berg 2020	-0.04	1.025914	Not estimable		− ? − + + −



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 4.4. Comparison 4: Activity vs dietary (all studies), Outcome 4: Percentile long-term

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Ickovics 2019	2.3	1.03775	Not estimable		? + − + ? −



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

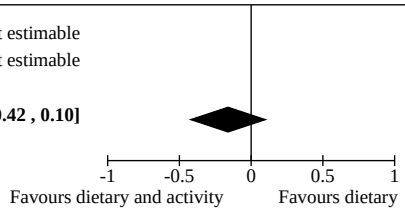
Comparison 5. Dietary and activity vs dietary (all studies)

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

Analysis 5.1. Comparison 5: Dietary and activity vs dietary (all studies), Outcome 1: BMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.09	0.162371		Not estimable	+ + + + ? ?
Stettler 2015	-0.3	0.227655		Not estimable	? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.16 [-0.42 , 0.10]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

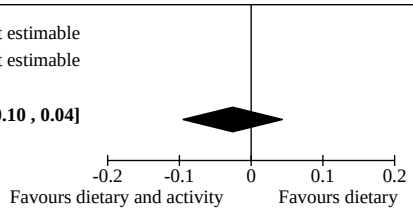


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 5.2. Comparison 5: Dietary and activity vs dietary (all studies), Outcome 2: zBMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	-0.02	0.054259		Not estimable	+ + + + ? ?
Stettler 2015	-0.03	0.046844		Not estimable	? + ? + ? ?
Total (95% CI)			**100.0%**	**-0.03 [-0.10 , 0.04]**	

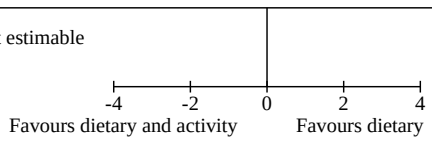
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

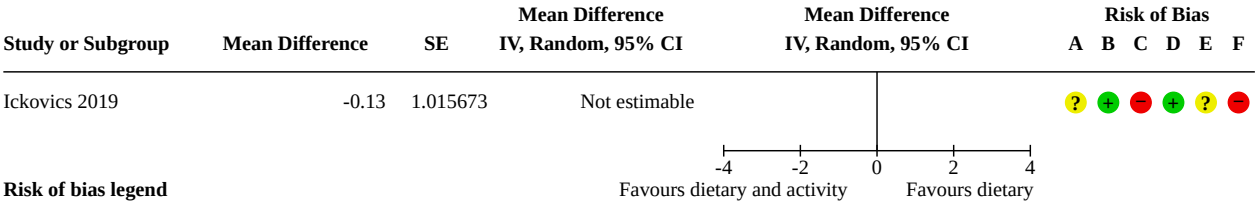
Analysis 5.3. Comparison 5: Dietary and activity vs dietary (all studies), Outcome 3: Percentile medium-term

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
van de Berg 2020	1.03	1.004191	Not estimable	− ? − + + −



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 5.4. Comparison 5: Dietary and activity vs dietary (all studies), Outcome 4: Percentile long-term



Risk of bias legend

(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

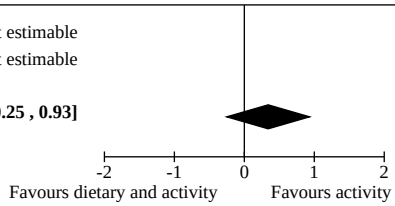
Comparison 6. Dietary and activity vs activity (all studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6.1 BMI short-term	2		Mean Difference (IV, Random, 95% CI)	0.34 [-0.25, 0.93]
6.2 BMI medium-term	2		Mean Difference (IV, Random, 95% CI)	0.19 [-0.12, 0.49]
6.3 BMI long-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6.4 zBMI short-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6.5 zBMI medium-term	2		Mean Difference (IV, Random, 95% CI)	-0.07 [-0.42, 0.28]
6.6 zBMI long-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6.7 Percentile medium-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6.8 Percentile long-term	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 6.1. Comparison 6: Dietary and activity vs activity (all studies), Outcome 1: BMI short-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Jones 2015	0.447098383	0.40661596		Not estimable	+ + + + ? ?
Robinson 2003	0.21	0.451361998		Not estimable	+ + + + ? ?
Total (95% CI)			**100.0%**	**0.34 [-0.25 , 0.93]**	

Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable

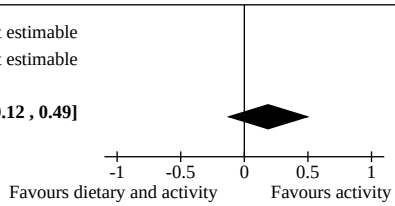


Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.2. Comparison 6: Dietary and activity vs activity (all studies), Outcome 2: BMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0.19	0.16746		Not estimable	+ + + + ? ?
Jones 2015	0.16619152	0.450251931		Not estimable	+ + ? + ? ?
Total (95% CI)			**100.0%**	**0.19 [-0.12 , 0.49]**	

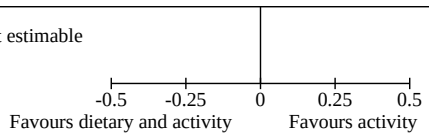
Heterogeneity: Not applicable
Test for overall effect: Not applicable
Test for subgroup differences: Not applicable



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.3. Comparison 6: Dietary and activity vs activity (all studies), Outcome 3: BMI long-term

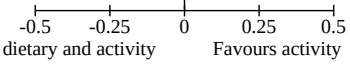
Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Robinson 2010	-0.08	0.179919218	Not estimable	? + − + + −



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.4. Comparison 6: Dietary and activity vs activity (all studies), Outcome 4: zBMI short-term

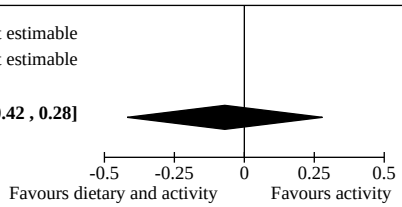
Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Jones 2015	-0.120529756	0.091766319	Not estimable		+ + + + ? ?



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.5. Comparison 6: Dietary and activity vs activity (all studies), Outcome 5: zBMI medium-term

Study or Subgroup	Mean Difference	SE	Weight	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Barnes 2021	0.1	0.056473		Not estimable		+ + + + ? ?
Jones 2015	-0.256399854	0.096021884		Not estimable		+ + ? + ? ?
Total (95% CI)			**100.0%**	**-0.07 [-0.42 , 0.28]**		
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
Test for subgroup differences: Not applicable						



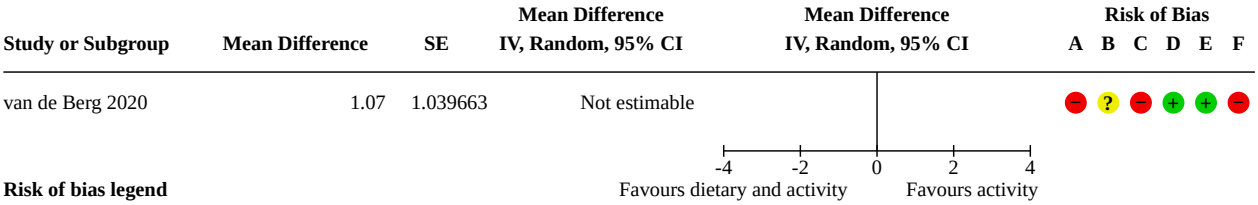
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.6. Comparison 6: Dietary and activity vs activity (all studies), Outcome 6: zBMI long-term

Study or Subgroup	Mean Difference	SE	Mean Difference IV, Random, 95% CI	Mean Difference IV, Random, 95% CI	Risk of Bias A B C D E F
Robinson 2010	-0.04	0.047059747	Not estimable		? + − + + −

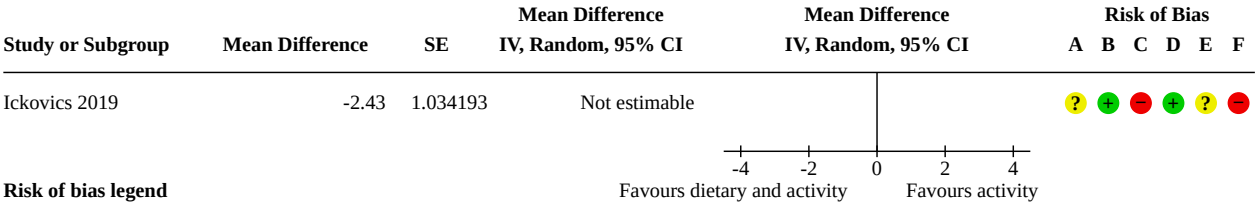
Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.7. Comparison 6: Dietary and activity vs activity (all studies), Outcome 7: Percentile medium-term



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

Analysis 6.8. Comparison 6: Dietary and activity vs activity (all studies), Outcome 8: Percentile long-term



Risk of bias legend
(A) Bias arising from the randomization process
(B) Bias due to deviations from intended interventions
(C) Bias due to missing outcome data
(D) Bias in measurement of the outcome
(E) Bias in selection of the reported result
(F) Overall bias

ADDITIONAL TABLES

Table 1. Further details of the population

Comparison: dietary intervention vs control

Study ID	Meta-analysis outcome(s)	Were children with physical disabilities excluded?	Were children with mental disabilities excluded?	Supporting evidence on the exclusion of children with physical and/or mental disabilities	Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?	Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area

Table 1. Further details of the population *(Continued)*

Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Chai 2019	zBMI short-term; BMI short-term	Yes	Yes	Children that required medication that influences growth, weight or appetite; or required a therapeutic (i.e. texture modified) diet, or with significant learning difficulties were excluded	No	n/a
Coleman 2012	zBMI medium-term; zBMI long-term	NR	NR		Yes	The study is set in a low-income district and 100% of the children receive free or reduced-price school meals
Cunha 2013	BMI medium-term	No	No		Yes	The study was set in one of the poorest areas in Brazil and most students were from low socioeconomic level families
Damsgaard 2014	zBMI short-term	Yes	Yes	Children with diseases or conditions that might obstruct the measurements were excluded	No	n/a
Davis 2021	zBMI medium-term; BMI medium-term: percentile medium-term	Yes	Yes	Children classified as special education in a wheelchair were excluded	Yes	Eligible schools had a high proportion of Hispanic children (> 50%) and a high proportion of children participating in the free and reduced lunch programme (> 50%)
de Ruyter 2012	zBMI short-term; zBMI medium-term; zBMI long-term	Yes	Yes	Children with the following were excluded: diabetes, growth disorders, coeliac disease, or serious gastro-enterologic diseases (for example inflammatory bowel disease), medical history or surgery known to interfere with the study, physical disabilities that hamper the measurements	No	n/a
Fulkerson 2010	zBMI short-term: percentile short-term	Yes	Yes	Children with conditions that would affect intervention programme participation were excluded	No	n/a

Table 1. Further details of the population *(Continued)*

Fulkerson 2015	zBMI medium-term; zBMI long-term	Yes	Yes	Children with a medical condition prohibiting participation (e.g. extreme food allergies) were excluded	No	n/a
Han 2006	zBMI long-term	NR	NR		No	n/a
Hendrie 2011	zBMI short-term; BMI short-term	No	No		No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch is available to all students in the district because eligibility is high overall, exceeding 60% in all schools (mean = 71.4%)
James 2004	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	NR	NR		No	n/a
Keshani 2016	BMI medium-term	Yes	Yes	Children were excluded if they had a chronic illness or disorder	No	n/a
Lent 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term: percentile medium-term: percentile long-term	No	No		Yes	Eligible schools had: (1) > 50% of students qualifying for free/reduced meals (income ≤ 185% of the poverty level adjusted for household size). Students from 10 schools in low-income neighbourhoods in Philadelphia were eligible to participate
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Students who suffer from serious illnesses, such as congenital heart disease, fixation or joint replacement surgery, and so on, who cannot withstand severe physical activity and diet control, were excluded	No	n/a
NCT00224887 2005	BMI medium-term	Yes	Yes	Children with chronic conditions or eating disorders were excluded	Yes	The study recruited mothers and their second or third grade children from 16 low-

Table 1. Further details of the population *(Continued)*

						wealth elementary schools. Only children whose mother is of Mexican descent and identifies with the Mexican-American community were included in the study
Nicholl 2021	zBMI short-term; BMI short-term: percentile short-term	Yes	No	Children with diagnosis of or medications for cardiometabolic or gastrointestinal dysfunction were excluded from the study	No	n/a
Paineau 2008	zBMI short-term; BMI short-term	Yes	Yes		No	n/a
Seguin-Fawler 2021	Percentile short-term	No	No		Yes	Trial aimed at low-income families: households were eligible if they met guidelines for low income (< 185% federal poverty level)
Sichieri 2008	BMI short-term	Yes	No	Children with physical disabilities preventing anthropometric measurement were excluded	Yes	The study setting was public schools in which most students were from families of low socioeconomic level
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes		No	n/a
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serving children from low-income households
Viggiano 2018	zBMI short-term; zBMI long-term	NR	NR		No	n/a
Comparison: activity intervention vs control						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**

Table 1. Further details of the population *(Continued)*

					school/ community within a disadvantaged area?	
Barbeau 2007	BMI medium-term	No	No		No	n/a
Barnes 2015	zBMI short-term	No	No		No	n/a
Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Breheny 2020	zBMI short-term; zBMI medium-term	Yes	Yes	Pupils that had a disability preventing them running or walking for 15 min and those that were unable to have their height and/or weight measured at baseline were excluded	No	n/a
Clemes 2020	BMI short-term	Yes	Yes	Children with known physical contraindications to standing were invited to participate and use the sit-stand desk in a seated posture for inclusivity, but these individuals were excluded from the analysis. Children with disabilities or injuries or illnesses that prevented them from going about their usual routine were excluded	Yes	The intervention was set in Bradford and was chosen because "the study location given its ethnic composition (predominantly South Asian and White British) and high levels of deprivation, health inequalities and childhood morbidity"
De Bock 2013	BMI short-term; BMI medium-term	Yes	No	Children with physical malformations and severe physical disabilities were excluded	No	n/a
de Greeff 2016	BMI short-term	NR	NR		No	n/a
Diaz-Castro 2021	zBMI short-term; BMI short-term	NR	NR	One participant was excluded because he had a chronic disease (diabetes)	No	n/a
Donnelly 2009	BMI long-term	NR	NR		Yes	From the study protocol: the targeted enrolment into the study was to have 27% of the students classified as minorities and 50% of the students receiving free or reduced meals

Table 1. Further details of the population *(Continued)*

Drummy 2016	BMI short-term	NR	NR		No	n/a
Farmer 2017	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	Yes	Yes	From trial registration: children unable to participate in physical activity were excluded	No	n/a
Ford 2013	BMI short-term	NR	NR		No	n/a
Ha 2021	BMI short-term; BMI medium-term	Yes	Yes	Participants were excluded from the study if they were deemed to be unfit for taking part in physical activity	No	n/a
Howe 2011	BMI medium-term	Yes	No	Children with physical impairment that would limit their participation in regular physical activity were excluded from the study	No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility was high overall, exceeding 60% in all schools (mean = 71.4%)
Jones 2015	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	NR	NR		Yes	Children were recruited from low-income areas of Wollongong, Australia. The intervention took place in elementary school within a disadvantaged area, with focus on low-income communities
Ketelhut 2022	BMI short-term	Yes	No	Children with physical limitations to exercise were excluded	Yes	The study sample was recruited from an elementary school located in a socially disadvantaged area
Khan 2014	zBMI medium-term; BMI medium-term	Yes	Yes	Participants with disabilities that could limit participation in the after-school program were excluded	No	n/a
Kovalskys 2016	zBMI long-term	Yes	Yes	Children with severe intellectual difficulties, with limitations to engagement in phys-	No	n/a

Table 1. Further details of the population *(Continued)*

				ical activity, suffering from illnesses that compromise nutrition or food selection, or taking medication known to affect body weight, were excluded from the analysis		
Kriemler 2010	BMI medium-term; BMI long-term	Yes	No	Children suffering from chronic disease that prohibited the physical activity program, i.e. cyanotic heart disease or severe motor handicaps, were excluded	No	n/a
Lau 2016	BMI short-term	NR	NR		No	n/a
Lazaar 2007	zBMI short-term; BMI short-term	Yes	Yes	Children with any disease were excluded	No	n/a
Li 2010	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	NR	NR		No	n/a
Martinez-Vizcaino 2014	BMI medium-term	Yes	Yes	Children were excluded if they presented: serious learning difficulties or physical and mental disorders identified by parents and teachers, which could impede participation in the scheduled activities; chronic disease that, as judged by their paediatrician or family doctor, would preclude participation in MOVI-2	No	n/a
Martinez-Vizcaino 2020	zBMI short-term; BMI short-term	Yes	Yes	Participants with serious physical or mental disorders identified by parents or teachers, which would impede participation in the programme's activities, were excluded	No	n/a
Martinez-Vizcaino 2022	zBMI medium-term; BMI medium-term	Yes	Yes	Children with chronic disorders such as heart disease, diabetes or asthma, or serious physical or mental disorders that could impede participation in the activities of the programme	No	n/a
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Students who suffer from serious illnesses, such as congenital heart disease, fixation	No	n/a

Table 1. Further details of the population *(Continued)*

				or joint replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded		
Morgan 2019	zBMI medium-term	No	No		No	n/a
Muller 2016	zBMI medium-term; zBMI long-term: percentile long-term	Yes	Yes	The trial registration reported conditions precluding exercise as exclusion criteria	No	n/a
Muller 2019	zBMI medium-term	Yes	Yes	Children suffering from medical conditions preventing participation in a maximum exercise test, as determined by qualified medical personnel, were excluded	No	n/a
Newton 2014	zBMI short-term; BMI short-term: percentile short-term	Yes	NR	Children were excluded if they were not physically capable of exercise	No	n/a
Rhodes 2019	BMI short-term	No	n		No	n/a
Sacchetti 2013	BMI long-term	NR	NR		No	n/a
Salmon 2022	zBMI long-term	No	No		No	n/a
Simon 2008	zBMI long-term; BMI medium-term; BMI long-term	NR	NR		No	n/a
Tanskey 2017	zBMI medium-term; BMI medium-term	No	No		Yes	The 24 schools enrolled represent a low-income, ethnically diverse population spanning urban, peri-urban and suburban settings
Telford 2012	BMI long-term	NR	NR		No	n/a
Thivel 2011	BMI short-term	Yes	Yes	Children had to be free of any known disease to be included	No	n/a
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serv-

Table 1. Further details of the population *(Continued)*

						ing children from low-income households
Vizcaino 2008	BMI medium-term	Yes	Yes	Participating children were free of serious learning difficulties or physical or mental disorders that could impede participation in scheduled physical activities	No	n/a
Wang 2018	zBMI medium-term; BMI medium-term	NR	NR		No	n/a
Wendel 2016	BMI long-term: percentile long-term	NR	NR		No	n/a
Yin 2012	zBMI medium-term; zBMI long-term	NR	NR		Yes	The study setting was a school district where 65% qualified for reduced-price or free school lunches
Comparison: dietary and activity intervention vs control						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Adab 2018	zBMI long-term	No	No		No	n/a
Annesi 2016	BMI short-term; BMI medium-term: percentile medium-term	NR	NR		No	n/a
Annesi 2017	BMI short-term; BMI medium-term	NR	NR		No	n/a
Baranowski 2003	BMI short-term	Yes	Yes	Children were excluded if they had a medical condition	No	n/a

Table 1. Further details of the population *(Continued)*

				or were taking medications affecting growth, and had conditions that would limit the girl's ability to participate in the intervention or measurement assessments		
Baranowski 2011	zBMI short-term: percentile short-term	Yes	Yes	Children were excluded if they had a medical condition that influenced diet or physical activity, the ability to complete the questionnaire or a seizure disorder	Yes	Children were recruited from ethnic minority communities (African-American, Hispanic) and were predominantly low-income
Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Beech 2003	BMI short-term	Yes	Yes	Children were excluded if they had a medical condition or were taking medications affecting growth, or had conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Yes	The Memphis study specifically targeted low-income participants
Bohnert 2013	zBMI short-term	NR	NR		Yes	All schools were located in underserved, urban, low-income communities
Brandstetter 2012	BMI long-term	NR	NR		No	n/a
Brown 2013	zBMI short-term; BMI short-term: percentile short-term	NR	NR		Yes	Northern Plains Indian youth 10 to 14 years old living on 2 American Indian reservations in north-central and south-western Montana were recruited for the study
Caballero 2003	BMI long-term	NR	NR		Yes	The study was set in public schools serving American Indian communities
Cao 2015	zBMI medium-term; zBMI long-term	Yes	Yes	Students with serious physical or mental disorders that could impede participation in scheduled physical activity were excluded	No	n/a
Chen 2010	BMI short-term	Yes	No	Children with chronic health problems that included any dietary modifications or ac-	No	n/a

Table 1. Further details of the population *(Continued)*

				tivity limitations (e.g. diabetes, exercise-induced asthma) were excluded		
Choo 2020	zBMI short-term	Yes	Yes	Children with mental and physical disabilities were excluded	Yes	The study targeted socioeconomically vulnerable children (defined as those registered in the public welfare system of community child centres, which serve children from: (1) families receiving benefits from the National Basic Livelihood Security System and (2) non-traditional families including grandparent-grandchild and single-parent families)
Crespo 2012	zBMI medium-term; zBMI long-term: percentile medium-term: percentile long-term	Yes	Yes	Children on a medically prescribed restricted diet or with a condition that limited their physical activity were excluded	No	n/a
De Heer 2011	BMI short-term: percentile short-term	Yes	Yes	Children that had conditions that would endanger their own or others' safety were excluded	Yes	The study target is low-income predominantly Hispanic children
Duncan 2019	BMI short-term	No	No		No	n/a
Elder 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term: percentile medium-term: percentile long-term	Yes	Yes	Children were excluded if they had a medical and/or psychological condition that affected their diet, physical activity or weight	No	n/a
Fairclough 2013	zBMI short-term; BMI short-term	Yes	Yes	Children with a medical condition that precluded them from taking part in the programme were excluded	Yes	The study was set in an area of high deprivation and health inequalities
Foster 2008	zBMI long-term; BMI long-term	NR	NR		Yes	The study was implemented in schools that had 50% of children eligible for feder-

Table 1. Further details of the population *(Continued)*

						ally subsidised, free or reduced-price meals
Fulkerson 2022	zBMI medium-term	Yes	Yes	Children with a medical condition(s) or food allergies contraindicating intervention programme participation were excluded	No	n/a
Gentile 2009	BMI short-term; BMI medium-term	Yes	Yes	Children unable to adhere to project procedures were excluded	No	n/a
Greve 2015	BMI long-term	NR	NR		No	n/a
Griffin 2019	zBMI short-term	NR	NR		Yes	The study aims to assess intervention in a socioeconomically deprived, ethnically diverse UK setting. Quote: "In 2017, both areas were ranked in the most deprived 20% of areas in the UK, with high ethnic diversity"
Grydeland 2014	zBMI long-term; BMI long-term	NR	NR		No	n/a
Habib-Mourad 2014	BMI short-term	No	No		No	n/a
Habib-Mourad 2020	zBMI long-term	No	No		No	n/a
Haire-Joshu 2010	zBMI short-term	NR	NR		No	n/a
HEALTHY Study Group 2010	zBMI long-term	Yes	Yes	Students with diabetes or any condition that would preclude regular participation in physical education were excluded	Yes	The eligibility criteria for school inclusion were middle school student body with at least 50% minority (defined as African American, Hispanic/Latino and/or Native American) and/or greater than 50% eligible for free or reduced lunch
Hendy 2011	Percentile short-term	NR	NR		No	n/a

Table 1. Further details of the population *(Continued)*

Hopper 2005	BMI short-term	NR	NR		No	n/a
Hull 2018	zBMI short-term; zBMI long-term; BMI short-term; BMI long-term	Yes	Yes	Children were excluded if they had a BMI > 35 kg/m^2, a medical condition or took medications that affect growth or had conditions or other circumstances that could interfere with participation in the measurements or the interventions	No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility was high overall, exceeding 60% in all schools (mean = 71.4%)
Jansen 2011	BMI short-term	No	No		Yes	The targeted population consisted of children attending primary schools in the more deprived, inner-city areas of Rotterdam with high proportions of immigrant children, where prevalence rates of overweight and obesity are relatively high
Kain 2014	zBMI medium-term; BMI medium-term	NR	NR		Yes	The trial targets low-income students.
Keller 2009	zBMI medium-term	No	No		No	n/a
Kipping 2008	BMI short-term	NR	NR	Special schools including learning disabilities schools were excluded, but it is not specified if children with disabilities were excluded from the study	No	n/a
Kipping 2014	zBMI short-term; zBMI long-term	Yes	Yes	Special schools (for children whose additional needs cannot be met in a mainstream setting) were excluded because they were unlikely to be teaching the standard UK National Curriculum and the children may not have been	No	n/a

Table 1. Further details of the population *(Continued)*

				able to take part in all the measurements		
Klesges 2010	BMI medium-term; BMI long-term	Yes	Yes	Children with conditions limiting participation in the interventions or measurements were not included in the study (e.g. unable to participate in routine physical education classes at school; developmental or physical disability preventing participation in interventions)	Yes	The intervention is delivered in a low-income community setting
Kobel 2017	BMI medium-term: percentile medium-term	NR	NR		No	n/a
Kocken 2016	zBMI short-term; zBMI long-term	NR	NR		No	n/a
Kubik 2021	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	Yes	Yes	Children with food allergies, physical limitations, medical conditions or emotional health conditions limiting their ability to participate in physical activity were excluded	No	n/a
Levy 2012	zBMI short-term	Yes	Yes	Children with disabilities for whom anthropometric measurements could not be performed were excluded	No	n/a
Li 2019	zBMI medium-term	Yes	Yes	Children were excluded if parents (or guardians) believed they should not participate in this study for any medical reasons	No	n/a
Lichtenstein 2011	zBMI medium-term; zBMI long-term	NR	NR		No	n/a
Liu 2019	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	Yes	Yes	Individuals suffering from or having a history of any cardiovascular and metabolic diseases, asthma and disabilities that could limit their ability to perform physical activity were excluded	No	n/a
Liu 2022	zBMI short-term; zBMI medium-term; BMI short-	Yes	Yes	Children with the following medical conditions were excluded from the study: medical history of heart disease, hypertension, diabetes, tu-	No	n/a

Table 1. Further details of the population *(Continued)*

	term; BMI medium-term			berculosis, asthma, hepatitis or nephritis; (2) obesity caused by endocrine diseases or side effects of drugs; (3) abnormal physical development like dwarfism or gigantism; (4) physical deformity such as severe scoliosis, pectus carinatum, limp, obvious O-leg or X-leg; (5) inability to participate in school sport activities; and (6) a loss in weight by vomiting or taking drugs during the past 3 months		
Llargues 2012	BMI long-term	Yes	No	Children with physical activity incapacity were excluded	No	n/a
Lloyd 2018	zBMI long-term; BMI long-term	NR	NR		No	n/a
Magnusson 2012	BMI long-term	NR	NR		No	n/a
Marcus 2009	zBMI long-term	No	No		No	n/a
Morgan 2011	zBMI short-term	No	No		No	n/a
Morgan 2014	zBMI short-term; BMI short-term	No	No		Yes	The study setting is two local government areas with high rates of mining and shift work-based employment (Australian Bureau of Statistics, 2009), which are linked to increased risks of obesity and associated health complications
NCT02067728 2014	zBMI short-term	Yes	Yes	Participants with chronic medical conditions or developmental delays that preclude age-appropriate nutrition and physical activity habits were excluded	No	n/a
Nemet 2011a	BMI medium-term: percentile medium-term	NR	NR		Yes	The study included 30 kindergartens from low socioeconomic status communities
Nemet 2011b	BMI medium-term; BMI	NR	NR		Yes	The study included graduates from 11

Table 1. Further details of the population *(Continued)*

	long-term: percentile medium-term: percentile long-term					kindergartens from low socioeconomic status areas
Nollen 2014	BMI short-term	No	No		Yes	Study targeted low-income, racial/ethnic minority girls
Nyberg 2015	zBMI short-term; zBMI medium-term	No	No		Yes	The study is set in a medium to low socioeconomic status area
Nyberg 2016	zBMI short-term; zBMI medium-term	NR	NR		Yes	The study was conducted in three areas in Stockholm County with low employment and low educational level, and with the highest prevalence of overweight and obesity among children in the county. These areas are also targeted specifically by the government to support socioeconomic development
O'Connor 2020	zBMI short-term	Yes	Yes	Participants were excluded if a medical clearance was deemed necessary and not provided, or if the child or parent had a disease affecting their dietary intake, physical activity, cognitive functioning or psychiatric functioning, which could affect their ability to take part in group classes of exercise	Yes	The study targeted low-income Hispanic children and fathers
Pena 2021	zBMI short-term; BMI short-term	No	No		No	n/a
Puder 2011	BMI medium-term	Yes	Yes	Children with severe chronic disease (restricting physical activity) were excluded	Yes	n/a
Ramirez-Rivera 2021	zBMI short-term	Yes	NR	Children that had a medical condition or were taking medication or receiving an intervention that can affect body weight or prevents physical activity (cardiovascular, respiratory, muscular, osteoarticular, etc.) at base-	No	n/a

Table 1. Further details of the population *(Continued)*

				line or during the study were excluded		
Rerksuppaphol 2017	zBMI short-term; BMI short-term	Yes	Yes	Children with a known history of chronic illness and children who could not stand upright or bear weight on their legs for measuring actual height and weight were excluded	No	n/a
Rosario 2012	zBMI short-term; BMI short-term	No	No		No	n/a
Rosenkranz 2010	zBMI short-term; BMI short-term: percentile short-term	No	No		No	n/a
Rush 2012	zBMI long-term	No	No		No	n/a
Safdie 2013	BMI short-term; BMI medium-term; BMI long-term	No	No		Yes	Schools were considered for inclusion if they were classified by the Ministry of Education as having students of low socioeconomic status and receiving benefits from the Federal School Breakfast Program served at schools
Sahota 2001	zBMI medium-term	NR	NR		No	n/a
Sahota 2019	zBMI long-term	NR	NR		No	n/a
Santos 2014	zBMI medium-term	Yes	Yes	Children with a condition that limited participation in physical activity were excluded	No	n/a
Sekhavat 2014	zBMI medium-term; BMI medium-term	Yes	No		No	n/a
Sgambato 2019	BMI short-term	Yes	Yes	Children that were disabled were not included	Yes	The study setting was one of the poorest municipalities in the state of Rio de Janeiro with most students at public schools having a low socioeconomic status

Table 1. Further details of the population *(Continued)*

Sherwood 2019	zBMI medium-term; zBMI long-term: percentile medium-term: percentile long-term	Yes	Yes	Children were excluded if they had any medical problems that would preclude study participation (e.g. a chromosomal abnormality, kidney disease, type I diabetes, lupus or cancer)	No	n/a
Siegrist 2013	zBMI medium-term; BMI medium-term	No	No		No	n/a
Siegrist 2018	BMI long-term	No	No		No	n/a
Spiegel 2006	zBMI short-term	NR	NR		No	n/a
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes		No	n/a
Stolley 1997	BMI short-term; BMI medium-term	NR	NR		Yes	Culturally specific obesity-prevention programme for low-income, inner-city African American, preadolescent girls and their mothers
Story 2003	BMI short-term	Yes	Yes	Children were excluded if they had a medical condition or were taking medications affecting growth; and had conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Yes	The target population was 8- to 10- year-old, pre-adolescent, African American girls, at risk of developing obesity. The Minnesota study specifically targeted low-income participants
Story 2012	zBMI long-term; BMI long-term	NR	NR		Yes	The study setting was within an American Indian reservation
Topham 2021	zBMI long-term	No	No		No	n/a
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serving children from low-income households
Wang 2012	zBMI medium-term	NR	NR		No	n/a
White 2019	zBMI short-term; zBMI medium-term;	Yes	Yes	Eligible children were free from life-threatening medical illnesses	Yes	Recruiting was targeted at ethnic diversity mostly among rural,

Table 1. Further details of the population *(Continued)*

	zBMI long-term					low-income communities
Williamson 2012	zBMI long-term	No	No		Yes	81.7% of the total student population in the 33 schools was classified as low to moderate socioeconomic status
Xu 2015	zBMI medium-term; BMI medium-term	No	No		No	n/a
Xu 2017 (5 other cities)	zBMI medium-term; BMI medium-term	Yes	Yes	Students who suffer from serious illnesses, such as congenital heart disease, fixation or joint replacement surgery, and so on, that cannot withstand severe physical activity and diet control were excluded	No	n/a
Comparison: activity intervention vs dietary intervention						
Study ID	**Meta-analysis outcome(s)**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**
Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility was high overall, exceeding 60% in all schools (mean = 71.4%)
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Students who suffer from serious illnesses, such as congenital heart disease, fixation or joint replacement surgery,	No	n/a

Table 1. Further details of the population *(Continued)*

				and so on, that cannot withstand severe physical activity and diet control were excluded		
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serving children from low-income households

Comparison: dietary and activity intervention vs dietary intervention

Study ID	Meta-analysis outcome(s)	Were children with physical disabilities excluded?	Were children with mental disabilities excluded?	Supporting evidence on the exclusion of children with physical and/or mental disabilities	Does study specifically target disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area?	Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area
Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility was high overall, exceeding 60% in all schools (mean = 71.4%)
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes		No	n/a
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serving children from low-income households

Comparison: dietary and activity intervention vs activity intervention

Study ID	Meta-analysis outcome(s)	Were children with physical disabilities excluded?	Were children with mental disabilities excluded?	Supporting evidence on the exclusion of children with physical and/or mental disabilities	Does study specifically target disadvantaged chil-	Supporting evidence on targeting disadvantaged children/families in a particular setting

Table 1. Further details of the population *(Continued)*

					dren/families in a particular setting and/or a school/community within a disadvantaged area?	**and/or a school/community within a disadvantaged area**
Barnes 2021	zBMI medium-term; BMI medium-term	No	No		No	n/a
Ickovics 2019	Percentile long-term	NR	NR		Yes	Students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility was high overall, exceeding 60% in all schools (mean = 71.4%)
Robinson 2003	BMI short-term	Yes	Yes	Children were excluded if they had medical conditions or were taking medications affecting growth; and had conditions that would limit the girl's ability to participate in the intervention or measurement assessments	Yes	The Stanford study specifically targeted low-income participants
Robinson 2010	zBMI long-term; BMI long-term	Yes	Yes	Children were excluded if they had a condition limiting their participation in the interventions or assessments or were unable to understand or complete informed consent	Yes	The target of the trial was lower socioeconomic status African-American girls, recruited from low-income, predominantly African-American neighbourhoods in Oakland, CA
van de Berg 2020	Percentile medium-term	No	No		Yes	The trial specifically targeted schools serving children from low-income households
Studies not included in the meta-analyses						
Study ID	**Comparison**	**Were children with physical disabilities excluded?**	**Were children with mental disabilities excluded?**	**Supporting evidence on the exclusion of children with physical and/or mental disabilities**	**Does study specifically target disadvantaged children/families in a particu-**	**Supporting evidence on targeting disadvantaged children/families in a particular setting and/or a school/community within a disadvantaged area**

Table 1. Further details of the population *(Continued)*

					lar setting and/or a school/ community within a disadvantaged area?	
Anand 2007	Dietary and activity vs control	n/a	Yes	Participants were excluded if they had a serious medical illness that prevented them from making dietary and exercise changes	Yes	The study recruited participants from the Six Nations. Quote: "The Six Nations people may be disproportionately affected by obesity because of their rapid change from a physically active to a relatively sedentary lifestyle, as well as their dietary transition from lower energy non-processed to energy-dense processed foods, all of which is compounded by the relatively low socio-economic status of this community"
Branscum 2013	Dietary and activity vs dietary and activity	n/a	NR		No	n/a
Carlin 2021	Dietary and activity vs control	n/a	NR	Participants were asked to notify the research team of any related issues that might affect participation in the intervention	Yes	All families in phase one were from low socioeconomic class
Di Maglie 2022	Activity vs control	n/a	Yes	Children were healthy and free of any disability or musculoskeletal, cardiological, neurological or respiratory diseases, or dysfunctions	No	n/a
Epstein 2001	Dietary and activity vs dietary and activity	n/a	Yes	Children with dietary or activity restriction or with current psychiatric problems were excluded	No	n/a
Gortmaker 1999	Dietary and activity vs control	n/a	NR		No	n/a
Hannon 2018	Dietary and activity vs di-	n/a	NR		Yes	With attention to the generalisability of the study, the population

Table 1. Further details of the population *(Continued)*

	etary and activity					recruited is overrepresented by women of minority status and from lower income groups
Hooft van Huysduynen 2014	Dietary vs control	n/a	NR		No	n/a
Huys 2020	Dietary and activity vs control	n/a	No		Yes	Trial was set in low socioeconomic status municipalities: in Flanders (Belgium), 11 municipalities from the tertile with the highest unemployment rates (5.2% to 12.5%) were randomly selected
Johnston 2013	Dietary and activity vs control	n/a	NR		No	n/a
Lynch 2016	Dietary and activity vs control	n/a	NR		No	n/a
Macias-Cervantes 2009	Activity vs control	n/a	Yes	Children with osteomuscular alterations that impair physical activity, chronic illness, or who received medications that alter body composition or insulin secretion were not included	No	n/a
Madsen 2013	Activity vs control	n/a	Yes	Children unable to participate in moderate physical activity were excluded	Yes	Not explicitly reported, but the intervention is aimed at students that participate in after-school programmes that preferentially enrol students who qualify for free or reduced-price meals
Marsigliante 2022	Dietary vs control	n/a	Yes	Children were healthy and free of any disability or musculoskeletal, cardiological, neurological or respiratory diseases, or dysfunction	No	n/a
Muzaffar 2019	Dietary and activity vs dietary and activity	n/a	No		No	n/a
Pindus 2015	Activity vs control	n/a	Yes	Children with physical disabilities, learning difficulties,	No	n/a

Table 1. Further details of the population *(Continued)*

				the use of medication that could affect metabolism or cognitive function, and the presence of neurological or psychiatric disorders, including clinical diagnosis of attention deficit and hyperactivity disorder (ADHD; as disclosed by parents) were excluded from the study		
Razani 2018	Activity vs activity	n/a	Yes	Children unable to walk or be otherwise physically active, attend the intervention park outings or complete 2 follow-up visits over 3 months were excluded	Yes	The target population was low-income families living in urban areas
Riiser 2020	Activity vs control	n/a	No		No	n/a
Salmon 2008	Activity vs control	n/a	No		Yes	The selected schools were located in low socioeconomic suburbs of Melbourne
Tessier 2008	Activity vs activity	n/a	No		No	n/a
Treviño 2004	Dietary and activity vs control	n/a	NR		Yes	The study targets students from economically disadvantaged households
Warren 2003	Dietary vs control Activity vs control Dietary and activity vs control Activity vs dietary Dietary and activity vs dietary Dietary and activity vs activity	zBMI long-term	NR		No	n/a
Zota 2016	Dietary vs control	n/a	NR		Yes	The study targeted students attending both elementary and secondary schools in areas of low socioeconomic status

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations
ADHD: attention deficit hyperactivity disorder; BMI: body mass index; n/a: not applicable; NR: not reported; vs: versus; zBMI: standardised body mass index.

Table 2. Description of the interventions

Comparison: dietary intervention vs control

Study ID	Meta-analysis outcome(s)	Setting of intervention	Intervention/study name	Intervention (description)	Comparison type and short-term description
Barnes 2021	zBMI medium-term; BMI medium-term	School + home	SWAP IT	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and

Table 2. Description of the interventions *(Continued)*

					learning resources).
Chai 2019	zBMI short-term; BMI short-term	Telehealth	Back2Basics (family telehealth consultations)	Web-based family telehealth nutrition intervention. Telehealth dietitian consultation: Semi-structured telehealth consultations delivered by an accredited practising dietitian during scheduled clinic appointments. Website. The Back2Basics Family website contained information on various nutrition topics and purpose-built healthy cooking videos. Facebook group for parents to exchange ideas and information related to the Back2Basics Family website. Web-based family telehealth nutrition intervention with additional text messages: a series of SMS targeting healthy eating for children was delivered to both parents (e.g. mother and father) of the child in 4-weekly rotations of decreasing frequency. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control group received no intervention for 3 months and was given access to all intervention components (the same as Telehealth + SMS) after the week 12 assessments
Coleman 2012	zBMI medium-term; zBMI long-term	School	Healthy ONES (Healthy Options for Nutrition Environments in Schools)	Intervention goals were to eliminate unhealthy foods and beverages on campus and at home, to deliver active nutrition education to children and nutrition messages to parents, to develop nutrition services as the main source on campus for healthful eating, and to promote school staff modelling of healthful eating (teachers and school staff not consuming unhealthy foods/beverages). The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: yes	
Cunha 2013	BMI medium-term	School	PAPPAS (Parents, students, and teachers for healthy eating)	The intervention focused on encouraging students to change their eating habits and food consumption. Trained nutritionists gave monthly 1-hour sessions in the classrooms. These sessions included playing games, staging of theatre sketches, watching movies and puppet shows, and writing and drawing contests. A set of messages were sent to the families in the form of illustrated booklets and recipes. The families also received small gifts such as buttons and magnets. In addition, teachers were encouraged to work with the children on the topics addressed in each intervention session. The themes of the intervention sessions were as follows: healthy eating, native Brazilian eating habits, excessive sugar in processed food, marriage of the rice and beans, the beauty of fruits, super water: a super-hero, cookies, minimarket and food advertisements. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received a 1-hour section of orientation on general health and advice on healthy eating, at the end of the study
Damsgaard 2014	zBMI short-term	School	OPUS (The Optimal Well-Being, Development and Health for Danish Children through a Healthy New Nordic Diet (OPUS) School Meal Study)	During the 3-month New Nordic Diet (NND) period, the children were served a mid-morning snack, an ad libitum hot lunch meal and an afternoon snack, and twice a week dessert, consisting either of fresh fruit or of a fruit-based snack. Prior to study start, the class teachers were given a box of teaching materials about the human body, the clinical measurements, and taste sensorics, including background information about NND and suggestions for related educational activities and games. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention The control group received the usual packed lunch from home. The teachers were instructed not to use the material about NND during the control period.

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	
Davis 2021	zBMI medium-term; BMI medium-term; percentile medium-term	School	TX (Texas) Sprouts	Garden Leadership Committees (GLC) were formed at each intervention school and were comprised of teachers, parents, community members, school staff and students. GLCs assisted with physical garden design, to build hosting several garden workdays and with the development and implementation of long-term garden maintenance and sustainability plan. Gardens were built in every intervention school in the spring prior to the academic year of baseline measurements. The parents' curriculum paralleled the nutrition and gardening topics/activities taught to the children and had a strong emphasis on cooking components and focused on growing and cooking foods that are culturally relevant. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control schools received a delayed intervention (identical intervention as described above) in the year after the post-testing for that wave. Every control school received a garden, identical in size and structure to the intervention schools.
de Ruyter 2012	zBMI short-term; zBMI medium-term; zBMI long-term	School	DRINK (Double-blind Randomized Intervention Study in Kids)	Children were provided with 1 can per day of a noncaloric, artificially sweetened, non-carbonated beverage or a sugar-containing non-carbonated beverage. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes	Attention control The control group children were provided with a sugar-containing non-carbonated beverage

Table 2. Description of the interventions *(Continued)*

				– provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	
Fulkerson 2010	zBMI short-term; percentile short-term	Community	HOME (Healthy Home Offerings via the Mealtime Environment)	Sessions were held at rented space in a church and community centre (with kitchen and dining facilities) within close proximity to participants' homes in the early evening (6 to 7:30pm). Families participated in five 90-minute intervention sessions in a multiple family-group format (3 to 8 families at one time). Each session included a healthy snack, separate parent and child group time, family meal preparation, interactive nutrition education activities, a group meal, homework assignment, take-home materials and session evaluations. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Families randomised to the control condition participated in home assessments only and were sent written intervention materials at the end of the study
Fulkerson 2015	zBMI medium-term; zBMI long-term	Home + community	HOME Plus (Healthy Home Offerings via the Mealtime Environment Plus Study)	The intervention included ten monthly group sessions and 5 brief goal-setting telephone calls. Families received a guidebook with session topics, strategies to promote behaviour change and study goals, recipes and community resources. All family members were invited to attend sessions and transportation and childcare were provided, if needed. The goal-setting calls (~20 minutes) were completed by dietitians trained in motivational interviewing who tailored each call to the family-selected behavioural goal(s). Calls included the same behaviour change techniques as in-person sessions but followed an interview format, utilised motivational interviewing techniques and provided opportunities to discuss behaviours/goals that complemented the group session topics. The intervention includes a home activity: yes The intervention is delivered: individually and as a group	Attention control Control group participants received a monthly family-focused newsletter and did not receive the HOME Plus intervention programme

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Han 2006	zBMI long-term	School	NR	Based on the Precede-proceed model, the intervention included: healthy lunch for students; set up regulations for lunch in the intervention schools and lunch providers; improvement of canteen's environment; appointment of nutritionists in the lunch providers to supervise and monitor lunch provision, as well as act as a 'bridge' among school, family and community; training of the nutritionists in lunch providers and relevant teachers in the schools; delivery of newspapers (about nutritional knowledge) to students and teachers; improvement of the environment near the schools; a variety of education means adopted by residents near the schools (including blackboard, broadcast, cooking training course, leaflets); supervisions of local community health centres and local centres for disease control to the schools and lunch providers. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention NR
Hendrie 2011	zBMI short-term; BMI short-term	Home	NR	Parents received individualised nutrition education from a research dietitian about the importance of dairy foods for children and the need to change their children from regular to reduced- or low-fat dairy foods. Parents were guided through a standard written intervention booklet by the research dietitian that also included an extensive pictorial shopping guide of appropriate reduced-	Non-active intervention Parental education on reducing children's screen time. NB: Screen time was encour-

Table 2. Description of the interventions *(Continued)*

				and low-fat dairy products available in supermarkets. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	aged to be replaced with other sedentary behaviours to avoid an increase in physical activity
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned 1 research staff member who visited the school 1 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition) and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g. Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no	Attention control For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: no	
James 2004	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	School	CHOPPS (Christchurch obesity prevention programme in schools)	The intervention was conducted over 1 school year, with 4 sessions of focused education promoting a healthy diet and discouraging the consumption of carbonated drinks. The initial session focused on the balance of good health and promotion of drinking water. The children tasted fruit to learn about the sweetness of natural products. In addition, each class was given a tooth immersed in a sweetened carbonated cola to assess its effect on dentition. The second and third sessions comprised a music competition; each class was given a copy of a song (Ditch the Fizz) and challenged to produce a song or a rap with a healthy message. The final session involved presentations of art and a classroom quiz based on a popular television game show. The children were also encouraged to access further information through the project's website (www.b-dec.com). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention NR
Keshani 2016	BMI medium-term	School	NR	Six nutrition education sessions for students and 4 sessions for mothers were held during 1 year in 4 intervention schools, using a similar method. Strategies/techniques used in the sessions included lecture, problem-solving, goal-setting, games, entertainment and competition, watching nutrition related animations, making story and targeted snacks. Also, some posters related to the objectives of the nutrition education were hung on the classes' wall. Four short-term (5 to 10 minutes) animations with nutrition and physical activity content were presented to the students. Then they were asked to write a story, draw/paint or make a wall newspaper about healthy eating, obesity and related topics so they could enrol in a competition. In ad-	Non-active intervention No training was considered for the control group, except the routine school training

Table 2. Description of the interventions *(Continued)*

				dition, they were served with some healthy snacks like low salt puffed wheat and soy nuts, raisins, low fat milk, and cheese and cucumber sandwich in the nutrition education sessions. The schools' buffets were also checked, and some healthy food items were suggested to be available for the students' use. Four nutrition education sessions (each about 2 hours) were considered for the parents. The purpose of these sessions was increasing the awareness of parents about the benefits of healthy eating and physical activity, making them familiar with the programme, and convincing them to collaborate with the students at home. Pamphlets and booklets on children's healthy eating were prepared for parents, and some nutritional messages were sent to them via text messaging. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Lent 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	School + community	Healthy Corner Store Initiative	Healthy corner store intervention was designed to promote healthier snack and beverage purchases in students shopping in corner stores. Intervention has 3 components: (1) classroom-based nutrition lessons (7 x 45-min); (2) a branded social marketing campaign with messaging on healthy eating and well-being + Snackin' Fresh logo giveaways and banners and displayed in corner stores + website, comic book and video; (3) healthy corner store (store owner trainings + adding healthier items and signage for them). The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no	Non-active intervention The control group students were still intercepted and asked what they bought in their non-intervention corner stores

Table 2. Description of the interventions *(Continued)*

				– provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	School	NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China)	Group 1: Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Classes on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students in the school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. Group 2: Students conducted "Happy 10" led by teachers to do a 10-minute segment moderate intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention No intervention took place in the control schools
NCT00224887 2005	BMI medium-term	Home/community (active intervention control group)	FBC (Family Based Counseling)	In-home family-based behavioural counselling using in-person and video interventions delivered by community health advisors. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to	Non-active intervention The control group received standard nutrition education curriculum consisting of video and lesson plans based on USDA Food

Table 2. Description of the interventions *(Continued)*

				– modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Guide pyramid
Nicholl 2021	zBMI short-term; BMI short-term; percentile short-term	Home	Milky Way Study	Children were requested an ongoing intake of ≥ 1 serving of reduced-fat dairy per day (where a serving comprised a 250 mL glass of milk, 40 g cheese, or a 200 g tub of yogurt), with no order limits. Children continued their habitual diet but replaced all dairy with the study dairy products, provided at no cost. Study dairy products were all purchased at local supermarkets, relabelled by independent researchers, packaged for optimum cold storage, and, after the first on-site collection, delivered regularly to most families at home. Apart from fat content, each product pair was closely matched for brand and nutrient content to minimise product variations, including differences in bovine diet and sugar content. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control group received the usual full-fat dairy diet
Paineau 2008	zBMI short-term; BMI short-term	School + home + community	ELPAS (Etude Longitudinale Prospective Alimentation et Santé)	Monthly telephone counselling by a trained dietician dedicated to analysing food habits of the participants according to their last food records and determining pragmatic advice to reach their specific dietary targets. Intervention A: advice on how to reduce dietary fats (< 35% of total energy intake) and how to increase complex carbohydrates (> 50% of total energy intake). Intervention B: advice on how to reduce both dietary fats (35% of total energy intake) and sugars (-25% of initial crude intake) and how to increase complex carbohydrates (> 50% of total energy intake). The intervention includes a home activity: no The intervention is delivered: individually and as a group	Attention control Participants in the control group received general information about nutrition, but no individualised advice, to maintain motivation and to avoid a high dropout level. They were followed at the same inter-

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	vals as participants in the intervention groups and were asked to record their diets in an identical fashion.
Seguin-Fawler 2021	Percentile short-term	Community + home	F3HK (Farm Fresh Foods for Healthy Kids)	The focus of the F3HK intervention was a summer Community Supported Agriculture (CSA) membership of 15 to 24 weeks length (CO-CSA) plus nutrition education. Nine farms offered multiple CSA share sizes from which caregivers could select the option that best suited their needs and preferences. Shares were offered at half-price and caregivers paid weekly. Families in the CO-CSA plus nutrition education group were offered kitchen tools and education classes. Caregivers selected 2 to 4 larger kitchen tools from among the following: food processor, crockpot, stockpot, large cutting board, chef's knife, salad spinner, and reusable grocery bag. Adults and children also were invited, but not required, to attend 9 in-person CSA-tailored education classes offered locally. Classes featured seasonal produce via food tasting, demonstrations, hands-on cooking activities, handouts, and recipes; 2 of the lessons involved field-based learning via grocery store and farm tours; and 3 lessons taught the use of a vegetable peeler, vegetable scrub brush or paring knife, which participants were allowed to keep. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control group received the delayed intervention starting at year 2

Table 2. Description of the interventions *(Continued)*

Sichieri 2008	BMI short-term	School	NR	The intervention evaluated in the present study focused on the reduction in consumption of sugar-sweetened carbonated beverages by students. A healthy lifestyle education programme was implemented using a simple message encouraging water consumption instead of sugar-sweetened carbonated beverages. Education was delivered via classroom activities. All children in the intervention classes were taught the importance of drinking water and asked to make drawings and songs about water and how much the body needs it. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control The control group received only 2 one-hour general sessions on health issues and printed general advice regarding healthy diets
Stettler 2015	zBMI medium-term; BMI medium-term	Clinical setting	Smart Steps	Parents and children in this programme participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Group 1: Beverages-only intervention aimed to progressively reduce intake of beverages with high sugar content (e.g. regular soda, sweetened iced teas and lemonade, fruit drinks with less than 100% fruit juice and sports drinks) to ≤ 1 to 2 12 oz servings/day and progressively increase intake of water, fat-free milk and 1% milk to ≥ 6 12 oz servings of per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Parents and children in this programme participate in a series of consultations aimed at bullying prevention that are designed to help children learn strategies to make and keep friends, to express feelings appropriately and to successfully decrease conflicts that often occur at school among children

Table 2. Description of the interventions *(Continued)*

van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go! (TGEG)	Multi-arms study Group 1: WalkAcrossTexas (WAT!). WAT! is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among youth. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form) and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists and PE teachers to implement the WAT! intervention. Group 2: Learn!Grow!Eat!Go! (LGEG!). The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programmes The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Delayed intervention control
Viggiano 2018	zBMI short-term; zBMI long-term	School	Kaledo	One play session (15 to 30 min) with the board game Kaledo, every week for 20 weeks. A game session represents a journey through daily meals of the Mediterranean diet. At the start, each player receives 4 chips and sets the energy expenditure of his/her kaleidoscope on the value corresponding to his/her BMR (BMR is obtained by consulting a simple table on the kaleidoscope which is based on age and weight). The game allows each player to personalise the BMR according to sex, weight and age. During a game	Non-active intervention The children in the control group did not play with Kaledo

Table 2. Description of the interventions *(Continued)*

				session, the players move their pawns on the 59 boxes on the board and, consequently, they receive nutrition cards (common food items of the Mediterranean diet) or activity cards (common daily activity) as indicated in the destination boxes. A player can refuse to take a card by leaving one chip. In this way, he can try to balance the total energy intake given by the nutrition cards with the total energy expenditure given by the activity cards and the BMR. At the end of the game, the winner is the person with maximum points calculated on the bases of energy balance (maximum 5 points), best food items (maximum 4 points) and food variety (maximum 1 point). Seven special boxes on the board act as a punishment or a reward during the game and they are associated with specific dietary behaviour in real life (e.g. a fast food lunch). Therefore, Kaledo could affect dietary behaviour by a knowledge-based nutrition education and/or a behaviourally focused nutrition education. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	

Comparison: activity intervention vs control

Study ID	Meta-analysis outcome(s)	Setting of intervention	Intervention/study name	Intervention (short-term description)	Comparison type and short-term description
Barbeau 2007	BMI medium-term	School	NR	The intervention consisted of 30 minutes of homework time during which the subjects were provided with a healthy snack free of charge, and 80 minutes of physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to	Non-active intervention Subjects in the control group received no intervention

Table 2. Description of the interventions *(Continued)*

				– modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	
Barnes 2015	zBMI short-term	Community	MADE4Life Program	The MADE4Life program involved mothers and daughters attending weekly after-school 90-minute sessions over 8 weeks. The major focus of the mother-daughter PA sessions were fun active games, health-related fitness zumba, aerobics, pilates, yoga, rough and tumble play, and fundamental movement skills. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control group was composed of a 6-month waitlist
Barnes 2021	zBMI medium-term; BMI medium-term	School + home	PACE (Physically Active Children in Education)	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for lead-	Non-active intervention Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by

Table 2. Description of the interventions *(Continued)*

				ing their school's implementation of the PA policy. Educational materials: an intervention manual was provided to each school champion and classroom teachers received various educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and learning resources).
Breheny 2020	zBMI short-term; zBMI medium-term	School	Daily Mile	The Daily Mile involves children doing an extra 15 min of activity by running or walking around a track within the school grounds. Schools map out a route or track in their school grounds. The intervention was carried out in lesson time at a time to suit each class during the school day, children left the classroom to run or walk around a predefined route within the school grounds for 15 min (on average equivalent to a distance of around 1 mile). The intervention was carried out in all but severe adverse weather conditions and required no change of clothing or footwear and was not a substitute for PE or break-times. Whilst advised as a daily activity, the frequency and duration were at the class teacher's discretion. Class teachers delivered the intervention and were permitted to adapt it for implementation, using motivational materials such as certificates, or using it to facilitate learning within another subject area such as Maths. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention Only the usual school health and wellbeing activities were implemented in the control group

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	
Clemes 2020	BMI short-term	School	Stand Out In Class	Six sit-stand desks replaced 3 standard desks (sitting 6 children) in the intervention classrooms. Teachers were encouraged to use a rotation system to ensure all pupils were exposed to the sit-stand desks for > 1 h/day on average. The training included a presentation on the benefits of regular physical activity and reductions in sedentary time. Teachers received a Professional Development Manual (available on request) and a series of nudging prompt cards containing information on the health benefits of reducing prolonged sitting and on correct posture when standing at the desks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The 4 schools assigned to the control condition were asked to continue with their usual practice and took part in the study measurements at the same 2 time points using the same measures as those in the intervention condition. Upon completion of the study, control schools were offered a report summarising the collected data of their pupils.
De Bock 2013	BMI short-term; BMI medium-term	School + community	Ene mene fit	A complex intervention designed to engage parents, preschool teachers, and other members of the preschool community and aimed at motivating parents to develop and implement their own project ideas for promoting children's physical activities. It included access to an intervention-specific website (www.ene-mene-fit.de); an introductory video; and a printed book with 15 project ideas. The external gym trainers in intervention schools received additional training and served as intervention facilitators helping to co-ordinate parent activities (e.g. by proposing timelines) and encouraging participation. The intervention includes a home activity: no	Non-active intervention The control group received the state-sponsored programme initiated in 2006 to encourage physical activity among children in Baden-Württemberg. As part of this

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	programme, specially trained external PA teachers deliver 40 standardised 1-hour gym lessons over a 6-month period (i.e. twice weekly) in preschools that participate in the programme.
de Greeff 2016	BMI short-term	School	F&V (Fit en Vaardig op school)	The intervention programme contained lessons that included simple, individual physical exercises during routine learning activities such as mathematics, spelling and reading tasks in the classroom. At the start of each lesson, the children stood behind or beside their school desk. During each lesson, 10 to 15 minutes were spent on solving maths problems followed by 10 to 15 minutes on solving language problems. For example, the children had to solve a mathematical problem by giving the answer with the correct number of jumps (2 times 3 is 6 jumps) or words had to be spelled by jumping in place for every mentioned letter. Learning activities were matched with the regular learning activities, resulting in a different program for second- and third-grade children. The physical exercises were aimed to be of moderate to vigorous intensity, yet relatively easy to perform, for example marching, jogging or hopping in place. The interactive whiteboard played an important role in the lessons. Every lesson was supported by a presentation on the board whereupon the mathematical and language tasks became visible. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

Diaz-Castro 2021	zBMI short-term; BMI short-term	School	NR	The intervention consisted of a 6 months physical activity programme delivered by the physical education teacher with specific elements of additional vigorous physical activity to the standard classes (control group): first month: 10 extra minutes of warm up (70 min/day, 3 days/week); second month: 25 min of aerobic work per session were added to the protocol developed in the first month (85 min /day, 3 days/week); third month: 15 min of aerobic work per session were added to the protocol developed in the second month (100 min/day, 3 days/week); fourth month: one extra day per week was added to the exercise protocol (100 min/day, 4 days/week); fifth and sixth month: one additional day per week was added to the exercise plan (100 min/day/5 days/week). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received the usual physical activity curriculum. Training classes for 60 min/day, 3 days per week that consists of 3 parts: 1) warm-up (10 min); 2) main part of the exercise (45 min): technique exercises (15 min): passes, catches, drives, feints, dribbles, shots on goal, control exercises, skill circuits, tactic drills (15 min): rounds, defence drills, attack drills, counterattacks, set plays, superior attack, ball possession drills, pressures, field positions, lines, set pieces, real game situation "match" (15 min); 3) cool down (5 min): stretching
Donnelly 2009	BMI long-term	School	PAAC (Physical Activity Across the Curriculum)	Physical Activity Across the Curriculum (PAAC) intervention was delivered via moderate-intensity PA (3 to 6 METs) intermittently throughout the day. The goal was for students to accumulate 90 to 100 min of PA a week (~20 min per day) through the instruction of academic lessons that incorporated PA. Students also participated in their regular physical education classes (~60 min per week). Students were shown that	Non-active intervention The control group received regular classroom instruction without phys-

Table 2. Description of the interventions *(Continued)*

				they do not need to report to a special location, wear special exercise clothes, or interrupt their normal routine. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	ically active lessons
Drummy 2016	BMI short-term	School	NR	Teachers in the intervention group were asked to lead a 5-min activity break 3 times per day for 12 weeks. The activity break began with gentle jogging on the spot as a warm-up for less than 1 min, followed by moderate to vigorous intensity exercises such as hopping, jumping and running on the spot, scissor kicks. The teachers could select which exercises to include in each activity break. They were encouraged to vary the activities each day. The children participated in the activity break in the classroom beside their desks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control groups continued with their normal daily routine throughout the 12-week period
Farmer 2017	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	School	PLAY	The researchers, playworkers and school community worked together to develop a playground action plan that met the needs of each school community. Following baseline evaluations of their play space, each intervention school was provided with a list of tailored suggestions for improvements. This was specific to each school but could include the addition of more interactive play equipment, and alterations to school rules	Non-active intervention Control schools were asked not to change their play environment

Table 2. Description of the interventions *(Continued)*

				and policies that may limit risk-taking during play (for example, no tree climbing, separation of older and younger children into physically separate play areas), with all alterations meeting playground safety standards. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	
Ford 2013	BMI short-term	School	NR	The walkers took part in the accumulated brisk walking programme during school time, which involved walking at a brisk intensity around the school grounds for 15 min in the morning and afternoon, at least 3 times a week, for a total of 90 min per week, during the 15-week intervention period. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group took part in normal school lessons during the walking sessions, which involved seated literacy work
Ha 2021	BMI short-term; BMI medium-term	School	Active 1 + Fun	Family-based physical activity programme consisting of 10 x 30-min workshops followed by 60-min activity classes, led by 2 coaches in each session. The workshops addressed the health benefits of regular PA, parenting tips and principles of self-determination theory through a story-telling approach. The activity sessions incorporated different types of parent-and-child activities and games. These sessions took place in school halls or playgrounds to allow more open space for activities. Some activities and games were designed around a set of	Non-active intervention The control group started the intervention after 1 year (waitlist control)

Table 2. Description of the interventions *(Continued)*

				free equipment participants received. These included a sponge flying disc, soft volleyball, skipping rope, a pair of rackets and some sponge balls. After the tenth session, participants were invited to attend a booster session approximately 3 months afterward. For the activity session, coaches invited parents and children to take more initiative in choosing what activities to do, even allowing some of them to lead group games. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Howe 2011	BMI medium-term	School	NR	The intervention consisted of 30 minutes of homework time during which the subjects were provided with a healthy snack free of charge, and 80 minutes of PA. All of the snacks were individually packaged, and every day the subjects had a choice of something salty (e.g. crackers and cheese), something sweet (e.g. low-fat cookies), or a fruit or vegetable. Subjects chose one snack, and were allowed to get another snack if they were still hungry after the first one. The PA component included 25 minutes of skills development (e.g. how to dribble a basketball), 35 minutes of VPA, and 20 minutes of toning and stretching. Subjects wore Polar Accurex Plus HR monitors every day during the PA portion of the programme. Activities during the MVPA included games such as basketball, tag, softball, relay races, etc., all of which were modified to keep all of the subjects active throughout the 35-minute period. Subjects received small weekly prizes (e.g., bouncy balls, Slinkies, pencils, note pads, lip gloss, play jewellery) for maintaining good behaviour and attitude and at most one unexcused absence. They picked a student of the month in each school who received a slightly larger prize (e.g. movie pass, roller skating pass, basketball). The main purpose of the prizes was to reward good behaviour, participation and effort (extracted from Barbeau 2007).	Non-active intervention Participants in the control group received no intervention and were not allowed to stay for the after-school intervention but rather instructed not to change their daily after-school routine

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual) or delayed. Each school was assigned 1 research staff member who visited the school 1 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition) and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g. Rethink Your Drink campaign). Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Attention control For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with obesity prevention delivered at the end of the trial
Jones 2015	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	School	The Wollongong SPORT	The PA programmes comprised 30 min of homework plus 90 min of structured physical activity. Facilitators optimised time spent in moderate-to-vigorous physical activity by: i) implementing activities - often with modifications (e.g. to rules, equip-	Dietary and activity intervention The healthy lifestyle education pro-

Table 2. Description of the interventions *(Continued)*

		ment and play space) - designed to encourage participation and maximise 'movement time', ii) minimising or eliminating 'wait time' within and between activities, and iii) providing regular verbal positive reinforcement and feedback. In addition to the bi-weekly physical activity sessions, the PA programmes included a home and parental component. Participants were provided with a 'Health Passport' containing weekly challenges to be completed at home with parents. The challenges focused on physical activity and screen time and included activities in areas of active transport, active chores, fun outdoor activities and monitoring screen time. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	gram (active comparison group) consisted of 30 min homework, 45 min healthy lifestyle education and 45 min physical activity. The healthy lifestyle education comprised evidence-based information on healthy lifestyles for children from the Australian Department of Health and Aging and best-practice information developed by the researchers. The healthy lifestyle education focused on general health messages, such as healthy hearts, food groups and the importance of eating breakfast. In contrast to the PA programme, the physical activity component of the HL programmes focused on lighter intensity and life-long-term activities (e.g. bocce and orienteering) and did not include modifications to maximise participation or

Table 2. Description of the interventions *(Continued)*

					physical activity levels.
Ketelhut 2022	BMI short-term	School	ExerCube intervention	Exergames are active video games that require bodily movements to play the game. In addition to the normal PE class twice a week, the children in the intervention group participated in 2 exergaming sessions per week lasting 15 to 20 min. The sessions were integrated into the daily school schedule and took place before, between or after classes, as well as during breaks. The ExerCube is a physically immersive exergame setting shaped like an open cube. The 3 cushioned walls of the cube serve as a projection screen for the game scenario and a haptic interface. During the game (Sphery Racer), the player navigates an avatar along a virtual racing track by performing a variety of whole-body movement tasks. A motion-capturing system using HTC Vive Trackers attached to the wrists and ankles detects the player's movement in three dimensions through infrared sensor technology. By analysing the timing and accuracy of movements throughout the game, the motion capturing system guarantees a correct execution of the different movement tasks. Before each game, the system was calibrated to match the targets to the body height of the player. The game Sphery Racer implements 6 game levels, which guide the player through the workout while also gradually increasing duration. For a 15-minute session, the duration of the levels is 1:30, 2:00, 2:40, 3:50 and 5:10 min. For a 20-minute session, the duration of the levels is 1:50, 2:30, 3:20, 5:10 and 7:10 min. The levels are interspersed with short-term resting phases of about 30 s. The game continuously adjusts game difficulty and complexity to the player's fitness and cognitive skills. When the player makes too many mistakes or reaches a predetermined heart rate (HR), the game's speed slows down. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no	Non-active intervention The control group participated in their normal PE classes twice a week

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: no	
Khan 2014	zBMI medium-term; BMI medium-term	School	FITKids (Fitness improves thinking in kids)	The intervention group received a 2-hour intervention (5 days/week for 9 months). The sessions consisted of 70 minutes of intermittent MVPA. Each session began with 20 to 25 minutes at physical activity stations focused on a health-related fitness component (e.g. cardiorespiratory fitness, muscular strength). After the fitness activities, a healthful snack was provided during the 15-minute educational component (topics included goal setting, self-management and self-efficacy). After the educational component, participants engaged in 50 to 55 minutes of organisational games or sport-oriented activities (e.g. dribbling a basketball). The sessions concluded with a 15-minute cool-down period. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention Participants in the control group partook in their regular after-school activities, without intervention from the study staff. The control group was not contacted again until follow-up
Kovalskys 2016	zBMI long-term	School	SALTEN (Spanish initials ofHealthy, Active, and Free from Non-Communicable Chronic Diseases)	Playgrounds were re-designed to promote 30 minutes of unstructured moderate-to-vigorous PA during school-breaks; a PA instructor acted as facilitator, and an educational component encouraging PA was included in the curricula. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

Kriemler 2010	BMI medium-term; BMI long-term	School	KISS (Kinder-Sportstudie)	Children in both groups had 3 physical education lessons each week, which are compulsory by law. The intervention group had 2 additional physical education lessons on the remaining school days (45 minutes each) taught mostly outdoors by physical education teachers. In addition, 3 to 5 short-term activity breaks (2 to 5 minutes each) during academic lessons - comprising motor skill tasks such as jumping or balancing on one leg, power games, or co-ordinative tasks - were introduced every day. The children received daily physical activity homework of about 10 minutes' duration prepared by the physical education teachers. This included aerobic, strength or motor skill tasks such as brushing their teeth while standing on one leg, hopping up and down the stairs, rope jumping or comparable activities. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control group received 3 physical education lessons each week (compulsory by law)
Lau 2016	BMI short-term	School	NR	Children were arranged to group play an AVG, Xbox 360, twice per week with each session at 60 minutes over a period of 12 weeks in a school setting beyond the regular PA and physical education class. Xbox Sport Season Series 1 and 2, which comprise 6 different sport games in each season, were adopted in the intervention. The two Seasons feature both team-based and individual sports, including 10-pin bowling, boxing, track and field, table tennis, beach volleyball and association football in Season 1 and golf, darts, baseball, skiing, tennis and American football in Season 2. The player controls the sports by mimicking how the sports are played in real life without the equipment that usually is associated with them. Children in the intervention group participated in two 60-minute gaming sessions per week for 12 school weeks. The intervention was held after school in a large function room that allowed all children in the intervention group to play at the	Non-active intervention The control group received regular PA and physical education class and received no additional intervention

Table 2. Description of the interventions *(Continued)*

				same time. Team games were played with two children sharing one Xbox 360. This was designed to provide a better motivational climate compared with individual-based gameplay. Children and their partners with consensus of opinion had their own choice on the orders of games, what they wanted to play, and on the duration of each gameplay. Otherwise, the investigator would help to determine the game order. Participants could get awarded based on degree and speed of movement and level of difficulty. The research assistant recorded the scores and briefed the participants in each session. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	
Lazaar 2007	zBMI short-term; BMI short-term	School	NR	Children were required to follow PA after class, twice a week for 1 h. The exercise programme was designed to enhance the joy of movement, body awareness and team spirit in order to bring about long-term changes in behavioural patterns. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received regular sport physical education and PE classes
Li 2010	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	School	Happy 10 program	The programme consisted of 2 daily 10-min physical activity sessions conducted in the break between classes. It provided a variety of safe, moderate, age- and space-appropriate exercises. Teaching materials included activity cards, video demonstrations, track-	Non-active intervention No intervention took place in

Table 2. Description of the interventions *(Continued)*

				ing posters and stickers. Each activity card introduced one exercise and explained how to perform it. The videos showed students from the pilot study performing the activities. Teachers could either demonstrate the activity or show it on a video. The tracking poster and stickers were used to illustrate the progress of each class. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	the control schools
Martinez-Vizcaino 2014	BMI medium-term	School	MOVI-2	The programme consisted of non-competitive recreational activities focused on developing aerobic and muscular fitness. MOVI-2 included basic sports games, traditional games, and other outdoor activities such as cycling or gymkhanas. The programme included two 90-minute PA sessions during the weekdays in the evening from 4 to 5.30 pm and one 150-minute session on Saturday morning each week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Control schools kept their usual patterns of PA
Martinez-Vizcaino 2020	zBMI short-term; BMI short-term	School + home	MOVI-KIDS	After-school play-based, non-competitive, physical activity intervention including basic sports games, playground games, dance and other activities focusing on developing motor skills. Parents and teachers were involved in the programme promoting active lifestyles in children through the use of reinforcement tools as teaching mate-	Non-active intervention The control group received standard physical education lessons

Table 2. Description of the interventions *(Continued)*

				rial (e.g. refrigerator magnet with recommendations for physical activity for children), and accessing the study blog (http://movi3kids.blogspot.com.es/) where questions about how to promote active lifestyles were answered. Environmental interventions were introduced to encourage children to be more active in the playground, including balance circuits and panels encouraging physical activity during recess, and tyres of different colours and sizes with posters describing how to use them. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	
Martinez-Vizcaino 2022	zBMI medium-term; BMI medium-term	School	MOVI-daFIT!	This programme included recreational and non-competitive physical activities, based on traditional games, but using a high-intensity interval training (HIIT) protocol adapted to children's age. "Children were involved in 60-minute after-school sessions 4 times a week developed within the school setting. Each session consisted of 15 minutes of set-up and warm-up games, followed by 28 minutes of games using the HIIT protocol, in which a 4-minute game of high-intensity activity (at 85% to 90% of the maximum heart rate, approximately 178 to 190 ppm) was followed by a game of recovery activity lasting 3 minutes (at 65% to 75% of the maximum heart rate, approximately 136 to 147 ppm), and this sequence was repeated 4 times. Finally, children played a 10- minute low-intensity game for cool down." The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no	Non-active intervention Control children continued with their standard physical education curriculum throughout the intervention period (2 regular 50-min sessions per week)

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: no – change the physical environment of the child: no	
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	School	NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China)	Group 1: Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Class on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students in the school lunch cafeteria was evaluated periodically and specific nutrition improvement was suggested accordingly. Group 2: Students conducted "Happy 10" led by teachers to do a 10-minute segment of moderate-intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes for once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention No intervention took place in the control schools
Morgan 2019	zBMI medium-term	Community	DADEE (Dads And Daughters Exercising and Empowered)	The DADEE programme was designed to energise fathers to become physical activity role models and advocates for their daughters, and vice versa. The programme included 8 weekly sessions with educational and practical components, which were delivered at the university by members of the research team. Mothers and non-enrolled siblings were invited to one of the 8 sessions and were told they could review the programme resources at home if they were interested. The programme engaged fathers and daughters in fun, co-physical activities targeting rough and tumble play, sports skills and aerobic and muscular fitness.	Non-active intervention The waitlist control group received the intervention after the 36 weeks assessment

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Muller 2016	zBMI medium-term; zBMI long-term; percentile long-term	School	Leipzig School Project	Intervention classes were assigned to 1 unit of physical exercise (45 minutes) with at least 15 minutes of endurance training per school day in comparison to the regular 2 PE units (45 minutes each) weekly in the non-intervention control group. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control classes continued to receive 2 units of exercise per week
Muller 2019	zBMI medium-term	School	DASH (Disease, Activity and School children's Health)	"The physical activity interventions consisted of physical education lessons, moving-to-music classes, in-class activity breaks and school infrastructure enhancement to promote physical activity. [...] One school received the physical activity intervention only, one school also received the health education intervention (a series of classroom-based lessons to increase awareness of intestinal parasite infections) and one school also received a nutritional intervention (a series of classroom-based to increase the awareness of the importance of healthy nutrition)." The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention The control group continued to follow their usual school curriculum

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	
Newton 2014	zBMI short-term; BMI short-term; percentile short-term	Home	Parent-Targeted Mobile Phone Intervention	Children in both study groups were instructed to wear a study-provided pedometer every day during the course of the 12-week intervention. Parents in the intensive intervention group were given access to a version of the website in which they could view their child's daily step goal, monitor their child's step counts, view a steps/day graph and read weekly behavioural articles, and they also received text messages. The step monitoring and steps/day website components and goals were identical to the minimal intervention group. The steps/day graph was colour-coded to illustrate how their child's daily steps compared to the target step goal. Behavioural strategies based on the Social Cognitive Theory were adapted from previous interventions and were delivered through weekly articles posted on the website and via text messages. Text messages were designed to prompt parents to encourage their child's physical activity, remind parents of behavioural concepts presented in the articles, and motivate parents to foster behavioural change in their child. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Parents in the control group were given access to a version of the website (formatted for a mobile phone) in which they could view their child's daily step goal, monitor their child's step counts, and receive monthly nutrition tips. The website provided parents with a target steps/day goal for their child, which was intended to increase their child's physical activity by 1000, 3000 and 6000 steps/day above the child's individualised baseline during the first, third and fourth week of the intervention, respectively. The additional 6000 steps/day above the baseline level was to be maintained

Table 2. Description of the interventions *(Continued)*

					from weeks 4 to 12.
Rhodes 2019	BMI short-term	School	NR	The intervention condition received the Canada physical activity guidelines (see comparator short-term description) and was provided with family physical activity planning material. This material included skill training content (workbook on how to plan for family physical activity) and practical materials to create a plan. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control group received the standard package consisting of the Canada physical activity guidelines recommending 60 minutes of activity a day in bouts as short-term as 5 to 10 minutes for children and a breakdown of ways for the family to achieve this physical activity (structured, unstructured, endurance, strength, activities, less than 60 minutes of sustained sedentary activity, reduce screen viewing by 30 min per day) commensurate with this guide
Sacchetti 2013	BMI long-term	School	NR	In each class assigned to the intervention group, the ordinary classroom teacher was joined by a physical education teacher who held the physical education lessons and monitored the activity carried out during the week. Each educator was specifically trained in physical education (degree in "Exercise and Sport Sciences") and was responsible for the activity in 3 to 4 classes (a total of 7 educators). The type of physical activity (exercises, games, circuits, etc.) was co-ordinated through monthly meetings, according to a previous standardised plan. The daily physical activity consisted of at least 30 minutes of physical exercise per day, divided between the school yard (vigorous ac-	Non-active intervention The control group received the standard programme of physical education

Table 2. Description of the interventions *(Continued)*

				tivity) and the classroom (moderate activity). Twice-weekly, a further 50 minutes of physical education was spent in the gym, according to the standard curriculum of physical education. On average, then, during school hours, the children were engaged for around 45 minutes in specific physical activity which was both moderate, defined as activity allowing the children to control their verbal language without becoming breathless (the child can talk, but not sing), and vigorous, defined as activity leading to sweating and heavy breathing (the child is not able to say more than a few words without pausing for breath). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	
Salmon 2022	zBMI long-term	School	Transform-Us!	The programme was delivered by classroom teachers and targeted physical activity (PA-I) and sedentary behaviours (SB-I) in the school and home settings. Year 3 teachers in the PA-I group were asked to deliver 9 key learning messages to children (which were reinforced in Years 4 and 5) that were focused on physical activity. Class-sets of pedometers were provided to support delivery of some of the lessons. Parents were sent 9 newsletters each year (18 in total) that reinforced these messages and teachers set children physically active homework tasks (e.g. go for a walk with parents and count letterboxes in their street). Classroom sets of physical activity (e.g. balls, skipping rope) and novel circus equipment (e.g. juggling balls, ribbons) were provided each year of the intervention. Asphalt line markings were painted in the school playground in the first year of the intervention, signage promoting physical activity was placed around the school and teachers were asked to encourage and support children's physical activity during recess and lunch breaks. Year 3 teachers in the SB-I group were asked to deliver nine key learning messages per	Non-active intervention The control group was a usual curriculum control condition and at study completion they were provided with all the intervention curriculum and supporting materials

Table 2. Description of the interventions *(Continued)*

				year to children (e.g. impact of sedentary behaviour on health, self-monitoring, goal setting). Year 4 and 5 teachers were asked to repeat and reinforce these learning messages to the children and extended lesson plans were provided. Nine newsletters were sent to parents each year (18 in total) that reinforced these messages and promoted family involvement. Teachers were asked to deliver a 30-min standing/active lesson every day by modifying how they delivered their usual curriculum (eg, active maths). Each SB-I classroom received 6 standing easels to help facilitate standing lessons. Teachers were asked to break up children's prolonged sitting (approximately every 30 min) with a 2-min standing/active break. They were asked to adapt standard homework tasks to break up sitting and incorporate standing at home. The PA-I + SB-I group received a combination of the PA-I and SB-I strategies (i.e. their 9 key learning messages each year targeted both physical activity and sedentary behaviour). The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Simon 2008	zBMI long-term; BMI medium-term; BMI long-term	School + community	ICAPS (Intervention Centered on Adolescents' Physical activity and Sedentary behaviour)	The programme included an educational component focusing on physical activity and sedentary behaviours. New opportunities for physical activity were offered at lunchtime, during breaks and after school hours, taking into account the obstacles to being active. Sporting events and 'cycling to school' days were organised. Parents and educators were encouraged to provide support to enhance the adolescents' physical activity level through regular meetings. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention The controls followed their usual school curriculum without any intervention

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Tanskey 2017	zBMI medium-term; BMI medium-term	School	FLEX (Fueling Learning through Exercise) Study	Group 1: The 100 Mile Club is a walk/run programme that encourages children to move 100 miles over the course of the school year (> 3 miles per week). The programme can be implemented before, during (physical education/recess) or after school. Group 2: The CHALK/Just Move program is composed of structured classroom-based PA breaks. Teachers were provided with a set of activity cards with various high- and low-intensity PA moves and were suggested combinations of moves to group together to build 5-movement breaks of 15 minutes. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Control group schools were offered an intervention of their choice after completion of the evaluation in Fall 2017
Telford 2012	BMI long-term	School	LOOK (Lifestyle Of our kids) Study	The specialist-taught intervention was conducted in 13 schools by 1 of 3 visiting PE teaching specialists and involved 2 classes of 45 to 50 minutes per week for 75 of the 80 weeks of school over the 2-year period. The general classroom teachers associated with the specialist-taught group conducted the remaining 50 to 60 minutes of PE in 2 or 3 extra sessions per week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no	Non-active intervention The PE in the common-practice group was conducted only by general classroom teachers. In the control group, classroom teachers continued teaching commonly prac-

Table 2. Description of the interventions *(Continued)*

				The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	tised PE programmes.
Thivel 2011	BMI short-term	School	NR	The intervention consisted of 120 min (2 times for 60 min) of supervised physical exercise in addition to 2 h of Physical Education classes per week. The additional 2 h per week of exercise were managed and taught by sports science students as part of their training; they were themselves supervised by a member of the investigation staff. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group did not have any intervention and followed their habitual 2 h of physical education per week.
van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go! (TGEG)	Multi-arms study Group 1: WalkAcrossTexas (WAT!). WAT! is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form) and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists and PE teachers to implement the WAT! intervention. Group 2: Learn!Grow!Eat!Go! (LGEG).The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both	Non-active intervention Delayed intervention control

Table 2. Description of the interventions *(Continued)*

				fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programmes The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Vizcaino 2008	BMI medium-term	School	MOVI	The intervention consisted in a non-competitive recreational physical activity programme (Movi) adapted to the children's age and held after school at the school's athletic facilities. The sessions included sports with alternative equipment (pogo sticks, frisbees, jumping balls, parachutes) co-operative games, dance and recreational athletics. In most cases, children went home after class and then returned to the school premises to participate in the programme. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received the standard physical education curriculum (3 h per week of physical activity at low-to-moderate intensity)
Wang 2018	zBMI medium-term; BMI medium-term	School	HLP-YOG (Health Legacy Project of the 2nd Summer Youth Olympic Games)	Intervention components included (a) Classroom curricula; (b) School environment support; (c) Family involvement; (d) Fun programmes/events. Local government was also involved in the intervention and played a critical role. Classroom curricula: knowledge of obesity and its hazards to health, the benefits of sufficient PA for body weight control, and skills	Non-active intervention Control students received their routine health education programmes regulated by

Table 2. Description of the interventions *(Continued)*

	to maintain sufficient PA, reduce screen time and take physically active transportation in daily lives. School environment support: three subcomponents: 1) Posters and slogans encouraging students to engage in sufficient PA were posted on billboards inside the classroom, gymnasium, playground and cafeteria and refreshed bimonthly according to the scheduled intervention curriculum themes within each intervention school. 2) Easily accessed instruments for body weight and height measurement and BMI calculation were provided within each intervention classroom in the first month of intervention. 3) News leaflets regarding programme progress were developed and sent to participating schools, students and families quarterly. Family involvement: Families (parents) were involved in this study via 3 ways. First, one health class was prepared for parents in each semester, with topics covering knowledge of childhood obesity, the health consequences of physical inactivity and skills to help children maintain sufficient PA in their daily lives. Second, parents were assigned homework and asked to complete it with their children (for example, measuring body weight and height, calculating each other's BMI) in the first semester. Third, with assistance from parents, three special 1-week activities were developed for all intervention students in the second semester, including: 1) Physical housework week: students engaged in PA through helping parents do physical housework at home, such as house cleaning, raw food preparation and dishwashing, for 1 week; 2) Walk-to-school week: intervention children were encouraged to walk or ride bicycle to/from school for 1 week; and 3) No-TV week. Fun programmes/events: 2 fun events for intervention students with consideration of the regular curricula: a composition writing and a painting class with the theme of PA events in daily life. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes	the educational authority

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: yes	
Wendel 2016	BMI long-term; percentile long-term	School	NR	The intervention involved changing classroom environments from traditional seated desks to stand-based desks, which are set at a height at which children can work at their desk while standing but are also outfitted with a stool so that they can sit if they choose to. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention The control classrooms were left unchanged, outfitted identically to the rest of the classrooms in the school, with traditional seated desks
Yin 2012	zBMI medium-term; zBMI long-term	School	Fitkid - Georgia Fitkid Project	The FitKid PA programme was designed to teach sport skills and improve aerobic and musculoskeletal fitness following a mastery-oriented youth sport activity programme philosophy that focuses on confidence building, enjoyment, team play, and learning skills and de-emphasises competition and winning. To make the programme appealing to parents and school officials, FitKid also included a free snack (USDA after-school snack programme), academic assistance (homework and study skills) and transportation to home by school bus. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received the regular free "health screenings," which otherwise may cost more than 300 USD, and diet/PA information to all participants
Comparison: dietary and activity intervention vs control					

Table 2. Description of the interventions *(Continued)*

Study ID	Meta-analysis outcome(s)	Setting of intervention	Intervention/study name	Intervention (short-term description)	Comparison type and short-term description
Adab 2018	zBMI long-term	School + community	WAVES study (West Midlands ActiVe lifestyle and healthy Eating in School children study)	Several behaviour change strategies were employed to encourage increased physical activity and improved diet quality. School staff were provided with training and resources for intervention delivery. A termly family newsletter reinforced messages delivered through the various intervention components. The 12-month intervention encouraged healthy eating and physical activity, including a daily additional 30-minute school time physical activity opportunity, a six-week interactive skill-based programme in conjunction with Aston Villa football club, signposting of local family physical activity opportunities through mailouts every 6 months, and termly school-led family workshops on healthy cooking skills. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Schools allocated to the comparator arm continued with ongoing year 2 health-related activities. In addition, we provided citizenship education resources, excluding topics related to healthy eating and physical activity.
Annesi 2016	BMI short-term; BMI medium-term; percentile medium-term	School	YF4L (Youth Fit 4 Life)	Youth Fit 4 Life used theory-based behavioural skills to support increased physical activity and healthy eating behaviours occurring both within and beyond after-school care time. It included highly structured daily session of 30 min/day of moderate-to-vigorous physical activity and used cognitive-behavioural methods to encourage children to consume healthy foods and beverages. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention In the control group, physical activity was administered in a variety of ways that were mostly left up to the discretion of the counsellor

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: yes	
Annesi 2017	BMI short-term; BMI medium-term	School	YF4L (Youth Fit 4 Life)	Youth Fit 4 Life used theory-based behavioural skills to support increased physical activity and healthy eating behaviours occurring both within and beyond after-school care time. It included highly structured daily session of 30 min/day of moderate-to-vigorous physical activity and used cognitive-behavioural methods to encourage children to consume healthy foods and beverages. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention In the control group, physical activity was administered in a variety of ways that were mostly left up to the discretion of the counsellor
Baranowski 2003	BMI short-term	Community + home	Baylor GEMS (Girls health Enrichment Multi-site Studies)	The intervention at Baylor was a 4-week summer day camp, followed by an 8-week Internet-based programme, plus one Saturday meeting for the girls. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control camp experienced only the usual camp activities at that site and focused on general health issues
Baranowski 2011	zBMI short-term; percentile short-term	Home	Escape from Diab	Two interactive, computer-based video games (9 sessions each) played in sequence to increase fruit, vegetable and water intake, physical activity and decrease TV viewing. The intervention includes a home activity: yes	Dietary and activity (minimal intervention) The control group re-

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	ceived a parallel web and DVD based knowledge game on fruit, vegetable, water, physical activity and physical inactivity
Barnes 2021	zBMI medium-term; BMI medium-term	School + home	PACE (Physically Active Children in Education); SWAP IT	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: individually and as a group	Non-active intervention Control schools did not receive the physical activity or nutrition interventions (i.e. waitlist control) and were asked to continue with usual practices. Schools within the control group were not offered nutrition or physical activity support during the intervention period, which was monitored by the research team. However, schools were still able to access general nutrition and physical activity support available via NSW Government health promotion programmes, which included educational materials (e.g. factsheets and

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	learning resources).
Beech 2003	BMI short-term	Community	Memphis GEMS (Girls health Enrichment Multi-site Studies) pilot study	The active interventions involved highly interactive weekly group sessions with either girls (child-targeted programme) or parents/caregivers (parent-targeted programme). Content focused on knowledge and behaviour change skills to promote healthy eating and increased physical activity. 1. Child-targeted intervention "GEMS Jamboree": girls participated in weekly, 90-minute intervention sessions for 12 weeks including "Movin' It" (physical activity component) and "Munchin' It" (nutrition component). Each weekly session concluded with a "Taking It Home" segment in which the concepts of the day were reviewed, incentives (small gifts) were given, and motivation for healthy eating and the maintenance of physical activity was provided. 2. Eating and Activity Skills for Youth (EASY) was conducted in a 12-week, 90-minute session format that included: a physical activity component of dancing (EASY Moves); a didactic nutrition segment (EASY Tips); and a segment alternating food preparation and nutrition-related games (EASY Fun). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Girls participated in arts and crafts, "friendship-building"/social support type activities ("trust games") and enjoyable games. Nutrition and physical activity were not addressed in this condition.
Bohnert 2013	zBMI short-term	School + home	GIG ASPs (Girls in the Game Af-	30-week curriculum that includes 10 three-week modules. Each module covered a different sport, health and leadership top-	Non-active intervention

Table 2. Description of the interventions *(Continued)*

			ter-School Programmes)	ic and was age-appropriate for early adolescents. Each session was led by trained coaches, was approximately 90 min in length, and was divided into 2 areas of focus: 50% covers physical instruction and energetic activity through traditional and non-traditional sports and fitness activities (e.g. rhythm and movement, soccer, flag football, volleyball, tennis, basketball, lacrosse, softball, golf, track and field) and 50% addresses age-appropriate health education, nutrition education, and leadership and life skills topics. GIG focuses on enhancing girls' health literacy, empowering the girls to believe that they can make healthy choices as well as promoting self-control around health and life choices. A "girl of the day award" is given to the girl who worked the hardest at each session, along with a small prize. A healthy snack or meal is also provided at every session, along with take-home materials for families to reinforce programme messages. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	No specific interventions were conducted with participants in the control condition other than participating in the health festivals
Brandstetter 2012	BMI long-term	School	URMEL - ICE (Ulm Research on Metabolism, Exercise, and Lifestyle Intervention in Children)	URMEL-ICE focused on health-promoting behaviour change in three areas: drinking sugar-sweetened beverages, spending time with screen media and being physically active. Main issues were the following: drinking water instead of soft drinks, discovering 'hidden' sugar in drinks, encouraging everyday physical activities, engaging in leisure activities without TV, learning about local sport and leisure facilities. The URMEL-ICE-intervention consists of material for 1 school year including 29 teaching units (each 30 to 60 min), 2 short-term blocks of physical activity exercises a day (each 5 to 7 min), 6 family homework lessons (tasks that cannot be accomplished by the child himself without the help of a parent) and materials for the training and information of the parents.	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Brown 2013	zBMI short-term; BMI short-term; percentile short-term	Community	Journey to Native Youth Health	Modification the original Diabetes Prevention Program for Native young people included adding cultural components, addressing young people's knowledge of, and access to, healthy food, including hands-on interactive learning activities and using a group format to deliver the intervention. Cultural aspects were incorporated throughout the programme and included emphasis on traditional activities, use of storytelling and native language to convey information, and participation of elders. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Attention control Youth drug and alcohol prevention programme
Caballero 2003	BMI long-term	School	Pathways Study	The Pathways Study intervention consisted of 4 components; classroom curriculum: culturally appropriate school-based lessons that promote healthful eating behaviours and increased physical activity; food service: provided nutrient guidelines and practical tools for reducing the fat content of school meals; physical activity: increasing energy expenditure in the school environment by implementing a minimum of three 30-minute sessions per week of moderate to vigorous physical activity; family involvement: family action packs, including snack packs with samples of low-fat foods and tips	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

				for preparing healthful snacks at home and family events at schools, which included cooking demonstrations and activities for healthier lifestyle, with the direct involvement of children. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Cao 2015	zBMI medium-term; zBMI long-term	School + home	FIS (Family-Individual-School-Based Comprehensive Intervention)	The FIS-based comprehensive intervention model combined models of family- and school-based interventions and had three aspects: health knowledge, dietary behaviour, and exercise behaviour. Children received a 6-hour health education course per semester, dietary intervention (eating speed control, advice on healthy eating), and exercise intervention (20-metre music shuttle run, 2 to 3 times/week; > 1 hour PA at school) at school; parents received health education, dietary intervention and exercise intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention NR
Chen 2010	BMI short-term	Study centre + home	ABC (Active Balance Childhood) study	Children participated in a 45-min session once each week for 8 weeks, and parents participated in 2 sessions that lasted 2 h each session during that 8 weeks. In each session, children engaged in lessons related to nutrition, physical activity and critical thinking. An interactive dietary preparation	Non-active intervention After completing the final follow-up assessment, this group re-

Table 2. Description of the interventions *(Continued)*

				software program tailored to common Chinese foods that was developed by Joslin Diabetes Center Asian American Diabetes Initiative was used for this study. Children received a food diary to record their food intake, books related to healthy eating and a packet of materials in both Chinese and English each week explaining the activities that highlight healthy eating and active lifestyles. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	ceived the ABC study intervention
Choo 2020	zBMI short-term	Community + home	The Three-Healthy Program (Healthy Children, Healthy Families, Health Communities Program)	Multi-level intervention strategies: child-level educational strategies, parent-level strategies and centre-level organisational strategies for obesity prevention among vulnerable children. The child-level intervention consisted of behavioural strategies based on the cognitive learning theory such as goal-setting, self-monitoring, reinforcement, problem-solving and experiential learning activity strategies (e.g. cooking, taste and exercise classes). The healthy activity sessions consisted of weekly exercise directed by physical education graduates. The parent-level intervention consisted of parenting strategies aimed at promoting positive parenting styles and general/obesity-specific parenting practices and building behavioural modification skills of goal setting, self-monitoring and reinforcement, and fostering a supportive family environment. It involved 1 session of group teaching, 2 home visits, 3 telephone counselling sessions, and 12 weekly text messages. The centre-level intervention consisted of organisational strategies such as partnership building, curriculum development, centre staff education and centre policy changes. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Non-active intervention The control group received usual care, which was provided in the community child centre programme

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Crespo 2012	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	School + community/home/school + community + home (multi-arm study)	APN (Aventuras para Niños)	Multi-arm study: home/family environment intervention included discussions focused on increasing fruit, vegetable and water consumption, increasing active play and decreasing sugar-sweetened beverages and TV viewing. School/community environment interventions designed to alter physical structures (e.g. playgrounds and salad bars), social structures and policies (e.g. teachers' discipline and classroom practices and public park maintenance), availability of protective or harmful products (e.g. physical education equipment and healthy children's menus in restaurants) and culturally appropriate media messages (e.g. posters, newsletters and point-of-choice messages in grocery stores). One group received a combination of the home/family environment and school/community environment interventions. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Participants in the control condition were asked to maintain their regular lifestyles and to attend the yearly scheduled measurements
De Heer 2011	BMI short-term; percentile short-term	School	NR	A culturally tailored health education and physical activity after-school programme with modules on healthy eating, exercise, diabetes and self-esteem. Each session took place in the school yard or in the multipurpose room and comprised a 20- to 30-minute health education component followed by 45 to 60 minutes of physical activity.	Non-active intervention Members of the control and spillover groups received fourth-grade health workbooks and incentives

Table 2. Description of the interventions *(Continued)*

				The physical activity component of the after-school programme had 4 main objectives: 1) Involvement of students in at least 30 min of daily physical activity; 2) Involvement of students in MVPA for at least 40% of daily physical activity time; 3) Providing students with many opportunities to participate and practise skills in physical activities that could be carried over into other times of the day and maintained later in life; 4) Providing students with a variety of enjoyable physical activities. The health education curriculum consisted of a 12 to 16 lessons plan incorporating health modules, such as 'eating fruits and vegetables,' 'reading food labels' and 'what is diabetes.' Every child received a colourful bilingual health education workbook covering these modules. Each health education lesson was structured with 2 parts: the first part consisted of one or a few pages of explanations of a new concept, followed by an exercise such as a puzzle where children had to use the knowledge they just gained to complete the exercise. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	at pretest and follow-up measurements, but they did not attend the after-school sessions
Duncan 2019	BMI short-term	School	Healthy Homework	Healthy Homework was an 8-week curriculum-based homework schedule, complemented by an in-class teaching resource, designed to promote physical activity and healthy eating in children. The research team provided professional learning for the teachers of the 3 intervention classes at each intervention school. At the start of the intervention, all children in participating classes received a homework booklet organised into weekly topics that each contained 1 physical activity and 1 nutrition component (e.g. walking and fruit/vegetables, screen time and breakfast, fitness and cooking). The intervention includes a home activity: yes	Non-active intervention Schools assigned to the control group were offered the intervention (including all resources) following the final assessment period

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Elder 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	Home + community	MOVE/me Muevo	The family intervention was tailored to the family's needs to target physical and social aspects of the home environment, including setting household rules. It included a telephone survey, group workshops at the recreation centre and home visits. For families with children in the normal weight range, the intervention focused on maintaining healthy eating and physical activity habits. The recreation centre intervention emphasised making changes in the quantity and quality of physical activity and healthy food and beverage offerings within the centres and targeted centre policies, programmes and facilities. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Families and recreation centres assigned to the control condition completed measures on the same schedule as those in the intervention conditions
Fairclough 2013	zBMI short-term; BMI short-term	School	CHANGE! (Children's health, Activity and Nutrition: Get Educated!)	The CHANGE! curriculum consisted of 20 weekly lesson plan worksheets, homework tasks, lesson resources and a CD-ROM. The lessons were of 60 minutes duration and provided an opportunity for children to discuss, explore, and understand the meaning and practicalities of PA and nutrition as key elements of healthy lifestyles. The homework tasks supplemented the classroom work and targeted family involvement in food and PA related tasks.	Non-active intervention Comparison schools received normal instruction. This did not involve a specific unit of PSHE focused on healthy

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	eating and PA, but concepts related to these areas may have been touched on informally during other lessons (e.g. science, food technology, physical education, etc.)
Foster 2008	zBMI long-term; BMI long-term	School	SNPI (School Nutrition Policy Initiative)	The SNPI included the following components: school environment self-assessment on healthy eating and physical activity; 10 hours per year of training in nutrition education and nutrition and physical activity theme packets designed to integrate classroom lessons, cafeteria promotions and parent outreach; nutrition policy to remove the sale of soda and other drinks, chips and snacks from vending machines and cafeteria of schools with full-service kitchens; social marketing to increase meal participation and consumption of healthy snack and beverage items; parent outreach to encourage parents and students, on the way to and from school, to purchase healthy snacks. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention NR
Fulkerson 2022	zBMI medium-term	Home + community	NU-HOME (New Ulm at HOME - Healthy Home Offerings via the Mealtime Environment)	Participants randomised to the intervention condition received the NU-HOME family intervention programme that included group sessions with other families focused on nutrition education, cooking skills and physical activity. The intervention programme also included individual goal-setting phone calls with parents and online, complementary materials. The NU-HOME family intervention programme consisted of 7 monthly	Non-active intervention Participants randomised to the delayed intervention condition did not receive any educational mate-

Table 2. Description of the interventions *(Continued)*

				group sessions, individual goal-setting calls and online materials to support the sessions. The intervention focuses on promoting healthful family meals where parents and children cook and eat together, healthful home food and physical activity environments, and being active together as a family. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	rials or training until after the final data collection. Once all data collection was completed, they received a short-term version of the NU-HOME intervention programme that was offered to the intervention families
Gentile 2009	BMI short-term; BMI medium-term	School + home + community	Switch programme (Switch what you Do, View, and Chew)	The Switch programme promoted healthy active lifestyles by encouraging students to 'Switch what you Do, Chew, and View'. The specific Do, View, and Chew goals were to be active for 60 minutes or more per day, to limit total screen time to 2 hours or fewer per day, and to eat 5 fruits/vegetables or more per day. The intervention utilised overlapping behavioural and environmental strategies employed at multiple ecological levels. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Control schools did not receive any school materials. Control families were recruited similarly to experimental families, but received no materials other than the surveys
Greve 2015	BMI long-term	School	HSN (Healthy Schools Network)	The main focus of the HSN programme is to communicate information about the health status of the children involved (based on health measurements) via the school health committee and the HSN web-based plat-	Non-active intervention Control schools were offered the

Table 2. Description of the interventions *(Continued)*

				form. The intention is that measuring children should raise awareness of the state of health, and lead to health-improving behavioural change. Part of the health information provided through the HSN intervention is already provided by the school nurses. Schools measure height and weight irrespective of whether they participate in HSN. Intervention adds additional measurements of fitness ranking and vertical jump height. This provides information on measurements at grade and school level besides informing students about their own measurements, encourages teachers to use this and other health information in class and communicates knowledge on health and potential health promoting projects through the web-based platform and the school health committees. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	opportunity of participating in the HSN programme from the school year 2011/12 onward
Griffin 2019	zBMI short-term	Community	HDHK-UK (Healthy Dads, Healthy Kids, United Kingdom)	The HDHK-UK intervention comprised weekly 90-min sessions over 9 consecutive weeks; 4 courses were delivered. Fathers and children attended all sessions, which followed the same structure: 15 min discussion and review of the weekly activities followed by 30 min, where children and fathers took part in an education session separately. The groups were facilitated by local, experienced and trained staff to ensure the sessions were interactive and discussion was encouraged. Fathers' sessions covered a range of lifestyle behaviours around the importance of physical activity, nutrition and parenting. Children were taught about healthy eating, physical activity and how to be a supportive family member by encouraging and modelling healthy lifestyle behaviours at home. The final 45 min of the session were spent doing physical activity within family groups. These practical sessions had 3 elements: 'rough and tumble' play; teaching children fundamental move-	Attention control The control group received information about local opportunities for physical activity plus a voucher for the family to attend a leisure centre

Table 2. Description of the interventions *(Continued)*

				ment skills (catching, throwing and kicking); and aerobic fitness. Some adaptations to resources were made by study team as a result of qualitative research, including reducing the number of powerpoint slides, simplifying and anglicising wording and updating the guidance and stats to align to UK public health recommendations. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Grydeland 2014	zBMI long-term; BMI long-term	School	HEIA (HEalth In Adolescents)	The multilevel approach included collaboration with school principals and teachers, school-health services and parent committees. Multiple intervention efforts were orchestrated to promote a healthy diet and to increase awareness of healthy choices, to increase participants' physical activity during school hours and leisure time, and to reduce screen-time. The teachers were responsible for holding one structured lecture on energy balance for the students (lessons with student booklet), initiating a 10-minute physical activity break during class at least once a week, having fruit and vegetable breaks, hanging up key messages posters in the classrooms, carrying out active commuting campaigns, handing out fact sheets to parents once a month (including student-parent tasks in 7th grade), and implementing a computer-tailored program for the students. The intervention schools received an "Activity box" with sports equipment and toys (such as a variety of balls, hockey-sticks, jump ropes, elastic bands, frisbees, etc.) to promote physical activity during recess. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

				The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Habib-Mourad 2014	BMI short-term	School	Health-E-PALS (Healthy Eating and Physical Activity in Lebanese School)	The intervention specifically targeted obesity-related behaviours in 9- to 11-year olds including: increasing consumption of fruits and vegetables, favouring healthy over high-energy dense snacks and drinks, increasing the habit of having breakfast daily, increasing moderate-to-vigorous physical activity, and decreasing overall sedentary behaviour. The intervention comprised 3 co-ordinated components: 1) 12 culturally appropriate classroom sessions using fun and interactive activities; 2) a family programme consisting of meetings, health fairs and packets sent home along with some food samples and recipes; 3) a food service intervention targeted the school shops and the lunch boxes sent by the family. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Students in the control schools received their usual curriculum during the intervention period
Habib-Mourad 2020	zBMI long-term	School	Ajyal Salima Program	Twelve nutrition education interactive activities were delivered in the classroom during the first academic year and six complementary activities were delivered during the second academic year. The first component consisted of culturally appropriate classroom sessions using fun and interactive activities delivered once a week by teachers. The intervention sessions provided appropriate nutrition education in a simple and fun layout. Each session consisted of 2 sections; discussion, information and interaction about the topic of the week followed by activity: game and/or food preparation. Take-home packets summarising the major points covered during the educational ses-	Non-active intervention Students in the control schools did not receive any intervention through the entire 3-year study period. After completion of the study, students in the control schools were

Table 2. Description of the interventions *(Continued)*

				sions were also sent home along with some food samples and recipes. The goal of the take-home pamphlets was to address non-compliance and poor attendance at parents' school meetings. The third component included a food service intervention targeting the school shops and the lunch boxes sent by the family. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	offered the opportunity to receive the intervention.
Haire-Joshu 2010	zBMI short-term	Community	PARADE (Partners of all ages reading about diet and exercise)	Intervention families received the standard tutoring programme plus the intervention. The curriculum was developed to focus on content designed to enhance knowledge of dietary and activity guidelines, identify common and accessible activities, and low-cost and accessible fruits and vegetables. Each module was packaged to contain all programme materials including an individual visit lesson plan, a storybook and a parent action newsletter. Child tailored storybooks: 8 computer-tailored storybooks were developed that comprised an adventure series including colourful graphics and engaging characters (e.g. talking animals) as well as preferred repetitive phrasing of the storyline motto (e.g. "Play for an hour a day!") and an interactive word game. To create these computer-tailored storybooks, children first completed a brief 5-minute assessment to gather individual data on baseline knowledge, self-efficacy, dietary intake, activity level, current interests and preferred activities related to the theoretical constructs. Each child's data were matched with the specific messages and graphics that best reflected that child's needs. These elements were then exported into storybook templates, creating the 8 computer-tailored storybooks for each child. Since the storybook was developed for that specific child, the content varied. However, all storybooks included: (1) discussion of positive patterns and ways of changing negative patterns, (2) specific action steps for the child to take to	Non-active intervention Control children received the standard tutoring programme which consisted of routine 1-hour visits with the child

Table 2. Description of the interventions *(Continued)*

				change or maintain behaviours, (3) suggestions for how the child can talk to his or her parents about possible strategies or solutions. All storybooks were created, printed and bound in-house. Children received the storybook in each session and were encouraged to take the book home to their parents. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
HEALTHY Study Group 2010	zBMI long-term	School	HEALTHY Study	The intervention consisted of 4 integrated components: nutrition, physical activity, behavioural knowledge and skills, and communications and social marketing. The nutrition component targeted the quantity and nutritional quality of foods and beverages that were served throughout the school environment. The physical-education component was designed to increase the amount of time students spent in moderate-to-vigorous physical activity. Behavioural knowledge and skills were communicated with the use of a classroom-based programme, FLASH (Fun Learning Activities for Student Health). Communication strategies and social marketing integrated and supported the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Control school study activities emphasised recruitment and data collection. No 'placebo' intervention was delivered. Activities and efforts to retain the involvement of control schools and students throughout the trial were implemented. At the end of the study, control schools were given a set of intervention materials (excluding equipment and training sessions).

Table 2. Description of the interventions *(Continued)*

Hendy 2011	Percentile short-term	School	KCP (Kid's Choice Program)	The intervention group (called the "LIONS") received stars punched into their name tags for each of 3 "Good Health Behaviors" that included eating 1/8 cup of fruit or vegetables ("the size of a ping pong ball") first during their meal, choosing a low-fat and low sugar healthy drink, and having 5000 exercise steps recorded on their pedometers. Children could earn extra stars if their parents reported their behaviours during 5 dinner meals at home (with 1 star given for each dinner and for each mealtime behaviour reported). Reward Days were offered each week, so children could trade 10 stars for one small prize (pens, fancy pencils, notebooks, modelling clay, puzzles, banks, toy gliders, stickers, water bottles, playing cards, jump ropes, stuffed animals, balls, silly hats, etc.). A large table was set up in the corner of the lunch room with large plastic bins containing a selection of 5 or 6 prizes. During the last 10 min of the lunch period for each grade, children were called by classroom to line up along the edge of the lunchroom to approach the table and trade their 10 stars for a prize of their choice. Children were given new name tags each week, but allowed to keep leftover stars toward the next week's Reward Day. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Attention control The control group (called the "TIGERS") received stars punched into their nametags for each of 3 "Good Citizenship Behaviors" that included talking quietly during meals, keeping their meal area clean, and respecting others by not touching them or their things
Hopper 2005	BMI short-term	School	Family Fitness	The programme group received a health-related fitness school-based programme and a home programme that required parents and children to complete activities and earn points for nutrition and exercise activities. Physical education instruction for three 30-min lessons per week emphasised the physical activity and fitness objectives specified in Healthy People 2000 (1993). The specific lessons were taken from the curriculum guide by Hopper, Munoz, and Fisher (1997). Lessons included a variety of co-operative activities and games with 20 min of aerobic	Non-active intervention Children received no additional instruction in nutrition and physical education beyond that provided in their regu-

Table 2. Description of the interventions *(Continued)*

	activity in each. Children received suggestions on how to participate in such activities as walking and bicycling with parents. Nutrition education occurred in the classroom and was scheduled as part of the curriculum for two 30-min lessons per week. Classes emphasised the impact of nutrition on heart health, reading labels and other consumer tips. The classroom teacher taught the format and included hands-on activities, games, group discussion and role-playing designed to encourage the use of healthy foods. Food choices were designated as "everyday" (low in fat and cholesterol, high in fibre) and "sometimes" (typically higher in fat) foods, thus, attempting to remove guilt and promote healthy eating habits. Children were also taught how to discuss nutritional topics at home with their parents and how to improve eating habits within the family. The intervention included a home programme that requested parents and children to complete activities and earn points for exercise and nutrition activities. The school-based lessons paralleled the information taken home, and children were encouraged to share the knowledge learned in class with their parents. The family teams received weekly points for completing exercise and nutrition activities. Parents and children earned physical activity points, one point per minute of activity, in self-selected physical exercise/activity. A goal of 100 points per week was the target for each family fitness team. Children and parents received points for their individual exercise, but 50 of the 100-point weekly goal was designated for parents and children participating together in selected physical activities. Nutrition activities included using heart-healthy recipes, setting nutritional goals, and distinguishing between everyday and sometimes foods. Each student and participating family members received a t-shirt after completing the pre-test session, and children were rewarded with stickers every time they returned their scorecard on Mondays. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	lar school curriculum

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: no	
Hull 2018	zBMI short-term; zBMI long-term; BMI short-term; BMI long-term	Home + community	Healthy Families Study	Familias Saludables Activas aimed to increase physical activity, decrease sedentary behaviour and improve healthy eating behaviours through parental modelling and experiential learning for children. Trained lay Community Health Promoters (CHPs) implemented the intervention in a Hispanic community centre over 12 months. The intensive 4-month phase consisted of eight 90-min bi-weekly group sessions, and was attended by parents and their children. During the 8-month reinforcement phase, families were mailed a bi-monthly newsletter reinforcing intervention content. In the alternating months, CHPs called parents to discuss goal-setting progress, motivate, give social support and answer questions. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control The families randomised to the control arm receive an alternative intervention called Familias Saludables Sonrientes, or Smiling Healthy Families, focused on oral health that does not overlap with the content areas of the weight gain prevention intervention. The oral health intervention is structured in a parallel fashion to the obesity prevention intervention, as a family-based intervention implemented by trained lay CHPs in a community setting over a 12-month period
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned 1 research staff member who visited the school 2 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition), and physical education teachers (physical activity condition). Newsletters were distributed tri-	Attention control For delayed-intervention schools, health-focused messages not related to obesity prevention were implemented, with

Table 2. Description of the interventions *(Continued)*

				ennially to reinforce targeted health messages (e.g. Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	obesity prevention delivered at the end of the trial
Jansen 2011	BMI short-term	School	Lekker Fit! (Enjoy being fit!)	Multicomponent intervention delivered by teachers and integrated into curriculum that focuses on the promotion of healthy eating and active living. The intervention targets individual behaviours as well as school policies and curriculum and is based on the theory of planned behaviour and the ecological model of Egger and Swinburn. The Rotterdam Daily Exercise Project consisted of an intensified school sports curriculum by a professional teacher, during and after school hours, education of parents with respect to healthy nutrition and exercise, education of children with respect to healthy nutrition and exercise, as well as promoting sport facilities in the neighbourhood. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention Control schools continued with their usual curriculum. The usual curriculum of primary schools in the Netherlands consists of 2 PE sessions a week by the classroom teacher or a PE teacher, dependent on the school's policy

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: no	
Kain 2014	zBMI medium-term; BMI medium-term	School	NR	The intervention included classroom nutrition education, increasing physical education (PE) class time, and increasing the time children were moderately active during those classes. Teachers from kindergarten to 3rd grade were trained on the correct application of the contents of a special booklet that includes 8 sessions of 90 min each on health eating for the children, and on the use of a book containing a leaflet for each class which includes drawings of different exercises recommended to increase MVA. Kiosk owners were trained on how to gradually offer 80% of healthy foods. During one regular school meeting, the study nutritionist briefly explained to parents in every class the objectives of the programme and specifically the types and combination of snacks considered to be "healthy". The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention NR
Keller 2009	zBMI medium-term	Clinical setting	NR	The paediatrician carried out a low-threshold intervention that consisted of an age-adapted nutrition and exercise programme to inspire the awareness of adequate nourishment and motion. This included 3-monthly measurement of height and weight by a paediatrician and consultation about aims to change lifestyle (diet and exercise) and progress to targets based on results of questionnaire (PA) and food diaries; 3 food diaries over period of 12 months, each for 5 days including 1 weekend. Dietitian passed recommendations for dietary change (based on food diaries) to paediatrician for consultation with family and child. The intervention includes a home activity: no The intervention is delivered: individually	Non-active intervention The subjects of the control group received neither information after intervention

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Kipping 2008	BMI short-term	School	AFLY5 (Active for Life Year 5)	The intervention schools were provided with teacher training and teaching materials for 9 physical activity lessons, 6 nutrition lessons and 1 lesson about screen viewing. In the physical activity lessons, the children played games based on the food groups using photographs of food that reinforced the theory taught in the nutrition lessons. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control schools were provided with teacher training and teaching material after the completion of the study
Kipping 2014	zBMI short-term; zBMI long-term	School	AFLY5 (Active for Life Year 5)	The intervention schools were provided with teacher training and teaching materials for 9 physical activity lessons, 6 nutrition lessons and 1 lesson about screen viewing; 10 parental-child interaction homework activities; information in the school newsletters about the importance of increasing physical activity, reducing sedentary behaviour and improving diet; written information for parents on how to encourage their children to eat healthily and be active. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes	Non-active intervention Schools randomised to the control group continued standard education provision for the school year, and involvement in any additional health-promoting activities, but had no access to the intervention teacher training and no known ac-

Table 2. Description of the interventions *(Continued)*

				– provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	cess to the teaching materials, which have not been published and were not made available by the research team beyond the intervention schools
Klesges 2010	BMI medium-term; BMI long-term	Community	Memphis GEMS (Girls health Enrichment Multi-site Studies)	The obesity prevention intervention provided practical experience with nutrition and physical activity. Girls and caregivers participated in the obesity prevention intervention through a combination of separate and joint sessions. Participants met weekly in small groups of typically 8 to 15 girls. Meetings were held at the community centres on weekday evenings. Sessions lasted approximately 90 min, and parents/caregivers attended with the girls. During the second year of the programme, the intervention transitioned to monthly field trips (e.g. tour of a grocery store, visit to the Civil Rights Museum) to provide an interactive learning experience in keeping with intervention goals. Field-trip sessions were designed to incorporate the nutritional and physical activity information from the first year into real-life scenarios. Behavioural goals for the girls included eating a nutritionally balanced diet, reducing consumption of high-fat foods and sugar-sweetened beverages, and increasing intake of fruits, vegetables and water. Behavioural goals for increased moderate-to-vigorous physical activity and decreased sedentary behaviour were also included. Behavioural strategies included skill building (e.g. teaching dance steps, healthy snack preparation), self-monitoring, feedback and positive reinforcement, goal-setting, problem-solving and social support. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes	Attention control The alternative intervention targeted the girls only and was designed to provide meaningful benefits with the goal of improving self-esteem and social efficacy. There was no focus on changing behaviours at home or activities related to diet, physical activity or body weight

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: no	
Kobel 2017	BMI medium-term; percentile medium-term	School	Join the Healthy Boat (Baden-Wurttemberg Study)	The intervention combines elements from behavioural prevention and situational prevention. The 3 main goals of the intervention are to increase physical activity, to decrease the consumption of sugar-sweetened beverages and to decrease time spent with screen media. The ready to use materials the teachers are given include 1 lesson per week (on physical activity, diet or screen media use) and daily exercise breaks of 10 to 15 min. The main focus lies on the promotion of healthy and active alternatives, which children are offered to choose in order to lead a healthier lifestyle. In order to enable children to carry home the learnt information, parents' nights, regular parents' letters and so-called family homework are provided; the latter require joint efforts of parents and child to solve the given exercises. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The teachers in the schools of the control group continued to teach as normal and were obliged to wait 1 year before they could take part in the vocational training
Kocken 2016	zBMI short-term; zBMI long-term	school + home	Extra Fit!	The intervention EF! comprised a variety of theory and practical lessons on nutrition and physical activity to provide an attractive program for the children. The intervention was focused on the main behavioural changes: decreasing consumption of high-energy or high-fat foods and sugar-sweetened drinks; promoting a healthy breakfast; increasing consumption of fruits and vegetables; reducing television viewing and computer gaming/browsing; and increasing physical activities at school and outside school hours. These activities were especially designed to increase knowledge and awareness of the children, to get them involved and excited, and to involve parents and teachers in the process. The programme consisted of 7 lessons in the first school year and 9 in the second year.	Non-active intervention Control schools followed their regular school programme

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Kubik 2021	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	Home + community	SNAPSHOT (Students, Nurses, and Parents Seeking Healthy Options Together)	The intervention targeted weight-related behaviours and lifestyle practices likely to prevent excess weight gain and unlikely to cause harm. The programme included 14 kid group and 5 parent group sessions that were held after school at a central school location and 4 home visits, totalling 32.5 contact hours. The 90-minute kid group sessions were held once or twice a month and focused on behavioural messages presented by characters from the SNAPSHOT comics, a series of 14 comics, each with a targeted message about a healthy lifestyle practice were developed and provided the 'theme' for each kid group. The comics were colourful and engaging, with behavioural messages conveyed in simple rhymes 'spoken' by the SNAPSHOT comic characters, Nurse Karen Aboutkids, Trudy Foody and the Phyz, and comic villains such as Lord Bored (sedentary behaviour), Sweatie Cheatie (sugary drinks) and the More Monsters (portion size). Each group session included a snack break with food preparation by the child, hands-on activities, games and goal-setting linked to the behavioural message and 30 minutes of physical activity. The 90-minute parent group sessions, held approximately every other month, began with a light easy-to-reproduce dinner prepared by the school nurse interventionist, followed by a check-in to share successes and challenges, hands-on activities with behavioural messages consistent with kid group themes, and 30 minutes of physical activity. A 60-minute home visit was scheduled quarterly and focused on tailored support for the child and parent, guided by child and family goals for behaviour change. This included an icebreaker game; questions and review of the SNAPSHOT program content; a card-sort game that allows the child with parent	Attention control The control group received monthly newsletter with family-oriented healthy lifestyle information

Table 2. Description of the interventions *(Continued)*

				assistance to identify dietary and activity behaviours that are important to the child and a focus for behaviour change, and a family goal-setting activity led by child with parent assistance. For the school-based components, a study-funded after-school bus transported children from their school to the intervention site. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Levy 2012	zBMI short-term	School	Nutrition on the Go	The strategy "Nutrition n the Go" consisted of 4 components: 1) A gradual decrease of the energy content of school breakfasts by reducing the fat content in milk, not increasing carbohydrates, decreasing the sugar content of the cereals provided and including fruit. 2) The gradual regulation of food offered within the school, through the technical council of the State of Mexico. 3) Gradual adherence to the physical activity programme, according to the requirements of the Ministry of Public Education (SEP, Spanish acronym). 4) Implementation of an educational campaign, called "Healthy Break," for healthy eating and physical activity. The educational materials produced for the "Nutrition on the Go" strategy for healthy eating and physical activity included: student booklets and a facilitator's guide; a school guide; a calendar for parents, as well as videos (or printed handouts for schools with no DVD players) and audio spots. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention NR

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: yes	
Li 2019	zBMI medium-term	School	CHIRPY DRAGON	The intervention programme included 4 school- and family-based components targeting children, main carers, school physical activity and food provision to encourage physical activity and healthy eating behaviours in children both within and outside of school. Component 1: interactive learning workshops with co-ordinated family-wide healthy behaviour challenges. Component 2: setting improvement goals and providing supportive evaluation and feedback for school lunch provision. Component 3: promoting physically active games and activities involving both children and their parents. Component 4: improving the implementation of the Chinese national requirement for One-Hour Physical Activity on Campus Every School Day. School principals and class teachers were provided with a programme handbook that explained all intervention activities and the support for intervention delivery that was required from the school staff. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Schools assigned to the control arm continued with their usual provision during the full trial period with no access to any of the CHIRPY DRAGON intervention activities and resources.
Lichtenstein 2011	zBMI medium-term; zBMI long-term	School	GiZu (Gesund in die Zukunft) Prevention Program	Nutrition module and physical activity for children, and evening coaching sessions for parents. Materials used included colouring pads, food or the like. The contents of the children's modules were laid down in manuals that were given to all schools. The child nutrition units were worked out on the basis of the About Milk Pirates and Limo Kings file. Sports teachers received a folder with thematically structured suggestions for exercises with roller boards etc. and for different settings such as sports field, playground or similar. The content of the movement units was flexible. The teaching units were: games	Non-active intervention No intervention

Table 2. Description of the interventions *(Continued)*

				with roller boards, playing with the swing cloth, when eating learns to walk, running and catching, wrestling and fighting, adventure worlds, relaxation. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Liu 2019	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	School	NR	School-level policies. Throughout the intervention period, students were told not to drink sugar-sweetened beverages or eat unhealthy snacks in schools, and drinking water was advocated. They were also told not to play with electronic products (e.g. smartphones and tablet computers) in schools. Children were encouraged to perform at least 60 minutes of MVPA each day. Health education activities. Delivery personnel (class teachers) of health education activities had been trained by study team members. Emphasis was put on participatory teaching methods (i.e. case discussions, brainstorming, practices, scenario analyses, game playing, and singing songs) and interaction between teachers and students. A total of 4 health education lessons were delivered to children in the first semester, with one 40-min lesson delivered once every 2 weeks. Students were asked to keep diaries of behaviours in relationship to diet and physical activity for a week (from Monday to Sunday) once a month. Improvement of physical activity. Schools were required to provide at least three 45-minute PE classes per week, with at least 30-minute MVPA in each class. We also provided students with small sports equipment to support the various extracurricular activities that children were interested in (e.g. rope jumping and shuttlecock kicking). In addition, students were encouraged to perform exercise at home and instruction manuals were distributed to them, which provided suggestions on types of activities they could engage in. Moreover, the extracurricular activities for children who were over-	Non-active intervention Schools in the control group continued usual practice without involvement in any intervention during the 12 months' follow-up

Table 2. Description of the interventions *(Continued)*

				weight/obese were encouraged by their parents, after the head teacher told their parents that the sport club was offered. PE teachers organised the club at weekdays, which consisted of 30-minute activities at moderate to vigorous intensity. Improvement of school lunches. Trained investigators then assessed the recipes of school lunches and provided practical suggestions to the managers of school lunch to improve children's dietary intake at school. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Liu 2022	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	School	DECIDE (Diet, Exercise and Cardiovascular Health) - Children	DECIDE intervention included 3 components targeting children to promote a healthy diet and physical activity (health education on better diet, less sedentary time and more physical activity, reinforcement of physical activity, and BMI monitoring and feedback) and 2 components targeting the children's environment by engaging schools and families. School implemented several school policies and ensured curriculum time for health education and physical education at school, and families supported children's behavioural changes. The intervention strengthened family involvement with the assistance of a smartphone app. The parents received 5 core messages through 3 face-to-face health education sessions and were encouraged to promote a healthy diet and physical activity for their children outside school. Parents were trained to encourage their children to make behavioural changes. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to	Non-active intervention The 12 control schools continued with their usual health education lessons and physical education sessions, but they did not focus on obesity

Table 2. Description of the interventions *(Continued)*

				– modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Llargues 2012	BMI long-term	School	AVall	The intervention consisted of the promotion of healthy eating habits and physical activity. The educational methodology IVAC, based on the principle that school children are actors able to operate over their environment, was used. The children investigate and reflect on how the environment determines their health and lifestyle, while the teacher assists them in developing skills to change these conditions. This educational method allows the inclusion of activities related to healthy food habits and physical activity in any subject of the curriculum. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention NR
Lloyd 2018	zBMI long-term; BMI long-term	School	HeLP (Healthy Lifestyles Programme)	HeLP intervention included dynamic and interactive activities (e.g. physical activity workshops, education sessions delivered by teachers with short-term homework tasks, drama sessions), and setting goals to modify behaviour (with parental support and one-to-one discussions with HeLP coordinators). HeLP consisted of 4 phases, which were ordered to enable and support behaviour change by targeting school and family environments and giving children the strategies and motivation to improve their snacking and activity-related behaviours. The programme delivered a general healthy lifestyle message with a focus on behaviours such as the consumption of sugar-sweetened beverages, healthy and unhealthy snacking, physical activity and reducing screen time. The intervention includes a home activity: yes The intervention is delivered: as a group	Non-active intervention Schools assigned to the control group continued standard education provision throughout their participation in the trial, and had no access to any of the HeLP resources and scripts, which have not been published and were not made available by the re-

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	search team beyond the intervention schools
Magnusson 2012	BMI long-term	School	NR	The intervention primarily focused on increasing physical activity during school hours and promoting healthy dietary habits, both at school and at home. It was a teacher-led daily implementation of various intervention tactics, which were introduced and discussed during bimonthly meetings led by the research team. The PA intervention was progressive in nature, starting with approximately 30 minutes a day at the start of the study and increasing to approximately 60 minutes a day in the latter intervention year, where teachers who implemented the intervention used various strategies to better integrate PA into the daily routine at school. The teachers at the intervention schools were provided access to physical activity equipment intended to be used during regular school lessons. This included a cart with different sized foam, plastic and rubber balls, different coloured vests, and cones. Teaching materials promoting physical activity, such as books and DVDs on classroom workouts and cooperative activity games etcetera were also provided. The main focus of the dietary intervention was on increasing fruit and vegetable intake, with both educational materials and homework assignments. Food-based dietary guidelines on fish, fish liver oil and milk intake were also in focus, and parents, teachers, and school food service staff were involved in the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Non-active intervention The teachers in the control schools knew that they were a part of an intervention study but were in no contact with the research team except during the measurement periods.

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: yes	
Marcus 2009	zBMI long-term	School	STOPP (Science and Technology in Childhood Obesity Policy Project)	The teachers were instructed to encourage the children to increase the intake of vegetables during school lunch, low-fat dairy products and whole grain bread were promoted and all sweets and sweetened drinks were eliminated in intervention schools. Physical activity was aimed to increase by 30 minutes per day during school time and sedentary behaviour restricted during after-school care time. A STOPP newsletter was distributed to parents and school staff twice annually, aimed to increase the awareness of the intervention. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control group received no intervention and continued as usual
Morgan 2011	zBMI short-term	Community	HDHK (Healthy Dads, Healthy Kids)	The 3-month HDHK programme involved fathers attending 8 face-to-face group sessions (75 min each). Five group sessions were for fathers only; 3 of the group sessions were practical and involved both fathers and children participating together. The programme aims were to help fathers achieve their weight loss goals, become healthy role models and promote healthy behaviour in their children. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes	Non-active intervention The waitlist control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: no	
Morgan 2014	zBMI short-term; BMI short-term	Community	HDHK (Healthy Dads, Healthy Kids)	The 3-month HDHK programme involved fathers attending 8 face-to-face group sessions (75 min each). Five group sessions were for fathers only, 3 of the group sessions were practical and involved both fathers and children participating together. The programme aims were to help fathers achieve their weight loss goals, become healthy role models and promote healthy behaviour in their children. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The waitlist control group received no information or intervention before attending the 3- and 6-month follow-up assessment sessions
NCT02067728 2014	zBMI short-term	Clinical setting	FNPA (Family Nutrition Physical Activity)	Family nutrition physical activity tool implemented during well-child visits within the practice, comprising 2 components: 1) assessment to screens for obesigenic behaviours. 2) Brief Action Planning conversation designed to assist the family develop a health behaviour change goal based on obesigenic risks on the assessment tool. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control group received usual care during the well-child visits
Nemet 2011a	BMI medium-term; percentile medium-term	School	NR	Nutritional intervention: the intervention consisted of topics such as food groups, vitamins, healthy food choices, food preparation and cooking methods, and informa-	Non-active intervention

Table 2. Description of the interventions *(Continued)*

	tion on fast-food versus home cooking. The topics were taught through short-term lectures/talks, games and story reading. Topics, such as the contents of popular Israeli foods, fruits and vegetables, calcium and its importance, special dietary consideration during holidays and dealing with food excess during celebrations, vacations, restaurants, etc. were also covered. All topics were delivered by the preschool teachers and made appropriate to the cognitive and social development levels of kindergarten children. In addition, monthly flyers detailing nutritional information were sent home via the children. Children were asked to present the nutritional information to their parents, and parents were asked to discuss the information with their children. Physical activity programme: children participated in a 45-min (divided to three 15-min sessions) per day exercise training (6 days/week). Once a week, the training was directed by a professional youth coach. During the rest of the week, similar physical activity sessions were co-ordinated by the preschool teacher and/or her assistant, as instructed during the seminars. The physical activity sessions were performed indoors and/or outdoors. The activities varied in duration and intensity and were designed primarily as games to encourage enthusiasm and participation of the children. Endurance type activities accounted for most of the time spent in training (about 20% team sports, such as soccer or dodge ball and 80% running games, such as tag, hide and seek, relays, etc.), with attention also given to co-ordination and flexibility skills. Children were encouraged by the study staff to increase their habitual after-school physical activity and to reduce sedentary activities (e.g. television viewing, video games). Preschool teachers were also given a CD collection of children's songs, written by a famous Israeli children's songwriter, related to the topic of nutrition and exercise. Parents and children were invited for two “Health Festival” days that focused on the major themes of the programme (introduction of healthy nutrition, prevention of childhood obesity, and beneficial effects of exercise in children). The festivals included lectures given by the study team and games in which the children and parents played together. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes	The control group received regular kindergarten schedule

Table 2. Description of the interventions *(Continued)*

				The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Nemet 2011b	BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	School	NR	See Nemet 2011a The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention See Nemet 2011a
Nollen 2014	BMI short-term	Telehealth/school (active intervention control group)	MT (Mobile-Technology) intervention	Both conditions included three 4-week modules that targeted fruits/vegetables (FV; weeks 1 to 4), sugar-sweetened beverages (SSB; weeks 5 to 8), and screen time (weeks 9 to 12). The mobile technology (MT) intervention was delivered on a MyPal A626 handheld computer. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Attention control Girls randomised to the control condition received manuals at weeks 1 (FV), 5 (SSB) and 9 (screen time). Manuals were comprised of screen shots from each respective module and were identical in content to MT.
Nyberg 2015	zBMI short-term; zBMI medium-term	School	Healthy School Start	The programme comprised 3 components: Health information: a brochure was developed with the aim of increasing parental knowledge on how to promote children's dietary and physical activity habits based on a literature review. Motivational interviewing: used to target and increase parental care and control and	Non-active intervention Control classes were offered the whole programme di-

Table 2. Description of the interventions *(Continued)*

				self-efficacy to provide support for healthy eating and physical activity to the child, as well as to stimulate willingness to change. Classroom activities component: targeted the children's knowledge, attitudes and preferences and the parents' role modelling for healthy behaviours. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	rectly after the 6-month follow-up measurements
Nyberg 2016	zBMI short-term; zBMI medium-term	School	Healthy School Start Study II	See Nyberg 2015 The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention See Nyberg 2015
O'Connor 2020	zBMI short-term	Clinical setting	PSNS (Papa's Saludables Niños Saludables)	Papa's Saludables Niños Saludables was culturally adapted from the Healthy Dads Healthy Kids programme. Fathers were provided with the education and resources to successfully lose weight and learn about healthy nutrition, and fathers and children were encouraged to engage in fun PA together. This was achieved through the group sessions for fathers and children, and handbooks for fathers, mothers and children, which were culturally adapted. The programme included weekly 90-minute sessions over 10 weeks. The programme was offered on Sunday afternoon, the time identified by the fathers that they preferred due to busy work schedules, at the child's TCHP	Non-active intervention The families in the wait-list control group received the full programme after the post-assessment of the full sample.

Table 2. Description of the interventions *(Continued)*

				primary care paediatric clinic. Clinic classrooms and a designated area of the parking lot were used to deliver the programme. Fathers and children attended all the sessions together, and mothers were invited to 1 session (week 4). Each meeting consisted of a brief introductory and review session with fathers and children, separate break-out discussions for fathers and children (Dad's Club and Kid's Club); and a joint PA component (Sports Club) for fathers and children. Each week covered different nutrition and physical activity topics for fathers and a corresponding session for children. The Sports Club included facilitator-led activities in rough and tumble play, fundamental sports skills and fitness that encouraged fathers and children to take part in fun, active games together that they could also do at home. Each family was provided a set of culturally adapted game cards with a bag of sports equipment to encourage practising sports skills at home. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Pena 2021	zBMI short-term; BMI short-term	School	Juntos Santiago trial	Gamification strategy consisting of 4 components: (1) Healthy Challenges of 3 types: Healthy Snacks Challenge, in which children collect points for bringing healthy snacks for school breaks; Steps Challenge, in which children are given an activity tracker; and Healthy Activity Challenge, in which children and their families collect points by uploading pictures of specific healthy activities defined by the research team; (2) gamification incentives, including the use of points, leader boards, and badges, to promote behavioural and structural change in the schools; (3) rewards, including a starting kit, activity reward and structural reward for schools (e.g. climbing walls, improvements in sports infrastructure); and (4) an online platform, where children and parents could monitor the class and individual progress and receive nutritional education	Non-active intervention Students and parents in the control arm received access to the online platform used in the game (also available for participants in the intervention group).

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Puder 2011	BMI medium-term	School	Ballabeina study	Multidimensional culturally tailored lifestyle intervention including a physical activity programme, lessons on nutrition, media use (use of television and computers), and sleep and adaptation of the built environment of the preschool class. Children participated in a physical activity programme consisting of four 45-minute sessions of physical activity a week. The sessions were prepared by an exercise physiologist and aimed to increase aerobic fitness and co-ordination skills; they were designed to be playful and organised into themes (such as "clown, spiderman"). The sessions took place in or around the preschool classroom and once a week in the gym. Additional sports equipment such as balls or skipping ropes was offered. Health promoters taught one physical activity sessions a week, which was reduced to twice a month after 4 months. The remaining sessions were provided by the regular preschool teacher. Additionally, there were 22 sessions on healthy nutrition, media use and sleep. Positive and culturally independent nutritional messages were based on the 5 recommendations of the Swiss Society of Nutrition ("drink water," "eat fruit and vegetables," "eat regularly," "make clever choices," "turn your screen off when you eat"). Every other week, children received a new funny physical activity or nutrition activity card to take home. These cards were based on the same themes and nutritional recommendations as the sessions and included specific exercises to be done at home. A CD with specific music for most physical activity cards was created to increase pleasure and define the minimal time the activity should be performed. In addition, healthy snacks during recess and healthy treats for anniversaries were promoted and preschool classes exclusively of-	Non-active intervention The control group received the regular school curriculum.

Table 2. Description of the interventions *(Continued)*

				fered their children water and healthy food. In May 2009, a Ballabeina event was organised with games implementing the main messages of the intervention. Stickers that were pasted on a poster in the classroom showed how the programme was advancing. Parents participated in 3 interactive information and discussion evenings about promotion of physical activity, healthy food, limitation of TV use and the importance of sufficient sleep. The built environment in and around the preschool class was adapted to promote physical activity. Fixed and mobile equipment such as climbing walls, hammocks, balls, cords or stilts were installed or provided in and around classrooms, including a "movement corner". Preschool classes were provided with a coloured poster of the “Ballabeina track” to be hung up on a classroom wall. According to the themes of the lessons and cards, stickers were added to allow children and parents to follow progress. Similarly, each class received a large “Ballabeina game” integrating all four lifestyle behaviours that were targeted during the intervention to provide a playful and constant recapitulation of the different parts of the intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child’s behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Ramirez-Rivera 2021	zBMI short-term	School	Planet Nutrition Program	Nutrition and physical activity were delivered by interns from the University of Sonora. Nutrition education: the programme included 18 nutrition education sessions on 26 topics of nutrition and health; the intervention was delivered using a handbook and other didactic strategies such as videos, flannel boards, sketches, games and workshops, in order to make the classes more entertaining and comprehensive. The programme also includes the use of self-monitoring and positive reinforcement. Physical activity: 20 physical activity classes composed of 3 parts (initial, core (greater effort)	Attention control The control group only received general nutrition recommendations based on the 10 Tips to a Great Plate (Choose My Plate), in a single session of 1 h, at

Table 2. Description of the interventions *(Continued)*

				and final) to improve children's flexibility, cardiorespiratory fitness, balance and coordination. Indirect family participation: 6 information brochures were sent to parents. These included different nutrition and health topics, such as consequences of excess weight, difference between good and bad fats, importance of physical activity, healthy eating tips, and consequences of excessive consumption of ultra-processed foods. A booklet with ideas for preparing healthy snacks for their children was also sent home to parents. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	the end of the study. They continued with their usual classes.
Rerksuppaphol 2017	zBMI short-term; BMI short-term	School	Internet Based Obesity Prevention Program for Thai School Children	The contents of the programme consisted of personal data collection, anthropometric variables and the interpretation of nutritional status as normal, overweight or obese, information related to healthy nutrition, food habits and physical activity. Information presented over the internet included text and graphics. Information related to healthy nutrition, such as daily amounts of each food group, portion and serving sizes, was instructed to individual children based on their nutritional status. Participants were encouraged to have daily physical activity for at least 60 minutes per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention Children in the control group were asked to measure weight and height by their teachers monthly and record the information in the report form.

Table 2. Description of the interventions *(Continued)*

Rosario 2012	zBMI short-term; BMI short-term	School	NR	Teachers of the intervention group had 12 sessions and were encouraged to develop activities in class that focused on the learned topics; session 1: how to promote health and prevent disease, lifestyle determinants of health, obesity - definitions and descriptions of the problem, risk factors and health problems; session 2: key concepts in food and nutrition; sessions 3 and 4: dietary guidelines (the Portuguese Food Wheel), healthy eating advice for children, covering the 5 main food groups, and interventions to help children and their families to consume healthy foods and plan well-balanced meals and snacks; session 5: teach children about the importance of water, and teaching strategies to replace consumption of sugar-sweetened beverages with water; sessions 6 and 7: appropriate physical activity levels and healthy eating behaviours such increasing fruit and vegetable intake and decreasing energy-dense micronutrient-poor foods; session 9: strategies to reduce screen exposure time; sessions 11 and 12; healthy cooking and strategies to get children and their families involved in healthy cooking. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention NR
Rosenkranz 2010	zBMI short-term; BMI short-term; percentile short-term	Community	SNAP (Scouting Nutrition & Activity Program)	The intervention consisted of 3 main components: 1) An interactive educational curriculum delivered by troop leaders; 2) Troop meeting policies implemented by troop leaders; and 3) Badge assignments completed at home by Girl Scouts with parental assistance. The educational curriculum consisted of 8 modules, delivered over the course of about 4 months. Each module consisted of a discussion of intervention target behaviours, worksheet for goal setting and self-monitoring, physically active recreation session (e.g. walking, dancing, yoga and active games), fruit and vegetable snack recipe preparation, family meals role-playing, clean-up period and de-	Non-active intervention Control troops completed usual troop meeting activities and received equal observation time, equal pre-test and post-test assessment, and equal study scrutiny

Table 2. Description of the interventions *(Continued)*

				scription of the take-home assignment. The modules were designed to require 60 to 90 minutes to deliver, with flexibility allowed for specified programme activities and module order. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Rush 2012	zBMI long-term	School	Project Energize	Each school programme is individualised to the school and is based on a needs assessment informed largely by the school's stocktake and individual key priorities identified by the specific school. Some activities are uniform across schools, e.g. the 'homeplay challenge', which aims to increase movement and water intake and reduce sedentary time in the home. Children in low-decile schools are provided with daily supplementary fruit and low-fat calcium-enriched cow's milk. There was also a home-school link programme that provided opportunities for parents to attend 3 information-based sessions, which included a 45-min practical nutrition class. In addition to school children, the project offered assistance to teachers, parents and the local community. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Control schools were given no additional resources or information; however, no restrictions were placed on initiatives they may pursue for themselves
Safdie 2013	BMI short-term; BMI	School	NR	The aim of the nutrition intervention component was to improve the prevailing food	Non-active intervention

Table 2. Description of the interventions *(Continued)*

	medium-term; BMI long-term			environment by increasing the availability of healthy food and beverages (particularly water), by reducing the availability of energy-dense foods and sugar-sweetened beverages, and reducing the number of eating opportunities during the school day. The aim of the PA intervention component was to enhance the prevailing physical activity environment by increasing the availability of physical activity resources, by improving infrastructure and enhancing aesthetics. The BASIC programme focused on improving norms related to nutrition and physical activity at the schools and was limited to using existing school infrastructure and resources. The PLUS programme implemented all the components incorporated in the basic programme and included additional financial investment and human resources. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	No changes were made to existing nutrition or physical activity practices in control schools
Sahota 2001	zBMI medium-term	School	APPLES (Active Programme Promoting Lifestyle in Schools)	The programme consisted of teacher training, modifications of school meals, and the development and implementation of school action plans designed to promote healthy eating and physical activity over one academic year. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: yes	Non-active intervention The comparison schools continued with their usual health curriculum, without the intervention

Table 2. Description of the interventions *(Continued)*

Sahota 2019	zBMI long-term	School + home	PhunkyFoods Programme (PFP)	Whole school-based intervention to promote healthy nutrition and physical activity knowledge and behaviours: training of school staff in healthy lifestyles teaching and delivery of the PFP for pupils and their families; selection of on-line, interactive cross-curricular healthy eating and physical activity lesson plans and a resource box comprising food models, food mats, food cards, DVDs and books to facilitate teaching staff in programme delivery; increased sessions for physical activity. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control schools continued to deliver their existing curriculum and were offered GBP 200 book vouchers (half at the end of year 1 and half at the end of year 2) as an incentive for their participation, as well as priority status to receive the PFP at the end of the study when the programme was to be offered to all primary schools in the area.
Santos 2014	zBMI medium-term	School	Healthy Buddies Manitoba	The program content focused on physical activity, promoting healthy foods and having a healthy body image using the slogans: "Go Move!" (activity), "Go Fuel!" (nutrition) and "Go Feel Good!" (body image). Twenty-one lessons were provided to teachers to be delivered during the school year to older students. In schools randomised to the intervention, an older class was paired with a younger class. Each week, the older students received a 45-minute healthy living lesson from their classroom teacher. Later that week, the older students acted as peer mentors, teaching a 30-minute lesson to their younger "buddies." The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes	Non-active intervention Waiting list control group received a regular curriculum

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: no	
Sekhavat 2014	zBMI medium-term; BMI medium-term	Clinical setting	NR	The counselling was conducted in a structured format for the parents of an intervention group and consisted of a 5- to 10-minute counselling session performed in a separate quiet area of the dental clinic. The counselling encouraged an increase in the child's physical activity, a decrease in sugar-sweetened beverage consumption and a decrease in screen time. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention To ensure that both groups benefited equally from the study, the control group received counselling at the end of the study
Sgambato 2019	BMI short-term	School + home	PAAPPAS (Parents, students, community health agents and teachers for healthy eating)	School- and home-based obesity prevention programme encouraging healthy eating habits and physical activity. Interventions at schools were based on educational games, group debates and culinary classes with focus on: (1) reducing the intake of cookies and sugar-sweetened beverages; (2) assembling colourful and tasty salads using vegetables and fruits through culinary classes; (3) encouraging water consumption; (4) increasing physical activity and reducing sedentary behaviour; (5) serving a healthy meal; and (6) reducing the dependence on processed food. Secondary prevention of obesity at home among adolescents with overweight and obesity: community health agents led activities that stimulated lifestyle changes at the family level. The goals were the same as those of the school intervention with emphasis on reducing soda and sugar-sweetened beverages, cookies, sweets and processed food, and increasing fresh food intake. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes	Non-active intervention Participants in the control arm received only the routine activities for healthy behaviour of the school

Table 2. Description of the interventions *(Continued)*

				The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Sherwood 2019	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	Clinical setting + telehealth	Healthy Homes/ Healthy Kids 5-10	The intervention included 2 components: (1) a brief paediatric primary care provider counselling during a scheduled annual well-child visit, followed by (2) phone coaching to support parents in making changes in the home environment to promote the targets of the treatment arm. The obesity prevention (OP) arm behavioural target areas based on paediatric obesity guidelines included limiting sugar-sweetened beverage consumption, encouraging fruit and vegetable consumption, limiting television and other screen time, eating breakfast daily, limiting restaurant eating, encouraging family meals and limiting portion size. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Contact control intervention focused on home safety and injury prevention, fire safety, bicycle safety and sun protection
Siegrist 2013	zBMI medium-term; BMI medium-term	School	JuvenTUM	The programme consisted of monthly lessons lasting 45 min with 3 parts: a warm-up of 10 min with running, playing running games at high intensity, 30-min exercises to improve body awareness and self-esteem with conversation in class about health-related topics, and 5-min relaxation exercises. School environmental settings were altered to promote more physical activity, healthier food availability and choices (more vegetables and fruits and less energy-dense food), and reduce media consumption. Parents and teachers attended 2 and 3 educational health-related lessons, respectively, and also received 10 newsletters on health issues. The intervention includes a home activity: yes	Non-active intervention In the control group, school principals were instructed to continue with school activities as usual, without changing policies related to physical activity or nutrition during the study period

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Siegrist 2018	BMI long-term	School	JuvenTUM 3	The intervention programme comprised weekly lifestyle lessons for children that were taught by their school teachers. The aim of the programme was to increase physical activity in and outside of school by regular physical exercise in sports lessons and additional physical activity in school (active breaks during the lessons, active school breaks). Furthermore, the school prevention programme intended to improve the eating pattern (less sweetened drinks, more healthy meals at school, healthy breakfast) and the health behaviour (reduction of media use and inactivity) of the pupils. Parents received regular newsletters regarding the topics of the lifestyle lessons and were invited to a parental training programme (2 to 3 times a year). The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Control schools were asked to continue their usual activities
Spiegel 2006	zBMI short-term	School	WAY (Wellness, Academics & You)	The WAY programme engages students in multidisciplinary activities in language arts, mathematics, science and health content, building their academic skills while developing their health attitudes, behavioural intent, and, ultimately, behaviour. The programme activities were designed to be teacher initiated and were organised into discrete modules with topics including	Non-active intervention Comparison classes participated in the data collection only and were not exposed to

Table 2. Description of the interventions *(Continued)*

				physical activity and fitness, nutrition and diet, the body and how behaviour influences the body, genetics and family health history. The WAY intervention also included activities that required the students to interview family members to learn about their family health history, discuss meal and activity planning with their parents or guardians, and other impetuses to involve the parents. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	the WAY programme
Stettler 2015	zBMI medium-term; BMI medium-term	Clinical setting	Smart Steps	Parents and children in this programme participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Group 2: Parents and children in the multiple behaviour programme participated in a series of consultations and activities focused on multiple healthy interventions including the beverage only component and a physical activity aimed at progressively increase pedometer counts to 15,000 steps per day and progressively reduce screen time to ≤ 2 hours per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Parents and children in this programme participate in a series of consultations aimed at bullying prevention that are designed to help children learn strategies to make and keep friends, to express feelings appropriately, and to successfully decrease conflicts that often occur at school among children

Table 2. Description of the interventions *(Continued)*

Stolley 1997	BMI short-term; BMI medium-term	Community	NR	The intervention group was exposed to a culturally specific obesity prevention intervention that focused on adopting a low-fat, low-calorie diet combined with increased physical activity. Each week, subjects met in small groups of 7 to 10 dyads led by either an advanced doctoral student in clinical psychology or a registered dietitian (2 African American women, 1 white woman and 1 Asian woman). In these groups, a "concept of the week" was discussed. Dyads then participated in an activity that reinforced the information presented. Activities involved tasting foods, comparing high-fat to low-fat foods, changing recipes and planning meals. In addition, subjects in this programme were asked to bring in their favourite recipes or foods to be analysed for fat and caloric content; culturally relevant music and dance were used for a number of exercise and diet-related activities. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control The control group participated in a general health intervention. This intervention was organised like the treatment intervention with control subjects meeting in small groups (7 to 10 dyads) with group leaders. However, the focus of each class was a general health topic, including communicable disease control, various effective communication skills, relaxation techniques, stress reduction and recycling
Story 2003	BMI short-term	School	Minnesota GEMS (Girls health Enrichment Multi-site Studies) pilot study	KEEPS stood for Keys to Eating, Exercising, Playing, and Sharing. Intervention meetings, designed in a "club meeting" format, were held twice a week, for 1 hour after school, at each of the 3 elementary schools. The intervention also included a family component designed to reinforce and support the healthy eating and physical activity messages delivered in the after-school programme. The intervention was taught by trained African-American GEMS staff. Club meetings consisted of fun, culturally appropriate, interactive, hands-on activities, emphasising skill building and practice of the particular health behaviour message for that week. A healthful snack, sometimes prepared by the girls, and chilled bottled water, was offered at each club meeting. Messages included information about the benefits of drinking water more often than soda pop, increasing the consumption of fruits and vegetables, drink-	Attention control The GEMS Club served as an "active placebo", non-nutrition/physical activity condition, and focused on promoting positive self-esteem and cultural enrichment

Table 2. Description of the interventions *(Continued)*

	ing low-fat milk, selecting low-fat foods for snacks, eating smaller portions of snacks, choosing smaller-sized and lower-fat, entrées in fast food restaurants, increasing physical activity, watching less television and enhancing self esteem. A major component of the after-school intervention was increasing physical activity levels with a variety and choice of activities, such as dancing (ethnic, hip hop, aerobic), double-dutch jump rope, relay races, active African-American games, tag and step aerobics. To keep girls' interest and participation, incentives were built into the programme for attendance, setting short-term goals, and completing activities. These included attendance beads that made a bracelet when put together at the end of the intervention, water bottles, pedometers, jump ropes and t-shirts. The after-school intervention messages were reinforced by family activities, including weekly family packets sent home to the parents and family night events. The packets contained user-friendly materials, including practical suggestions about each week's healthful eating and exercise topic formatted on a refrigerator magnet, a "Fridge Facts" card, and colourful tip sheets. Every other week the family packet also included family-sized packets of ingredients for the low-fat snack prepared by the girls during that day's club meeting (e.g. baby carrots and non-fat ranch dressing, or canned peaches with low-fat granola topping). The girls were encouraged to make the snack for family members. Two family nights were held during the intervention. Families participated in interactive booths, performing such tasks as measuring out the sugar in soda pop, determining the amount of fat in whole milk, compared with low-fat milk, label reading and lower-fat cooking techniques. Family members participated in active games, danced, and had jump rope contests. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: no	
Story 2012	zBMI long-term; BMI long-term	School	Bright Start	Multicomponent intervention including physical activity at school, healthy eating at school and family environment. The physical activity intervention goal was to achieve a total of at least 60 minutes of physical activity at school each day through a variety of approaches, including school PE, class walks outdoors, in-class action breaks and active recess. Active Native American games were also integrated into the PE classes. The school-based dietary intervention goal was to improve the quality of children's diets at school, specifically to increase fruits and vegetables, and decrease sugar-sweetened beverages and high-fat foods. The family-focused intervention goal was to modify the home environment to reduce excessive caloric intake, reduce television watching, and increase physical activity. Each intervention school had three Family Night events related to nutrition and physical activity during the intervention period and one Summer Event. Parents received motivational encouragement telephone calls from trained Lakota research staff to set behavioural goals, encourage them in their efforts and to help them evaluate their progress. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention The control group did not receive any intervention
Topham 2021	zBMI long-term	School + community/community (multi-arm study)	FISH (The Families and Schools for Health)	Group 1: The Family Lifestyle (FL) component focused on developing healthy food and exercise habits to promote a healthy weight in participating children; the first part of the sessions was conducted for the parents and for the children separately. The content of the children's sessions included nutritional topics (e.g. dairy, fruits, veggies, healthy snacks, portion sizes) and activity (e.g. dance as activity, active games). In the second part of the sessions, children	Non-active intervention The control group received no classroom or family intervention

Table 2. Description of the interventions *(Continued)*

				and parents had to make and eat a healthy snack. Group2: The Family Dynamic (FD) component focused on psychoeducation about parenting and child socio-emotional functioning: general parenting and healthy family relationships (parent) and healthy emotion management and problem-solving (child). Group 3: The Peer Group (PG) intervention promoted teaching children to accept each other by disallowing rejection at school. Group 4: All 3 above The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go! (TGEG)	Multi-arm study Group 1: WalkAcrossTexas (WAT!). WAT! is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists and PE teachers to implement the WAT! intervention. Group 2: Learn!Grow!Eat!Go! (LGEG). The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programmes	Non-active intervention Delayed intervention control

Table 2. Description of the interventions *(Continued)*

				The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Wang 2012	zBMI medium-term	School	NR	Nutrition class (a total of 10 sessions, 45 min/session, once per month): topics focused on causes, adverse effects and prevention methods of child obesity, and ways to build up a healthy diet. Happy 10 minutes (Happy 10 min): school teachers organised students to do exercise in 2 sessions of "happy ten minutes" every day. The exercise reached the moderate physical activity level and was either indoors or outdoors. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	NR NR
White 2019	zBMI short-term; zBMI medium-term; zBMI long-term	Community	iCook 4-H Study	The intervention group participated in a curriculum that was composed of 6 x 2-hour, biweekly sessions on cooking, eating and playing together. After the 12-week face-to-face sessions, booster sessions, mailed monthly newsletters and website challenges were used to continue engagement with the treatment group for the remainder of the 2-year study. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes	Non-active intervention Control participants completed only assessments.

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Williamson 2012	zBMI long-term	School	Louisiana (LA) Health	Group 1: The Primary Prevention programme modified the school environment to promote healthy nutrition and physical activity with 3 primary objectives: 1) modify environmental cues related to healthy eating and activity, 2) modify the cafeteria food service programme, and 3) modify the physical education programmes as described in the SPARK study (Sallis 1993) and reduce sedentary behaviour. Bi-monthly newsletters were sent home with the student providing campaign-specific information, suggestions on how to alter the home environment consistent with campaign topics, and specific activities that children were to complete at home with their parents. Menus were sent to parents with emphasis placed on the food choices recommended by the LA Health programme. Group 2. This intervention arm combined Secondary Prevention (SP) with Primary Prevention (identical to the Primary Prevention programme described above). SP employed a classroom instruction component combined with an internet-based approach similar to the interventions that were developed and tested in the HIPTeens study and other health behaviour change studies in children. The internet intervention in this study was delivered as part of regular classroom instruction, combined with synchronous (online) internet counselling and asynchronous (email) communications for children and their parents. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Attention control This group was given access to a website that provides information on stress management and study skills, and received the educational enhancement programme (LA GEAR UP) that targets academic achievement but does not target weight gain prevention

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: no – change the physical environment of the child: yes	
Xu 2015	zBMI medium-term; BMI medium-term	School	CLICK-Obesity	Intervention schools implemented the specially developed intervention components, comprising: a) classroom curriculum (including education on healthy eating and sufficient physical activity), b) school environment support, c) family involvement (including parents/guardians health classes), and d) fun programmes/events. The classroom curriculum consisted of 2 education modules, one on nutrition and one on physical activity. The nutrition module included an introduction to types of foods, and energy contained in different foods and practical advice on how to eat healthily on a daily basis. Students were shown what high-dense-energy foods are, for example Western snacks, soft-drinks and deep-fried foods. They were encouraged to consume low-density-energy foods, such as vegetables and tofu. They were also offered tips on how to eat healthily, e.g. chewing thoroughly, and reducing fat intake by consuming meat without skin. The physical activity module encouraged students to engage in sufficient physical activity and to reduce screen time. Students were also encouraged to do exercises inside or outside of the classroom during recess, and to walk to and from school. School environmental support included brief health-related messages and posters presented in locations such as inside the classroom, gymnasium, playground and cafeteria. The messages and posters were updated monthly according to scheduled intervention themes. Furthermore, posters made by students were posted on rear blackboards in classrooms in intervention schools. The family involvement component included parents/guardians health class at school, in which they were invited to participate in an educational programme twice per semester to learn appropriate strategies to advance healthy lifestyle choices against obesity. After-school family events were also offered; these included parent-child interactive home assignments, such as identifying high-density-energy home foods, and practising to measure body weight and height and to calculate body mass index. Fun programmes/events included: 3 presentation competition (picture painting, short-term paper writing and stage drama); no un-	Non-active intervention The control group received the routine health education

Table 2. Description of the interventions *(Continued)*

				healthy snack for week; no TV for a week; no soft drinks for a week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Xu 2017 (5 other cities)	zBMI medium-term; BMI medium-term	School	NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China)	The comprehensive intervention was a combination of nutrition and PA interventions. Nutritional intervention: carton pamphlets were distributed to each student in the intervention schools. Classes on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students in the school lunch cafeteria was evaluated periodically, and specific nutrition improvement was suggested accordingly. Students were conducted in "Happy 10", led by teachers to do a 10-minute segment moderate-intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" 10 minutes once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention No intervention took place in the control schools

Table 2. Description of the interventions *(Continued)*

Comparison: activity intervention vs dietary intervention

Study ID	Meta-analysis outcome(s)	Setting of intervention	Intervention/study name	Intervention (short-term description)	Comparison type and short-term description
Barnes 2021	zBMI medium-term; BMI medium-term	School + home	PACE (Physically Active Children in Education); SWAP IT	PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received various educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group

Table 2. Description of the interventions *(Continued)*

					The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned 1 research staff member who visited the school 1 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition) and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g. Rethink Your Drink campaign). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes	Dietary intervention Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no

Table 2. Description of the interventions *(Continued)*

				– change the physical environment of the child: yes	The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	School	NISCOC (Nutrition-based Intervention Study on Childhood Obesity in China)	Students conducted "Happy 10" led by teachers to do a 10-minute segment of moderate-intensity, age- and space-appropriate exercises. The form of exercises was game, dance or rhythmic gymnastics. Students were also encouraged to develop more forms of exercises they like. Furthermore, education about physical activity was provided to students, parents, health workers and teachers. Each student attended the "Happy 10" for 10 minutes once, twice a day or 20 minutes for each time, once a day. Parents were sent nutrition education bulletins. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Dietary intervention Nutrition education intervention. Carton pamphlets were distributed to each student in the intervention schools. Classes on nutrition and health were given 6 times for the students, 2 times for the parents and 4 times for teachers and health workers. The menu for students in the school lunch cafeteria was evaluated periodically, and specific nutrition improvement was suggested accordingly.

Table 2. Description of the interventions *(Continued)*

					The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go!	Multi-arms study WAT! is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form) and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists and PE teachers to implement the WAT! intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group	Dietary intervention Multi-arm study The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, stu-

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	dents grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes

Comparison: dietary and activity intervention vs dietary intervention

Study ID	Meta-analysis outcome(s)	Setting of intervention	Intervention/study name	Intervention (short-term description)	Comparison type and short-term description

Table 2. Description of the interventions *(Continued)*

Barnes 2021	zBMI medium-term; BMI medium-term	School + home	PACE; SWAP IT	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple

Table 2. Description of the interventions *(Continued)*

					strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned 1 research staff member who visited the school 1 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition) and physical education teachers (physical activity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g., Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to	Dietary intervention Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons and fitness challenges. The intervention includes a home activity: no

Table 2. Description of the interventions *(Continued)*

				– modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Stettler 2015	zBMI medium-term; BMI medium-term	Clinical setting	Smart Steps	Parents and children in this programme participate in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. Parents and children in the multiple behaviour programme participated in a series of consultations and activities focused on multiple healthy interventions including the beverage-only component and a physical activity aimed at progressively increasing pedometer counts to 15,000 steps per day and progressively reducing screen time to ≤ 2 hours per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes	Dietary intervention Parents and children in this programme participated in a series of consultations and activities focused on a single intervention, the effects of beverage choices on diet, general health and teeth health. The beverages-only intervention aimed to progressively reduce intake of beverages with

Table 2. Description of the interventions *(Continued)*

		– change the social environment of the child: yes – change the physical environment of the child: no	high sugar content (e.g. regular soda, sweetened iced teas and lemonade, fruit drinks with less than 100% fruit juice, and sports drinks) to ≤ 1 to 2 x 12 oz servings/day and progressively increase intake of water, fat-free milk and 1% milk to ≥ 6 x 12 oz servings of per day. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no

Table 2. Description of the interventions *(Continued)*

van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go! (TGEG)	Multi-arm study Group 1: WalkAcrossTexas (WAT!). WAT! is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form) and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists and PE teachers to implement the WAT! intervention. Group 2: Learn!Grow!Eat!Go! (LGEG!). The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programmes The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary intervention Multi-arms study The 6-month LGEG intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit compo-

Table 2. Description of the interventions *(Continued)*

					nent aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes
Comparison: dietary and activity intervention vs activity intervention					
Study ID	**Meta-analysis outcome(s)**	**Setting of intervention**	**Intervention/study name**	**Intervention (short-term description)**	**Comparison type and short-term description**
Barnes 2021	zBMI medium-term; BMI medium-term	School + home	PACE (Physically Active Children in Education); SWAP IT	SWAP IT nutrition intervention: School nutrition guidelines; lunchbox flipchart lessons; parent communication pushed via a school mobile communication app ('m-health' component). Resources: information package containing tools and resources, including a lunchbox ideas booklet which provided easy, seasonal and low-cost lunchbox ideas, ice-brick and 'water only' drink bottle to address the identified barriers of food safety, lack of time/convenience, lack of knowledge, child preference and cost. PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (existing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received varies educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers	Activity intervention PACE physical activity intervention: Implementation of 150 min of scheduled physical activity across the school week. Other components of the interventions: Mandate change: Support officers meeting with principals and school executives to communicate the importance and benefits of scheduled PA. School champions: Each school nominated at least 2 in-school champions (exist-

Table 2. Description of the interventions *(Continued)*

				to demonstrate how to implement the 150 min of scheduled physical activity across the school week. One study arm received the SWAP IT nutrition and PACE physical activity interventions combined. The intervention includes a home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	ing teachers at the school) who, under the guidance of the principal and with the help of support officers, were responsible for leading their school's implementation of the PA policy. Educational materials: An intervention manual was provided to each school champion and classroom teachers received various educational materials to assist their scheduling and implementation of physical activity across the school week. Example lesson and classroom plans were provided by teachers to demonstrate how to implement the 150 min of scheduled physical activity across the school week.
Ickovics 2019	Percentile long-term	School	School-Based Policies intervention	Policy interventions related to nutrition and physical activity were implemented and evaluated, leading to 4 conditions: nutrition only, physical activity only, nutrition and physical activity (dual), or delayed. Each school was assigned one research staff member who visited the school 1 to 2 times per month. Visits typically included meeting with the School Wellness Team, principal, all teachers for the target grade, school cafeteria manager (nutrition condition) and physical education teachers (physical activ-	Activity intervention Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity in-

Table 2. Description of the interventions *(Continued)*

				ity condition). Newsletters were distributed triennially to reinforce targeted health messages (e.g. Rethink Your Drink campaign). Group 1: Nutrition interventions included cafeteria-based nutrition promotion to encourage healthy food choices, taste-testing new foods, and providing alternatives for use of food during celebrations. Group 2: Physical activity interventions included promotion of active transport (walk/bike) to school, integrating physical activity into classroom lessons, and fitness challenges. Group 3: Combination of policy interventions related to nutrition and physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: yes	to classroom lessons, and fitness challenges.
Robinson 2003	BMI short-term	Home + community/community (active intervention control group)	Stanford GEMS (Girls health Enrichment Multi-site Studies) Phase 1	GEMS Jewels dance classes were offered 5 days per week at 3 community centres in the target neighbourhoods. The START (Sisters Taking Action to Reduce Television) intervention consisted of 5 lessons to be delivered during home visits with participating families over 12 weeks. GEMS Jewels dance classes were offered 5 days per week. Girls were encouraged to attend the dance classes as often as possible for their entire 3-month study enrolment, but they were not forced or coerced to attend any minimum number of days. Each daily session lasted for up to 2.5 hours, starting with a healthful snack (a motivating and necessary feature for the girls) and an hour-long homework period. This hour was followed by 45 to 60 minutes of moderate- to-vigorous dance. The sessions ended with 30-minute GEMS talks exploring the meaning of dance in the girls' lives, and the importance of dance in the African-American community and culture. Classes were led by female African-American college students and recent college graduates, recruited from dance organisations/troupes at nearby universities and in local communi-	Activity intervention The control intervention was designed to be a state-of-the-art information-based health education programme to promote healthful diet and activity patterns. It included presenting monthly community health lectures and mailing newsletters to parents and to girls. The intervention includes a

Table 2. Description of the interventions *(Continued)*

				ties. Three styles of dance were taught: traditional African dance, Hip-Hop and Step. The classes were structured, and steps chosen, to provide sustained moderate-to-vigorous activity. Occasional activities also included creating costumes, videotaping and performing for families and friends. The START (Sisters Taking Action to Reduce Television) intervention consisted of 5 lessons to be delivered during home visits with participating families. A female African-American intervention specialist scheduled lesson times with each family, and then delivered the intervention to the participating girl and any other available family members. The strategies promoted for reducing television viewing included non-selective reductions in total hours and/or access to television, selective reductions by day, time, context or content, and replacing that drive media content. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	home activity: no The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Robinson 2010	zBMI long-term; BMI long-term	Home + community/community (active intervention control group)	Stanford GEMS Phase 2	See Robinson 2003	Activity intervention See Robinson 2003
van de Berg 2020	Percentile medium-term	School + home	Texas, Grow! Eat! Go! (TGEG)	Multi-arm study Group 1: ! WalkAcrossTexas! (WAT!) is a school-based PA programme, which includes multiple programme components designed to establish the habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form), and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension	Activity intervention Multi-arm study WAT! is a school-based PA programme, which includes multiple programme components designed to establish the

Table 2. Description of the interventions *(Continued)*

		Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. Group 2: The 6-month Learn!Grow!Eat! Go! (LGEG!) intervention (http://jmgkids.us/lgeg) included a school garden and a 32-lesson school curriculum that centred around the vegetables grown in the school gardens. During the year, students grew vegetables and participated in both fresh vegetable samples and classroom vegetable recipe demonstrations. They also took home recipe cards and Family Stories. Group 3: Combined WAT! and LGEG! programmes The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	habit of regular PA among young people. For the Texas, Grow! Eat! Go! study, components of the WAT! programme included a kick-off event, a classroom team mileage competition, weekly lesson plans, family engagement pieces (bonus miles form) and an end-of-programme celebration. Weekly English and Spanish newsletters featuring both healthy PA and eating tips were added to enhance family engagement. The local AgriLife Extension Educators assisted the classroom teachers, parent support specialists, and PE teachers to implement the WAT! intervention. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple

Table 2. Description of the interventions *(Continued)*

					strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes
Studies not included in the meta-analyses					
Study ID	**Comparison**	**Setting of intervention**	**Intervention/study name**	**Intervention (short-term description)**	**Comparison type and short-term description**
Anand 2007	Dietary and Activity vs Control	Home	SHARE-AP (Study of Health Assessment and Risk Evaluation in Aboriginal Peoples) ACTION	The SHARE-ACTION intervention consisted of a regular home visit by Aboriginal health counsellors trained to assess and set dietary and physical activity goals for each household member. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	Non-active intervention Usual care families received Canada's Food Guide to Healthy Eating and Canada's Physical Activity Guide to Healthy Active Living
Branscum 2013	Dietary and Activity vs Dietary and Activity	School	Comics for Health	Comic book programme designed to help children learn and engage in behaviours associated with the prevention of obesity. For the theory-based intervention, constructs of the SCT, including self-efficacy, expectations and self-control, were operationalised and targeted. Children in the theory-based intervention were asked to develop their	Dietary and Activity (minimal intervention) For the knowledge-based intervention,

Table 2. Description of the interventions *(Continued)*

		comic stories on the health issues covered during the intervention. During the 'Introduction & Purpose of lesson' the instructor introduced and reviewed the lesson's key objectives and covered necessary knowledge and skills in order to perform the behaviour the lesson targeted. In the 'Benefits' module, children learned positive benefits associated with the health behaviour being promoted and sketched a comic-panel showing such a benefit. Next, children participated in 'Role-Playing' with the instructor to practise skills learned in the lesson in 2 separate real-world examples: one with a parent or guardian, and one with a peer. Finally, during 'Goal Setting', the instructor reviewed the key objectives of the lesson; children had the opportunity to ask questions about the lesson, and children sketched comic-book panels of themselves setting goals, monitoring and self-rewarding themselves for engaging the behaviour the lesson targeted. The behavioural objectives for each lesson of the experimental intervention were to enable children to: engage in no more than 2 hours of screen time per day (lesson 1), consume water and sugar-free drinks instead of sugar-sweetened beverages (lesson 2), participate in at least 60 minutes of physical activity per day (lesson 3), and consume 5 servings of fruits and vegetables per day. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	pedagogical techniques were based on only building knowledge regarding healthy eating and physical activity. Children in the knowledge-based intervention were not asked to incorporate the health messages. Each lesson consisted of 4 modules: Introduction & Purpose of lesson, Comic-Book activity #1, Comic-Book activity #2 and Wrap-up. During the 'Introduction & Purpose of lesson' the instructor introduced and covered the lesson's key objectives and taught necessary knowledge and skills in order to perform the behaviour the lesson targeted. In the 'Comic-Book activity #1' and 'Comic-Book activity #2' modules, children learned an aspect of comic-book creation and sequential art. Finally, during 'Wrap-up', the instructor reviewed

Table 2. Description of the interventions *(Continued)*

					the key objectives of the lesson, and children had the opportunity to ask questions about the lesson. The behavioural objectives for each lesson of the comparison intervention were to enable children to: engage in no more than 2 hours of screen time per day (lesson 1), consume water and sugar-free drinks instead of sugar-sweetened beverages (lesson 2), participate in at least 60 minutes of physical activity per day (lesson 3), and consume 5 servings of fruits and vegetables per day.
Carlin 2021	Dietary and Activity vs Control	Home	IPAP (Intelligent Personal Assistant Project)	The IPAP intervention aimed to promote positive health behaviours in the family setting through the utilisation of the functions of a smart speaker and its linked intelligent personal assistant. The research team was able to remotely access the devices and set weekly tasks, prompts, and reminders for family members. Families were signposted to search for the app Skills under the topics of Health and Fitness, Lifestyle, Sport, Cooking and Recipes. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: yes The intervention uses multiple strategies (3 or more): no	Non-active intervention The control group continued as normal without the provision of the technology

Table 2. Description of the interventions *(Continued)*

				The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Di Maglie 2022	Activity vs Control	School	NR	The enriched activity was obtained by limiting the inactivity time of children by introducing additional minutes of PA per day (at least 40 min) for 5/6 days a week for 6 months, in the context of schools and a sport centre. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention Children in the control group participated in usual practice
Epstein 2001	Dietary and Activity vs Dietary and Activity	Home	NR	Weight-control treatment was provided to the parents for 8 weekly meetings, followed by 4 biweekly and 2 monthly meetings during the 6-month intensive treatment. Participating parents and children attended the first meeting, at which they received the first modules in their parent and child workbooks. Child materials were sent home with the parents each week and included new workbook modules and program-related activities for the children to do with their parents. Parents were taught stimulus control to reduce access to high-fat/high-sugar foods and to increase access to fruits and vegetables, and to increase access to physical activity and to reduce access to sedentary behaviours. In the Increase Fruit and Vegetable group, the goal was to incrementally increase the intake of fruits and vegetables to reach at least 2 servings of fruits and 3 servings of vegetables per day. The intervention includes a home activity: yes The intervention is delivered: individually The intervention is delivered electronically: no	Dietary and activity intervention Participants in the Decrease Fat and Sugar group were provided incremental goals to reach a goal of no more than 10 servings of high-fat/high-sugar foods per week, in addition to the activity component of the intervention. The intervention includes a home activity: yes The intervention is deliv-

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	ered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Gortmaker 1999	Dietary and Activity vs Control	School	Planet Health	Planet Health sessions were included within existing curricula using classroom teachers in 4 major subjects and physical education. Sessions focused on decreasing television viewing, decreasing consumption of high-fat foods, increasing fruit and vegetable intake, and increasing moderate and vigorous physical activity. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention Control schools received their usual health curricula and PE classes and none of the Planet Health programme

Table 2. Description of the interventions *(Continued)*

Hannon 2018	Dietary and Activity vs Dietary and Activity	Home + community/community (multi-arm study)	ENCOURAGE healthy families study	The intervention was adapted from the lifestyle curriculum used in the Diabetes Prevention Programme (DPP). Scripts used in the 16 sessions of the Lifestyle Balance curriculum used in the DPP were modified to reflect consideration of applying session content to family members (mothers and children) vs the individual. They created 2 versions of the curriculum: one for mothers without direct involvement of their children, and another that included a supplemental program for young people. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Dietary and activity intervention This second curriculum had 2 fundamental differences from the mother-only version. First, it made mothers aware of what their children were learning in parallel sessions. Second, it asked mothers to do at-home activities (conceptualised as homework) with their children to reinforce lesson concepts. The children's curriculum was designed as a 16-session weekly programme that introduced several themes in the DPP curriculum adjusted for age-appropriate presentation. Each session contained both a snack and a physical activity component adapted from SPARK, an evidence-based physical education programme. Finally, the curriculum encouraged children to engage parents in the form of "homework".

Table 2. Description of the interventions *(Continued)*

					The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no
Hooft van Huysduynen 2014	Dietary vs Control	Home	Towards Healthy Diets for Parents	The intervention included 5 face-to-face sessions during which a dietician used motivational interviewing to guide the parents towards a healthy diet. To remind parents of what has been discussed and to provide additional practical information to improve dietary intake, the parents received leaflets about the discussed dietary behaviours. The parents also received 3 emails with individualised feedback. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no	Non-active intervention The control group did not receive any of the intervention elements

Table 2. Description of the interventions *(Continued)*

				– provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	
Huys 2020	Dietary and Activity vs Control	School	Feel4Diabetes-intervention	The Feel4Diabetes intervention involved (1) the family component: 6 counselling sessions on healthy eating, improving PA and limiting sedentary behaviour and families set SMART-goals; (2) the school component: a meeting with the headmasters and teachers from all participating intervention schools in which researchers gave suggestions and examples of activities to promote children's PA, healthy snacking, drinking water and reducing sedentary behaviour in the school context; (3) the community level component: existing health-related activities in the intervention communities were bundled in monthly community-specific activity calendars. The intervention includes a home activity: yes The intervention is delivered: individually and as a group The intervention is delivered electronically: as a minor component The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Families of the control group only received the first individual session of the family component (general advice for a healthy and active lifestyle during a 1-hour session) and did not receive an intervention on the school or community level
Johnston 2013	Dietary and Activity vs Control	School	NR	Curriculum materials with integrated health information, teaching aids, and health and nutrition educational materials developed for this study were provided to all 7 schools (intervention and control). The materials centred around 7 healthy messages: eat more fruits and vegetables, drink more water and fewer sugary beverages, opt for healthy snacks, increase active play and decrease screen time, eat 3 servings of low-fat dairy every day, eat a healthy breakfast, and choose an appropriate portion size. Staff at schools randomised to the PFI condition were provided with a health professional that assisted with daily integration of materials and healthy messages. The intervention includes a home activity: no The intervention is delivered: as a group	Non-active intervention Schools randomised to the self-help (SH) condition attended a 1-day training before the beginning of each school year to review curriculum materials. Staff at schools randomised to the SH condition were

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	not provided with the health professional.
Lynch 2016	Dietary and Activity vs Control	School	Let's Go! 5-2-1-0	The curriculum involved 8 sessions anchored around the 5-2-1-0 curriculum: weight trends in America & Plate Method; fruits and vegetables; hours or less of recreational screen time; hour of physical activity; sugary drinks; hours of sleep and healthy breakfast; portion sizes and healthy snacks. Each lesson consisted of review of previous topic, introduction of new content with visuals and class interaction, a class activity, simple goal setting related to the topic of the day at the end of the session. At baseline measurement students received pedometer and were instructed to wear the pedometer at all times that they were awake for the next 7 days. At initiation of the study, children in intervention classrooms received 5-2-1-0 information and a Small Steps Every Day 5-2-1-0 Mayo Action Card. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention NR
Macias-Cervantes 2009	Activity vs Control	Community	NR	Children in the experimental group were instructed to modify their physical activity with the main objective to obtain an increase of at least 2500 steps per day over the baseline level. The intervention includes a home activity: no The intervention is delivered: individually The intervention is delivered electronically: no	Non-active intervention Children in the control group were asked to maintain the same level of physical activity throughout

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	the 12 weeks of observation
Madsen 2013	Activity vs Control	School	Modified SCORES program	SCORES is an after-school soccer program that offers soccer, creative writing and service learning experiences to young people that would otherwise have limited access to extracurricular activities. In the current study, a modified version of SCORE was implemented due to budget cuts. SCORES trained the district's after-school staff to operate the SCORES programme. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention NR
Marsigliante 2022	Dietary vs Control	School	NR	Food education and a healthy lifestyle (e.g. food choices, food labels, the 5 meals, consumption of fruits and vegetables, and sleep quality) were discussed with the active involvement of everyone. The educational intervention covered 12 lessons for the subject's biology and alimentation implemented by classroom teachers. The first part (6 lessons) aimed at increasing awareness and information regarding energy balance-related behaviours, with supporting materials, such as a pocket-sized diary, to monitor own behaviour. The second part (6 lessons) aimed at facilitation of choice to improve one of the behaviours, setting personal goals, identifying barriers, improving self-efficacy and evaluating the change process. In this way, the children and families understand how to organise their weekly meal planning without detailed prescriptions. All teachers and parents in the intervention schools received on-site training to provide	Non-active intervention The control schools followed their regular curriculum

Table 2. Description of the interventions *(Continued)*

				them with general information on the nature and significance of the intervention and to support their role in educating the children. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	
Muzaffar 2019	Dietary and Activity vs Dietary and Activity	School	PAWS (Peer-education About Weight Steadiness) Club	Each lesson lasted approximately 90 minutes and included: (1) 20 to 30 minutes of moderate physical activity; (2) nutrition and cooking activities; (3) discussions; (4) self-reflections; (5) goal setting for healthier eating and physical activity; and (6) food and beverage tastings. Printed education materials, including recipes and goal-setting worksheets were provided to the participants at each of the 12 sessions. Educators led small group discussions, conducted hands-on and food preparation activities, and facilitated group decision-making and problem-solving experiences for participants. Peer educators were 8th grade students from the participating schools and were selected based on teacher recommendations regarding these students' high level of demonstrated responsibility and work ethic. Peer educators had 4 to 5 adolescents per educator. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no	Dietary and activity intervention Intervention is the same as the peer-led intervention, but ther educators were adults. Adult educators were recruited from among participating schools' staff members. Adult educators delivered the programme to 7 to 8 adolescents per educator. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple

Table 2. Description of the interventions *(Continued)*

					strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: yes – change the social environment of the child: no – change the physical environment of the child: no
Pindus 2015	Activity vs Control	Community	FITKids2 (Fitness improves thinking in kids 2)	70 minutes (5 days/week) of moderate to vigorous physical activity. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	Non-active intervention The control group received regular after-school activities
Razani 2018	Activity vs Activity	Clinical setting	SHINE (Stay Healthy In Nature Everyday)	Supported park prescription group. Parents randomised to the supported park prescription group received counselling by a paediatrician about nature, a postcard with the map of local parks, a journal and pedometer. After randomisation, they were advised to attend group nature outings on 3 consecutive Saturdays, and were invited to bring their families. Participants received phone reminders on the Wednesday before outings and a text on the Friday before the Saturday outing. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no	Activity intervention The independent park prescription group received counselling from a paediatrician about nature according to the script above, the postcard with a map of local parks, a journal, a pedometer and

Table 2. Description of the interventions *(Continued)*

				The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no	no further intervention after randomisation. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: yes – change the physical environment of the child: no
Riiser 2020	Activity vs Control	School	Active Play in APS (After School Programs)	ASP staff received a 7-month course programme to enhance their knowledge of, and skills in, creating a PA-supportive environment by accommodating and gently encouraging activities instead of directing them in a controlling manner. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: no – provide education/information for the child: no	Non-active intervention The control group participants were invited to receive the intervention after the study was completed

Table 2. Description of the interventions *(Continued)*

				– change the social environment of the child: yes – change the physical environment of the child: no	
Salmon 2008	Activity vs Control	School	Switch - play	Each of the intervention conditions consisted of 19 lessons (40 to 50 min each) delivered by one qualified physical education teacher over one school year. Group 1: The Behavioural modification (BM) intervention aimed to reduce the time spent on TV viewing by 20%. The BM lessons were delivered in the classroom and a newsletter was sent home to parents of children in the BM or combined BM/Fundamental movement skills (FMS) intervention to monitor and confirm that the nominated programme was turned off, and encouraged their child to maintain the TV switch-off. Group 2: The FMS intervention comprised 19 sessions of 40 to 50 min duration taught across 3 school-terms by the same intervention specialist teacher that delivered the BM intervention. The FMS intervention focused on 6 skills, including 3 object control skills (overhand throw, kick and strike) and 3 locomotor skills (run, dodge and vertical jump). The FMS lessons were delivered either in the indoor or outdoor physical activity facilities at each school. Group 3: Children in the BM/FMS condition received both the BM and FMS lessons, therefore receiving double the dose of the other intervention groups. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Non-active intervention The control group received the usual physical education and sports classes (usual curriculum)
Tessier 2008	Activity vs Activity	School	REGU'LAPS (REGULarity of Physical ActivitieS)	In the intervention group, the 3 compulsory hours of physical education were delivered over 3 or 4 sessions a week. In the control group, the 3 compulsory hours of physical education were delivered over 1 or 2 sessions a week The intervention includes a home activity: no The intervention is delivered: as a group	Activity intervention The control group received the 3 compulsory hours of physical education following over

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no – change the physical environment of the child: no	a week delivered over 1 or 2 sessions. The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): no The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: no – change the social environment of the child: no
Treviño 2004	Dietary and Activity vs Control	School	Beinestar Health Program	The objective of the Bienestar Health Program is to provide children with 50 sessions of health programming distributed throughout 7 months. These behaviours were taught and reinforced through classroom, home, school cafeteria and after-school care educational activities. Physical education teachers, parents, school cafeteria staff and after-school caretakers were asked to encourage less dietary saturated fat intake, more dietary fibre intake and more physical activity, and to be role models for the children. Children were asked to set goals aimed at accomplishing the targeted behaviours and to keep records of their accomplishments. Children were also asked to encourage their peers and adult caretakers to practice the 3 health behaviours. The intervention includes a home activity: yes The intervention is delivered: individually and as a group	Non-active intervention The control group received the health examination alone

Table 2. Description of the interventions *(Continued)*

				The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	
Warren 2003	Dietary vs Control Activity vs Control Dietary and Activity vs Control Activity vs Dietary Dietary and Activity vs Dietary Dietary and Activity vs Activity	School	Be Smart!	For all intervention groups, an activity book, designed for use at home, accompanied each term's lessons. Every week in the activity book a related and fun 'homework', such as colouring, quiz or craftwork, was given, concluding with a weekly message for the children and parents. 1. Eat smart: Children explored the concept of health and its link with food (term 1); fruit and vegetables were promoted using tasting sessions and games (term 2); specific positive messages about 'power' foods (high starch foods) were given out (term 3); tooth-friendly foods were explored (term 4). 2. Play Smart: The physical activity programme was designed to promote activity in daily life; children explored the concept of energy and activity (term 1); promotion of activity in the playground and a reduction in television viewing using team games, fun physical activities and quizzes (term 2 and 3); lessons on the activity pyramid (term 4). 3. Eat/Play Smart: Children in this group received half of the nutrition and half of the physical activity programme each term. The intervention includes a home activity: yes The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: no	Attention control Be Smart: Children learnt about food in a non-nutrition sense. On alternate weeks, children learnt about the human body, using an interactive CD-Rom. Children had an activity book, which had a related homework, but it did not have weekly messages.
Zota 2016	Dietary vs Control	School	DIATROFI Program	The intervention group received the DIATROFI programme (daily free healthy meals) and health nutrition education programme. All students enrolled in a school partici-	Non-active intervention The control group only

Table 2. Description of the interventions *(Continued)*

	pating in the DIATROFI Program received a boxed fresh meal at 10 a.m. every school day. In the schools assigned to the multicomponent intervention group, a healthy nutrition educational programme was also implemented, including educational materials and activities for each target group (students of different ages, parents and school staff). The intervention includes a home activity: no The intervention is delivered: as a group The intervention is delivered electronically: no The intervention uses multiple strategies (3 or more): yes The intervention has an explicit component aiming to – modify the child's behaviour: yes – provide education/information for the child: yes – change the social environment of the child: yes – change the physical environment of the child: yes	received the DIATROFI Program (daily free healthy meals)

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations

BMI: body mass index; BMR: basal metabolic rate; CBT: cognitive behavioural therapy; IVAC: Investigation, Vision, Action and Change methodology; MET: metabolic equivalent; MVA: moderate to vigorous activity; MVPA: moderate to vigorous physical activity; NR: not reported; PA: physical activity; PE: physical education; ppm: pulse per minute; PSHE: personal, social and health education; SCT: Social Cognitive Theory; SSB: sugar-sweetened beverages; USD: United States dollar; USDA: United States Department of Agriculture; VPA: vigorous physical activity; vs: versus; zBMI: standardised body mass index.

Table 3. Description of serious adverse events

Comparison: dietary intervention vs control

Study ID	Meta-analysis outcome(s)	Any data on serious adverse events reported	Serious adverse events (related to participation in the study) observed	Serious adverse events details as reported by authors
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Chai 2019	zBMI short-term; BMI short-term	No	n/a	n/a
Coleman 2012	zBMI medium-term; zBMI long-term	No	n/a	n/a
Cunha 2013	BMI medium-term	No	n/a	n/a
Damsgaard 2014	zBMI short-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Davis 2021	zBMI medium-term; BMI medium-term; Percentile medium-term	No	n/a	n/a
de Ruyter 2012	zBMI short-term; zBMI medium-term; zBMI long-term	Yes	Yes	Control: headache: intervention: 0 (0%); control: 2 (1%); allergy: intervention: 2 (1%); control: 3 (1%); behavioural problems: intervention: 2 (1%); control: 1 (0.5%); abdominal discomfort: intervention: 2 (1%); control: 7 (2%). The authors reported that "We urged parents to report adverse events at the email address or cell phone number printed on all beverage cans and gave all parents the telephone number of an independent physician to report and discuss adverse events. None of the parents approached this physician. Adverse events were reported by 21 non-completers as a reason to stop drinking the beverages and by 7 children who completed the study."
Fulkerson 2010	zBMI short-term; percentile short-term	No	n/a	n/a
Fulkerson 2015	zBMI medium-term; zBMI long-term	Yes	No	No serious adverse events were reported
Han 2006	zBMI long-term	No	n/a	n/a
Hendrie 2011	zBMI short-term; BMI short-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
James 2004	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a
Keshani 2016	BMI medium-term	No	n/a	n/a
Lent 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	No	n/a	n/a
NCT00224887 2005	BMI medium-term	Yes	No	Adverse event reporting description: the study was considered to be minimal risk. Interventions were informational/educational and did not include medications or invasive testing/procedures. No serious adverse events or all-cause mortality were reported.

Table 3. Description of serious adverse events *(Continued)*

Nicholl 2021	zBMI short-term; BMI short-term; percentile short-term	Yes	No	Parental feedback requested included details of suspected adverse events, including any untoward medical occurrence affecting their child and not necessarily due to the dairy intervention. No adverse effects from the supplied dairy were reported.
Paineau 2008	zBMI short-term; BMI short-term	No	n/a	n/a
Seguin-Fawler 2021	Percentile short-term	No	n/a	n/a
Sichieri 2008	BMI short-term	No	n/a	n/a
Stettler 2015	zBMI medium-term; BMI medium-term	No	n/a	n/a
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Viggiano 2018	zBMI short-term; zBMI long-term	No	n/a	n/a
Comparison: activity intervention vs control				
Study ID	**Meta-analysis outcome(s)**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Barbeau 2007	BMI medium-term	No	n/a	n/a
Barnes 2015	zBMI short-term	No	n/a	n/a
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Breheny 2020	zBMI short-term; zBMI medium-term	Yes	No	No adverse events were reported
Clemes 2020	BMI short-term	No	n/a	n/a
De Bock 2013	BMI short-term; BMI medium-term	No	n/a	n/a
de Greeff 2016	BMI short-term	No	n/a	n/a
Diaz-Castro 2021	zBMI short-term; BMI short-term	No	n/a	n/a
Donnelly 2009	BMI long-term	No	n/a	n/a
Drummy 2016	BMI short-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Farmer 2017	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a
Ford 2013	BMI short-term	No	n/a	n/a
Ha 2021	BMI short-term; BMI medium-term	No	n/a	n/a
Howe 2011	BMI medium-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
Jones 2015	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	Yes	No	Adverse events, such as injuries, were recorded throughout the programme. No adverse events were reported for the PA (physical activity) or HL (healthy lifestyle) group participants.
Ketelhut 2022	BMI short-term	Yes	No	No adverse events occurred during the intervention period in any of the participants
Khan 2014	zBMI medium-term; BMI medium-term	No	n/a	n/a
Kovalskys 2016	zBMI long-term	No	n/a	n/a
Kriemler 2010	BMI medium-term; BMI long-term	No	n/a	n/a
Lau 2016	BMI short-term	No	n/a	n/a
Lazaar 2007	zBMI short-term; BMI short-term	No	n/a	n/a
Li 2010	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a
Martinez-Vizcaino 2014	BMI medium-term	Yes	Yes	Adverse outcomes. Dizziness during baseline venepuncture occurred in 2% of the children at baseline, and in 1.1% of the children at the end of the study. No other adverse events were reported by students during health examinations. Two minor ankle sprains occurred during the sessions of the programme (9 months incidence risk: 0.4 %). One boy was expelled from the programme for aggressive behaviour toward peers; his parents and the School Board made the decision by consensus.
Martinez-Vizcaino 2020	zBMI short-term; BMI short-term	Yes	No	No injuries or other adverse events occurred during the physical activity sessions, or during the health and physical examinations

Table 3. Description of serious adverse events *(Continued)*

Martinez-Vizcaino 2022	zBMI medium-term; BMI medium-term	Yes	No	Adverse effects were recorded in each session by the monitor. Dizziness during baseline venepuncture occurred in 2% of the children at baseline and in 1.1% of the children at the end of the study. No other adverse events were reported by students during health examinations or physical activity sessions.
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	No	n/a	n/a
Morgan 2019	zBMI medium-term	No	n/a	n/a
Muller 2016	zBMI medium-term; zBMI long-term; percentile long-term	No	n/a	n/a
Muller 2019	zBMI medium-term	Yes	No	There were no injuries or other adverse events during the physical activity lessons.
Newton 2014	zBMI short-term; BMI short-term; percentile short-term	No	n/a	n/a
Rhodes 2019	BMI short-term	No	n/a	n/a
Sacchetti 2013	BMI long-term	No	n/a	n/a
Salmon 2022	zBMI long-term	No	n/a	n/a
Simon 2008	zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a
Tanskey 2017	zBMI medium-term; BMI medium-term	No	n/a	n/a
Telford 2012	BMI long-term	No	n/a	n/a
Thivel 2011	BMI short-term	No	n/a	n/a
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Vizcaino 2008	BMI medium-term	No	n/a	n/a
Wang 2018	zBMI medium-term; BMI medium-term	Yes	No	Neither complaints nor adverse events were reported by any students or school personnel
Wendel 2016	BMI long-term; percentile long-term	Yes	No	The results of this study and previous pilot studies have established that activity-permissive classrooms do not cause harm to students
Yin 2012	zBMI medium-term; zBMI long-term	Yes	Yes	The incident rate of adverse events (e.g. musculoskeletal injuries) are reported as: Year 1: 0.03 (20 mild; 3 moderate; 1 severe);

Table 3. Description of serious adverse events *(Continued)*

				Year 2: 0.02 (4 mild; 6 moderate; 2 severe); Year 3: 0.01 (5 mild; 2 severe)
Comparison: dietary and activity intervention vs control				
Study ID	**Meta-analysis outcome(s)**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Adab 2018	zBMI long-term	Yes	No	Quality of life, as total score or subdomains, social acceptance or dissatisfaction with body image did not differ significantly between arms at any time. The authors found no evidence of harm from the intervention.
Annesi 2016	BMI short-term; BMI medium-term; percentile medium-term	No	n/a	n/a
Annesi 2017	BMI short-term; BMI medium-term	No	n/a	n/a
Baranowski 2003	BMI short-term	No	n/a	n/a
Baranowski 2011	zBMI short-term; percentile short-term	No	n/a	n/a
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Beech 2003	BMI short-term	Yes	Yes	"Few adverse events and injuries were reported among the pilot study participants in Memphis. For example, during the 12-week intervention, injuries were reported by 2 girls (11%) in the comparison group, and one girl (4.7%) in the child-targeted group. Similarly, adverse events (problems requiring a visit to a healthcare provider) were reported by one girl (5.5%) in the comparison group, and 2 girls (9.5%) in the parent-targeted group. None of the above adverse events were judged by the Coordinating Center to be related to study participation, but the Center deemed 2 of the injuries to be possibly related to participation in the intervention. Lastly, an elevated cholesterol value was reported for one participant, with notification made to the family."
Bohnert 2013	zBMI short-term	No	n/a	n/a
Brandstetter 2012	BMI long-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Brown 2013	zBMI short-term; BMI short-term; percentile short-term	No	n/a	n/a
Caballero 2003	BMI long-term	Yes	No	No increase in physical education-related injuries was detected in the intervention schools on the basis of injury logs maintained by the schools
Cao 2015	zBMI medium-term; zBMI long-term	No	n/a	n/a
Chen 2010	BMI short-term	No	n/a	n/a
Choo 2020	zBMI short-term	No	n/a	n/a
Crespo 2012	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a
De Heer 2011	BMI short-term; percentile short-term	No	n/a	n/a
Duncan 2019	BMI short-term	No	n/a	n/a
Elder 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a
Fairclough 2013	zBMI short-term; BMI short-term	No	n/a	n/a
Foster 2008	zBMI long-term; BMI long-term	No	n/a	n/a
Fulkerson 2022	zBMI medium-term	Yes	Yes	All-cause mortality: intervention: 1 (0.86%); serious adverse events: 0 (reported in the trial registration document)
Gentile 2009	BMI short-term; BMI medium-term	No	n/a	n/a
Greve 2015	BMI long-term	No	n/a	n/a
Griffin 2019	zBMI short-term	Yes	No	There were no serious adverse events requiring hospital admission or adverse events requiring medical attention during the intervention. From Jolly 2020: "We present the number and percentage of fathers and children experiencing any serious adverse event (SAE) and suspected unexpected serious adverse reaction by group. Only overnight admissions to hospital due to injury or sudden illness during a

Table 3. Description of serious adverse events *(Continued)*

				HDHK (*Healthy Dads Healthy Kids*) session are reported as a SAE."
Grydeland 2014	zBMI long-term; BMI long-term	No	n/a	n/a
Habib-Mourad 2014	BMI short-term	No	n/a	n/a
Habib-Mourad 2020	zBMI long-term	No	n/a	n/a
Haire-Joshu 2010	zBMI short-term	No	n/a	n/a
HEALTHY Study Group 2010	zBMI long-term	Yes	Yes	"Less than 3% of the students who were screened had an adverse event; the proportions were nearly equivalent in the intervention and control schools. Adverse events were collected primarily to capture expected side effects of the blood drawing. A total of 2.4% of the students at baseline and 1.7% at the end of the study reported at least one adverse event that occurred during the health screening, with no significant differences between the intervention and control schools. The most frequent adverse event was dizziness. One 8th-grade girl in a control school committed suicide. The site investigators, the investigators from the National Institute of Diabetes and Digestive and Kidney Diseases, and the data and safety monitoring board determined that the event was unrelated to the study. We examined measures of extreme dieting behaviour at both the baseline and follow-up periods to assess whether the intervention could have produced unintended side effects. Overall, students in the intervention and control schools reported similarly low levels of extreme dieting behaviour at both baseline and follow-up measurements."
Hendy 2011	Percentile short-term	No	n/a	n/a
Hopper 2005	BMI short-term	No	n/a	n/a
Hull 2018	zBMI short-term; zBMI long-term; BMI short-term; BMI long-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
Jansen 2011	BMI short-term	No	n/a	n/a
Kain 2014	zBMI medium-term; BMI medium-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Keller 2009	zBMI medium-term	No	n/a	n/a
Kipping 2008	BMI short-term	No	n/a	n/a
Kipping 2014	zBMI short-term; zBMI long-term	No	n/a	n/a
Klesges 2010	BMI medium-term; BMI long-term	No	n/a	n/a
Kobel 2017	BMI medium-term; percentile medium-term	No	n/a	n/a
Kocken 2016	zBMI short-term; zBMI long-term	No	n/a	n/a
Kubik 2021	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	Yes	No	No serious adverse events were reported
Levy 2012	zBMI short-term	No	n/a	n/a
Li 2019	zBMI medium-term	Yes	No	The authors did not receive any reports of adverse events related to the intervention
Lichtenstein 2011	zBMI medium-term; zBMI long-term	No	n/a	n/a
Liu 2019	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	No	n/a	n/a
Liu 2022	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	Yes	No	Measured adverse events included injury related to physical activity, body image dissatisfaction, underweight and reduced growth in height. There were no reports from the children or parents of injuries related to physical activity. Body image dissatisfaction and other indicators of adverse events did not differ between the two groups.
Llargues 2012	BMI long-term	No	n/a	n/a
Lloyd 2018	zBMI long-term; BMI long-term	No	n/a	n/a
Magnusson 2012	BMI long-term	No	n/a	n/a
Marcus 2009	zBMI long-term	Yes	No	No signs of negative effects of the intervention as measured by self-report were found. The authors stated that the type of intervention presented seems not to be harmful.
Morgan 2011	zBMI short-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Morgan 2014	zBMI short-term; BMI short-term	No	n/a	n/a
NCT02067728 2014	zBMI short-term	Yes	No	One enrolled patient (control group) death occurred during the study period; however, the death was in no way related to participation in this research study. The patient's death occurred following 1-month data collection, but prior to the 6-month data collection.
Nemet 2011a	BMI medium-term; percentile medium-term	No	n/a	n/a
Nemet 2011b	BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a
Nollen 2014	BMI short-term	No	n/a	n/a
Nyberg 2015	zBMI short-term; zBMI medium-term	No	n/a	n/a
Nyberg 2016	zBMI short-term; zBMI medium-term	No	n/a	n/a
O'Connor 2020	zBMI short-term	No	n/a	n/a
Pena 2021	zBMI short-term; BMI short-term	No	n/a	n/a
Puder 2011	BMI medium-term	Yes	No	No injuries or other adverse events occurred during physical activity sessions in the intervention classes
Ramirez-Rivera 2021	zBMI short-term	Yes	No	No negative effects of the measurements or study activities on the health of the participants were observed
Rerksuppaphol 2017	zBMI short-term; BMI short-term	No	n/a	n/a
Rosario 2012	zBMI short-term; BMI short-term	No	n/a	n/a
Rosenkranz 2010	zBMI short-term; BMI short-term; percentile short-term	No	n/a	n/a
Rush 2012	zBMI long-term	No	n/a	n/a
Safdie 2013	BMI short-term; BMI medium-term; BMI long-term	No	n/a	n/a
Sahota 2001	zBMI medium-term	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Sahota 2019	zBMI long-term	Yes	No	Psychological well-being of the pupils was assessed to determine whether the intervention caused any harm
Santos 2014	zBMI medium-term	No	n/a	n/a
Sekhavat 2014	zBMI medium-term; BMI medium-term	No	n/a	n/a
Sgambato 2019	BMI short-term	No	n/a	n/a
Sherwood 2019	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a
Siegrist 2013	zBMI medium-term; BMI medium-term	No	n/a	n/a
Siegrist 2018	BMI long-term	No	n/a	n/a
Spiegel 2006	zBMI short-term	No	n/a	n/a
Stettler 2015	zBMI medium-term; BMI medium-term	No	n/a	n/a
Stolley 1997	BMI short-term; BMI medium-term	No	n/a	n/a
Story 2003	BMI short-term	No	n/a	n/a
Story 2012	zBMI long-term; BMI long-term	No	n/a	n/a
Topham 2021	zBMI long-term	No	n/a	n/a
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Wang 2012	zBMI medium-term	No	n/a	n/a
White 2019	zBMI short-term; zBMI medium-term; zBMI long-term	No	n/a	n/a
Williamson 2012	zBMI long-term	Yes	No	No serious adverse events or all-cause mortality were reported in the results section of the trial registration
Xu 2015	zBMI medium-term; BMI medium-term	Yes	No	There was no observable adverse event in the intervention group
Xu 2017 (5 other cities)	zBMI medium-term; BMI medium-term	No	n/a	n/a
Comparison: activity intervention vs dietary intervention				

Table 3. Description of serious adverse events *(Continued)*

Study ID	Meta-analysis outcome(s)	Any data on serious adverse events reported	Serious adverse events (related to participation in the study) observed	Serious adverse events details as reported by authors
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	No	n/a	n/a
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Comparison: dietary and activity intervention vs dietary intervention				
Study ID	**Meta-analysis outcome(s)**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
Stettler 2015	zBMI medium-term; BMI medium-term	No	n/a	n/a
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Comparison: dietary and activity intervention vs activity intervention				
Study ID	**Meta-analysis outcome(s)**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Barnes 2021	zBMI medium-term; BMI medium-term	No	n/a	n/a
Ickovics 2019	Percentile long-term	Yes	No	Through the trial there were no adverse events to report
Robinson 2003	BMI short-term	Yes	Yes	"Injuries and all adverse events (any medical illnesses or injuries requiring a visit to a medical care provider or institution) during the prior 3 months were formally assessed in both groups at the baseline and follow-up assessments. Adverse events were also monitored continuously, between assessments, as staff became aware

Table 3. Description of serious adverse events *(Continued)*

				of them. Adverse events were rare. Over the course of the 12-week pilot study, injuries were reported by 2 girls (7.4%) in the treatment group, and 3 girls (9.1%) in the active control group. Other adverse events (problems requiring a visit to a medical care provider) were reported by 4 girls (14.8%) in the treatment group, and 6 girls (18.2%) in the active control group. One injury in the treatment group was judged to be related to participation in the study (a broken finger). All other injuries and other adverse events in both groups were judged to be unrelated to study participation."
Robinson 2010	zBMI long-term; BMI long-term	Yes	No	"Self-reported psychosocial measures were assessed annually, including Overconcern with Weight and Shape, using the McKnight Risk Factor Survey, Self-Perceived body shape and body shape dissatisfaction using African American preadolescent female body figure silhouettes, Depressive symptoms using the 10-item short-term form of the Children's Depression Inventory (CDI), Self-Esteem using the 10-item Rosenberg Self-esteem scale, and School Performance. Systematic monitoring of all injuries and other medical problems requiring a visit to a medical care provider, height growth velocity, and BMI loss suggested no increased risk associated with participation in the study as a whole or between intervention groups (all P≥.20). No injuries or illnesses were judged to be "probably" or "definitely" related study participation."
van de Berg 2020	Percentile medium-term	No	n/a	n/a
Studies not included in meta-analyses				
Study ID	**Comparison**	**Any data on serious adverse events reported**	**Serious adverse events (related to participation in the study) observed**	**Serious adverse events details as reported by authors**
Anand 2007	Dietary and activity vs control	No	n/a	n/a
Branscum 2013	Dietary and activity vs dietary and activity	No	n/a	n/a
Carlin 2021	Dietary and activity vs control	Yes	No	No issues that limited or affected participation or resulted in adverse events were reported
Di Maglie 2022	Activity vs control	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

Epstein 2001	Dietary and activity vs dietary and activity	No	n/a	n/a
Gortmaker 1999	Dietary and activity vs control	Yes	Yes	Measures of extreme dieting behaviour at baseline and follow-up periods to assess whether the intervention could have produced unintended side effects. Overall, students in the intervention and control schools reported similarly low levels of extreme dieting behaviour at both baseline and follow-up measurements.
Hannon 2018	Dietary and activity vs dietary and activity	No	n/a	n/a
Hooft van Huysduynen 2014	Dietary vs control	No	n/a	n/a
Huys 2020	Dietary and activity vs control	No	n/a	n/a
Johnston 2013	Dietary and activity vs control	No	n/a	n/a
Lynch 2016	Dietary and activity vs control	No	n/a	n/a
Macias-Cervantes 2009	Activity vs control	No	n/a	n/a
Madsen 2013	Activity vs control	No	n/a	n/a
Marsigliante 2022	Dietary vs control	No	n/a	n/a
Muzaffar 2019	Dietary and activity vs dietary and activity	No	n/a	n/a
Pindus 2015	Activity vs control	No	n/a	n/a
Razani 2018	Activity vs activity	Yes	No	No serious adverse events (including all-cause mortality) were reported in the trial registration, but it is not clear if these results refer to the parents or the children or both
Riiser 2020	Activity vs control	No	n/a	n/a
Salmon 2008	Activity vs control	No	n/a	n/a
Tessier 2008	Activity vs activity	No	n/a	n/a
Treviño 2004	Dietary and activity vs control	No	n/a	n/a
Warren 2003	Dietary vs control Activity vs control	No	n/a	n/a

Table 3. Description of serious adverse events *(Continued)*

		Dietary and Activity vs control Activity vs dietary Dietary and activity vs dietary Dietary and activity vs activity			
Zota 2016	Dietary vs control	No	n/a	n/a	

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations

BMI: body mass index; n/a: not applicable; vs: versus; zBMI: standardised body mass index.

Table 4. Description of costing information

Comparison: Dietary intervention vs control

Study ID	Meta-analysis outcome(s)	Costing data recorded?	Intervention cost reported?	Trial costs reported?	Economic evaluation conducted (reference)
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Chai 2019	zBMI short-term; BMI short-term	Yes	No	Yes	No
Coleman 2012	zBMI medium-term; zBMI long-term	No	n/a	n/a	n/a
Cunha 2013	BMI medium-term	No	n/a	n/a	n/a
Damsgaard 2014	zBMI short-term	No	n/a	n/a	n/a
Davis 2021	zBMI medium-term; BMI medium-term; percentile medium-term	Yes	No	Yes	No
de Ruyter 2012	zBMI short-term; zBMI medium-term; zBMI long-term	No	n/a	n/a	n/a
Fulkerson 2010	zBMI short-term; percentile short-term	Yes	No	Yes	No
Fulkerson 2015	zBMI medium-term; zBMI long-term	Yes	Yes	No	No
Han 2006	zBMI long-term	No	n/a	n/a	n/a
Hendrie 2011	zBMI short-term; BMI short-term	Yes	No	Yes	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
James 2004	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a	n/a
Keshani 2016	BMI medium-term	No	n/a	n/a	n/a
Lent 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; per-	Yes	Yes	No	No

Table 4. Description of costing information *(Continued)*

	centile medium-term; percentile long-term				
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Yes	Yes (Meng 2013)
NCT00224887 2005	BMI medium-term	No	n/a	n/a	n/a
Nicholl 2021	zBMI short-term; BMI short-term; percentile short-term	No	n/a	n/a	n/a
Paineau 2008	zBMI short-term; BMI short-term	Yes	No	No	No
Seguin-Fawler 2021	Percentile short-term	Yes	No	Yes	No
Sichieri 2008	BMI short-term	Yes	No	No	No
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes	No	No
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Viggiano 2018	zBMI short-term; zBMI long-term	No	n/a	n/a	n/a
Comparison: activity intervention vs control					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barbeau 2007	BMI medium-term	Yes	No	Yes	No
Barnes 2015	zBMI short-term	Yes	No	Yes	No
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Breheny 2020	zBMI short-term; zBMI medium-term	Yes	Yes	No	Yes (Breheny 2020)
Clemes 2020	BMI short-term	Yes	No	No	No
De Bock 2013	BMI short-term; BMI medium-term	Yes	No	No	No
de Greeff 2016	BMI short-term	No	n/a	n/a	n/a
Diaz-Castro 2021	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
Donnelly 2009	BMI long-term	No	n/a	n/a	n/a
Drummy 2016	BMI short-term	No	n/a	n/a	n/a
Farmer 2017	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	Yes	Yes	No	No
Ford 2013	BMI short-term	No	n/a	n/a	n/a
Ha 2021	BMI short-term; BMI medium-term	Yes	Yes	Yes	No

Table 4. Description of costing information *(Continued)*

Howe 2011	BMI medium-term	Yes	No	Yes	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
Jones 2015	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	No	n/a	n/a	n/a
Ketelhut 2022	BMI short-term	No	n/a	n/a	n/a
Khan 2014	zBMI medium-term; BMI medium-term	Yes	No	Yes	No
Kovalskys 2016	zBMI long-term	No	n/a	n/a	n/a
Kriemler 2010	BMI medium-term; BMI long-term	Yes	No	No	No
Lau 2016	BMI short-term	No	n/a	n/a	n/a
Lazaar 2007	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
Li 2010	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a	n/a
Martinez-Vizcaino 2014	BMI medium-term	Yes	Yes	No	No
Martinez-Vizcaino 2020	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
Martinez-Vizcaino 2022	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Yes	Yes (Meng 2013)
Morgan 2019	zBMI medium-term	No	n/a	n/a	n/a
Muller 2016	zBMI medium-term; zBMI long-term; percentile long-term	No	n/a	n/a	n/a
Muller 2019	zBMI medium-term	Yes	No	No	No
Newton 2014	zBMI short-term; BMI short-term; percentile short-term	Yes	Yes	Yes	No
Rhodes 2019	BMI short-term	Yes	No	Yes	No
Sacchetti 2013	BMI long-term	No	n/a	n/a	n/a
Salmon 2022	zBMI long-term	Yes	No	No	No
Simon 2008	zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a	n/a
Tanskey 2017	zBMI medium-term; BMI medium-term	Yes	No	Yes	No
Telford 2012	BMI long-term	No	n/a	n/a	n/a

Table 4. Description of costing information *(Continued)*

Thivel 2011	BMI short-term	No	n/a	n/a	n/a
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Vizcaino 2008	BMI medium-term	Yes	Yes	No	No
Wang 2018	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Wendel 2016	BMI long-term; percentile long-term	Yes	No	Yes	No
Yin 2012	zBMI medium-term; zBMI long-term	Yes	Yes	No	Yes (Wang 2008)
Comparison: dietary and activity intervention vs control					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Adab 2018	zBMI long-term	Yes	Yes	Yes	Yes (Canaway 2019)
Annesi 2016	BMI short-term; BMI medium-term; percentile medium-term	No	n/a	n/a	n/a
Annesi 2017	BMI short-term; BMI medium-term	No	n/a	n/a	n/a
Baranowski 2003	BMI short-term	Yes	No	Yes	No
Baranowski 2011	zBMI short-term; percentile short-term	Yes	No	Yes	No
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Beech 2003	BMI short-term	Yes	No	Yes	No
Bohnert 2013	zBMI short-term	No	n/a	n/a	n/a
Brandstetter 2012	BMI long-term	No	n/a	n/a	n/a
Brown 2013	zBMI short-term; BMI short-term; percentile short-term	Yes	No	Yes	No
Caballero 2003	BMI long-term	No	n/a	n/a	n/a
Cao 2015	zBMI medium-term; zBMI long-term	No	n/a	n/a	n/a
Chen 2010	BMI short-term	No	n/a	n/a	n/a
Choo 2020	zBMI short-term	No	n/a	n/a	n/a
Crespo 2012	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	Yes	No	Yes	No
De Heer 2011	BMI short-term; percentile short-term	Yes	No	No	No

Table 4. Description of costing information *(Continued)*

Duncan 2019	BMI short-term	No	n/a	n/a	n/a
Elder 2014	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a	n/a
Fairclough 2013	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
Foster 2008	zBMI long-term; BMI long-term	No	n/a	n/a	n/a
Fulkerson 2022	zBMI medium-term	Yes	No	Yes	No
Gentile 2009	BMI short-term; BMI medium-term	Yes	Yes	No	No
Greve 2015	BMI long-term	Yes	No	Yes	No
Griffin 2019	zBMI short-term	Yes	Yes	Yes	No
Grydeland 2014	zBMI long-term; BMI long-term	No	n/a	n/a	n/a
Habib-Mourad 2014	BMI short-term	No	n/a	n/a	n/a
Habib-Mourad 2020	zBMI long-term	Yes	No	No	No
Haire-Joshu 2010	zBMI short-term	Yes	No	Yes	No
HEALTHY Study Group 2010	zBMI long-term	Yes	Yes	Yes	No
Hendy 2011	Percentile short-term	Yes	Yes	No	No
Hopper 2005	BMI short-term	No	n/a	n/a	n/a
Hull 2018	zBMI short-term; zBMI long-term; BMI short-term; BMI long-term	Yes	No	Yes	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
Jansen 2011	BMI short-term	No	n/a	n/a	n/a
Kain 2014	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Keller 2009	zBMI medium-term	No	n/a	n/a	n/a
Kipping 2008	BMI short-term	Yes	Yes	No	No
Kipping 2014	zBMI short-term; zBMI long-term	Yes	Yes	No	No
Klesges 2010	BMI medium-term; BMI long-term	No	n/a	n/a	n/a
Kobel 2017	BMI medium-term; percentile medium-term	Yes	Yes	No	Yes (Kesztyüs 2017)
Kocken 2016	zBMI short-term; zBMI long-term	No	n/a	n/a	n/a

Table 4. Description of costing information *(Continued)*

Kubik 2021	zBMI medium-term; zBMI long-term; BMI medium-term; BMI long-term	No	n/a	n/a	n/a
Levy 2012	zBMI short-term	No	n/a	n/a	n/a
Li 2019	zBMI medium-term	Yes	Yes	No	Yes (Zanganeh 2021)
Lichtenstein 2011	zBMI medium-term; zBMI long-term	No	n/a	n/a	n/a
Liu 2019	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	No	n/a	n/a	n/a
Liu 2022	zBMI short-term; zBMI medium-term; BMI short-term; BMI medium-term	No	n/a	n/a	n/a
Llargues 2012	BMI long-term	Yes	Yes	No	Yes (Mora 2015)
Lloyd 2018	zBMI long-term; BMI long-term	Yes	Yes	No	Yes (Wyatt 2018)
Magnusson 2012	BMI long-term	Yes	No	Yes	No
Marcus 2009	zBMI long-term	Yes	No	No	No
Morgan 2011	zBMI short-term	Yes	No	No	No
Morgan 2014	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
NCT02067728 2014	zBMI short-term	No	n/a	n/a	n/a
Nemet 2011a	BMI medium-term; percentile medium-term	No	n/a	n/a	n/a
Nemet 2011b	BMI medium-term; BMI long-term; percentile medium-term; percentile long-term	No	n/a	n/a	n/a
Nollen 2014	BMI short-term	No	n/a	n/a	n/a
Nyberg 2015	zBMI short-term; zBMI medium-term	No	n/a	n/a	n/a
Nyberg 2016	zBMI short-term; zBMI medium-term	Yes	No	Yes	No
O'Connor 2020	zBMI short-term	No	n/a	n/a	n/a
Pena 2021	zBMI short-term; BMI short-term	Yes	No	Yes	No
Puder 2011	BMI medium-term	Yes	No	No	No
Ramirez-Rivera 2021	zBMI short-term	No	n/a	n/a	n/a
Rerksuppaphol 2017	zBMI short-term; BMI short-term	No	n/a	n/a	n/a

Table 4. Description of costing information *(Continued)*

Rosario 2012	zBMI short-term; BMI short-term	No	n/a	n/a	n/a
Rosenkranz 2010	zBMI short-term; BMI short-term; percentile short-term	Yes	No	Yes	No
Rush 2012	zBMI long-term	Yes	Yes	No	Yes (Rush 2014)
Safdie 2013	BMI short-term; BMI medium-term; BMI long-term	Yes	No	No	No
Sahota 2001	zBMI medium-term	No	n/a	n/a	n/a
Sahota 2019	zBMI long-term	Yes	No	Yes	No
Santos 2014	zBMI medium-term	No	n/a	n/a	n/a
Sekhavat 2014	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Sgambato 2019	BMI short-term	No	n/a	n/a	n/a
Sherwood 2019	zBMI medium-term; zBMI long-term; percentile medium-term; percentile long-term	Yes	No	No	No
Siegrist 2013	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Siegrist 2018	BMI long-term	No	n/a	n/a	n/a
Spiegel 2006	zBMI short-term	No	n/a	n/a	n/a
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes	No	No
Stolley 1997	BMI short-term; BMI medium-term	Yes	No	Yes	No
Story 2003	BMI short-term	No	n/a	n/a	n/a
Story 2012	zBMI long-term; BMI long-term	No	n/a	n/a	n/a
Topham 2021	zBMI long-term	No	n/a	n/a	n/a
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Wang 2012	zBMI medium-term	No	n/a	n/a	n/a
White 2019	zBMI short-term; zBMI medium-term; zBMI long-term	Yes	Yes	Yes	No
Williamson 2012	zBMI long-term	No	n/a	n/a	n/a
Xu 2015	zBMI medium-term; BMI medium-term	No	n/a	n/a	n/a
Xu 2017 (5 other cities)	zBMI medium-term; BMI medium-term	Yes	Yes	No	Yes (Xu 2020b)
Comparison: activity intervention vs dietary intervention					

Table 4. Description of costing information *(Continued)*

Study ID	Meta-analysis outcome(s)	Costing data recorded?	Intervention cost reported?	Trial costs reported?	Economic evaluation conducted (reference)
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
Meng 2013 (Beijing)	zBMI medium-term; BMI medium-term	Yes	Yes	Yes	Yes (Meng 2013)
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Comparison: dietary and activity intervention vs dietary intervention					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
Stettler 2015	zBMI medium-term; BMI medium-term	Yes	Yes	No	No
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Comparison: dietary and activity intervention vs activity intervention					
Study ID	**Meta-analysis outcome(s)**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Barnes 2021	zBMI medium-term; BMI medium-term	Yes	No	No	No
Ickovics 2019	Percentile long-term	Yes	Yes	No	No
Robinson 2003	BMI short-term	Yes	No	Yes	No
Robinson 2010	zBMI long-term; BMI long-term	No	n/a	n/a	n/a
van de Berg 2020	Percentile medium-term	Yes	No	No	No
Studies not included in the meta-analyses					
Study ID	**Comparison**	**Costing data recorded?**	**Intervention cost reported?**	**Trial costs reported?**	**Economic evaluation conducted (reference)**
Anand 2007	Dietary and activity vs control	No	n/a	n/a	n/a
Branscum 2013	Dietary and activity vs dietary and activity	No	n/a	n/a	n/a

Table 4. Description of costing information *(Continued)*

Carlin 2021	Dietary and activity vs control	Yes	No	Yes	No
Di Maglie 2022	Activity vs control	No	n/a	n/a	n/a
Epstein 2001	Dietary and activity vs dietary and activity	No	n/a	n/a	n/a
Gortmaker 1999	Dietary and activity vs control	Yes	Yes	No	Yes (Wang 2008)
Hannon 2018	Dietary and activity vs dietary and activity	Yes	No	No	No
Hooft van Huysduynen 2014	Dietary vs control	No	n/a	n/a	n/a
Huys 2020	Dietary and activity vs control	Yes	Yes	No	Yes (Willems 2021)
Johnston 2013	Dietary and activity vs control	No	n/a	n/a	n/a
Lynch 2016	Dietary and activity vs control	No	n/a	n/a	n/a
Macias-Cervantes 2009	Activity vs control	No	n/a	n/a	n/a
Madsen 2013	Activity vs control	No	n/a	n/a	n/a
Marsigliante 2022	Dietary vs control	No	n/a	n/a	n/a
Muzaffar 2019	Dietary and activity vs dietary and activity	Yes	Yes	No	No
Pindus 2015	Activity vs control	No	n/a	n/a	n/a
Razani 2018	Activity vs activity	Yes	No	Yes	No
Riiser 2020	Activity vs control	No	n/a	n/a	n/a
Salmon 2008	Activity vs control	No	n/a	n/a	n/a
Tessier 2008	Activity vs activity	No	n/a	n/a	n/a
Treviño 2004	Dietary and activity vs control	Yes	No	Yes	No
Warren 2003	Dietary vs control Activity vs control Dietary and activity vs control Activity vs dietary Dietary and activity vs dietary Dietary and activity vs activity	No	n/a	n/a	n/a
Zota 2016	Dietary vs control	Yes	Yes	No	No

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations

BMI: body mass index; n/a: not applicable; vs: versus; zBMI: standardised body mass index.

Table 5. Description of PROGRESS characteristics

Comparison: dietary intervention vs control

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: School remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NR	Socioeconomic status was based on postal code of residence using the Index of Relative Socioeconomic Advantage and Disadvantage from the Australian Bureau of Statistics census-based Socio-Economic Indexes for Areas (SEIFA). The SEIFA (index) was developed using employment, education, low income, family breakdown, financial well-being, family type, housing stress, overcrowding, home ownership, family support, lack of wealth (no telephone or car), foreign birth and indigenous status (Australian Bureau of Statistics, 2008). Based on each family unit's postcode, a SEIFA score was allocated and grouped via the following: 1-2, 3-4, 5-6, 7-8, 9-10.
Chai 2019	Place of residence; Gender/Sex; Education; Socioeconomic status		Place of residence: One metropolitan and two rural sites. Modified Monash category: major city (MM 1): 61%; medium regional (MM 4): 3%; small regional (MM 5): 37%; Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 59% boys Religion: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Education (parents): school certificate: 7%; higher school certificate: 13%; certificate/diploma: 30%; undergrad degree: 24%; post grad degree: 26% SES: IRSAD (Index of Relative Socio-Economic Advantage and Disadvantage): low (IRSAD 1 to 3): 15%; mid (IRSAD 4 to 7): 65%; high (IRSAD 8 to 10): 20% Social capital: NR	
Coleman 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: Hispanic: 52%; African American: 19%; Non-Hispanic white: 19%; Asian/Pacific Islander: 7%; Native American: 0.3%; unknown: 2.7% Occupation (parents): NR Gender/sex: 43% boys Religion: NR Education (parents): NR SES: the school district was low-income; 100% of children had free and reduced lunch rates Social capital: NR	NR
Cunha 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: Metropolitan area of Rio de Janeiro Race/ethnicity/culture/language: skin colour: Intervention: White: 25.6%; Brown: 47.6%; Black: 26.8%. Control: White: 25.7%; Brown: 42.7%; Black: 31.5% Occupation (parents): NR Gender/sex: intervention: 52.3% boys; control: 51.4% boys Religion: NR Education (parents): NR SES: the study was set in one of the poorest areas in Brazil and most students were from low socioeconomic level families Social capital: NR	NR
Damsgaard 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: Immigrant/descendant: 12%; non-immigrant: 88% Occupation (parents): see PROGRESS notes Gender/sex: 52.1% boys Religion: NR Education (parents): short education: 41%; high education: 59% SES: see PROGRESS notes Social capital: NR	Children were defined as immigrants/descendants if all grandparents and one or both parents were born outside of Denmark. The household educational level was defined as the level of education of the parent with the highest level in the household, and families were categorised into 6 groups as described by Statistics Denmark: short education includes upper

Table 5. Description of PROGRESS characteristics *(Continued)*

			and lower secondary education and vocational education; higher education includes short higher education, bachelor's degree and higher. Occupation and income measurement were conducted at baseline but not reported.
Davis 2021	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: White: 20.8%; Black: 9.7%; Hispanic: 64.4%; Native Americans, Asian/Pacific Islands/Other: 3.6% Occupation (parents): NR Gender/sex: 47.4% boys Religion: NR Education (parents): education completed: < 8th grade: 13.1%; finished 8th grade: 9.9%; some high school: 13%; high school graduate/GED: 20.5%; some college/vocational school: 23.8%; college graduate: 15%; graduate or professional training: 4.8% SES: eligible for free or reduced school lunch: 68.9% Social capital: NR	NR
de Ruyter 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education	Place of residence: urban area Race/ethnicity/culture/language: Dutch: 78.2%; Non-Western: 18.7%; Other: 1.9% Occupation (parents): NR Gender/sex: 53.1% boys Religion: NR Education (parents): highest level of education attained by parent or guardian: elementary, vocational, or technical school: 13.5%; high-school diploma: 30.3%; college or university degree: 44.8% SES: NR Social capital: NR	NR
Fulkerson 2010	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education	Place of residence: NR Race/ethnicity/culture/language: children's ethnicity: Caucasian: 84%; mixed race; 11%; American Indian: 5%; African American: 2% Occupation (parents): full-time working parents: 52% Gender/sex: 48% boys Religion: NR Education (parents): college educated parents: 75% SES: NR Social capital: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

Fulkerson 2015	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: urban Race/ethnicity/culture/language: ethnicity: Hispanic: 9%; Race: White: 68%; Black: 18%; American Indian, Asian, Multi-racial: 14% Occupation (parents): NR Gender/sex: 53% boys Religion: NR Education (parents): education: ≤ associates degree: 41%; ≥ bachelor's degree: 59% SES: receiving economic assistance: 39% Social capital: NR	Economic assistance was defined by either being eligible for free or reduced priced lunches at school or household receipt of public assistance. PROGRESS data extracted from Fulkerson 2018.
Han 2006	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.8% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Article in Chinese, limited information on PROGRESS data
Hendrie 2011	Occupation; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): employment status: full-time: intervention: 18.8%; control: 22.2%; part-time: intervention: 45.8%; control: 48.9%; full-time homemaker: intervention: 27.1%; control: 17.8%; other: intervention: 8.30%; control: 11.1% Gender/sex: 60% boys Religion: NR Education (parents): higher level of education: some high school or less: intervention: 12.5%; control: 8.9%; completed high school or less: intervention: 18.8%; control: 4.4%; technical or trade qualification: intervention: 16.7%; control: 24.4%; tertiary degree: intervention: 52.1%; control; 62.2% SES: reported as estimated annual household income: < AUD 20,800: 2%; AUD 20,800 to AUD 36,399: 14%; AUD 36,400 to AUD 51,999: 13%; AUD 52,000 to AUD 77,999: 25%; AUD 78,000 to AUD 103,999: 15%; AUD 104,000: 37%; prefer not to answer: 4% Social capital: NR	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: urban district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4%	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one measured in the study population

Table 5. Description of PROGRESS characteristics *(Continued)*

		Social capital: NR	
James 2004	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 50.3% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Keshani 2016	Occupation; Gender/Sex; Education	Place of residence: NR Race/ethnicity/culture/language: see Notes on PROGRESS Occupation (parents): mother's occupation: housewife: 67%; worker: 6%; employee: 22%; self-employment: 2%; doctor/engineer: 2%; retired: 1%; father's occupation: worker: 18%; employee: 46%; self-employment: 23%; doctor/engineer: 10%; retired: 4% Gender/sex: 48.5% boys (refers to the sample included in the analysis) Religion: NR Education (parents): mother's education (years): ≤ 5: 4%; 6 to 8: 12%; 9 to 12: 39%; ≥ 13: 45% Occupation (parents): 5: 4%; 6 to 8: 7%; 9 to 12: 27%; ≥ 13: 62% SES: See PROGRESS notes Social capital: NR	Gender data refers to the sample included in the analysis (83/171). Socioeconomic status was evaluated using a questionnaire that included parent's education and job, household income, family size, home ownership status and ethnicity. Ethnicity and socioeconomic status (household income and home ownership) data are not reported.
Lent 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: Black/African American: intervention: 46.2%; control: 38.3%; White: intervention: 0.5%; control: 13.2%; Hispanic/Latino: intervention: 43.2%; control: 16.2%; Asian: intervention: 0.5%; control: 15.9%; Native American/Alaskan Native: intervention: 0.2%; control: 1.5%; Other/Mixed/Unknown: intervention: 9.4%; control: 15% Occupation (parents): NR Gender/sex: intervention: 44.6% boys; control: 42.2% boys Religion: NR Education (parents): NR SES: the study setting is schools in low-income neighbourhoods in Philadelphia Students that qualified for free or reduced-price meals: 82.1% (SD7.4%) Social capital: NR	NR
Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status	Place of residence: urban Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.1% boys Religion: NR Education (parents): mother's educational level: low (illiterate): intervention: 0.2%; control: 0.4%; middle (primary or junior middle school): inter-	PROGRESS data are from the Beijing cohort only

Table 5. Description of PROGRESS characteristics *(Continued)*

		vention: 33.1%; control: 39.4%; high (senior middle school or above): intervention: 66.6%; control: 60.2% SES: income capita per month (yuan, RMB): < 750 RMB: control: 14.2%; nutrition intervention: 10.9%; physical activity intervention: 16.7%; 750 to 2500 RMB: control: 67.1%; nutrition intervention: 66.8%; physical activity intervention: 64.2%; ≥ 2501 RMB: control: 18.7%; nutrition intervention: 22.4%; physical activity intervention: 19.1% Social capital: NR	
NCT00224887 2005	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: Native American communities in Pine Ridge Reservation Race/ethnicity/culture/language: mother is of Mexican descent and identifies with the Mexican-American community (See PROGRESS notes) Occupation (parents): NR Gender/sex: 28% boys Religion: NR Education (parents): NR SES: mothers and their second or third grade children from 16 low-wealth elementary schools Social capital: NR	The main article is a trial registration and not many details are reported: "Mothers' Socio-environment Measurements Demographics: Demographic variables, including household composition, who in the household shares the same food supplies, and where mothers purchase or receive food supplies (including WIC or food donations) will be collected from the mothers. To examine the variability in household food supplies relative to pay day, mothers will also report when their family receives pay checks. Household Level of Food Security: Food security is defined as people's assured access to enough acceptable food, that is acquired in socially acceptable ways, for an active and healthy life. This construct will be measured using the 18 item U.S.D.A. Core Food Security Module (FSM). This instrument conceptu-

Table 5. Description of PROGRESS characteristics *(Continued)*

			alizes food security as consisting of four components: 1) quantity of food, 2) quality of food, 3) food anxiety and 4) food acquisition in socially acceptable ways (166, 167). Households are categorized into four levels of food insecurity: 1) food secure, 2) food insecure without hunger, 3) food insecure with moderate hunger and 4) food insecure with severe hunger (i.e., children's food intake is restricted)." Ethnicity characteristics extracted from the inclusion criteria section.
Nicholl 2021	Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 53.1% boys Religion: NR Education (parents): mother education: year 12 or less: 15.2%; tertiary: 84.8% Father education: year 12 or less: 23.9%; trade: 8.7%; tertiary: 67.4% SES: household income, Australian dollar: AUD 100,000: 26.7%; AUD 100,000 to 150,000: 33.3%; > AUD 150,000: 20%; rather not say: 20% Social capital: NR	NR
Paineau 2008	Occupation; Gender/Sex	Place of residence: See Notes on PROGRESS Race/ethnicity/culture/language: NR Occupation (parents): higher social/professional levels: intervention A: 19%; intervention B: 48%; control: 53% Gender/sex: 47.5% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Education was used as proxy for socioeconomic status. Area of residence was measured and used (with parental educational level) as indicators of socioeconomic status. Data on place of residence are not reported.
Seguin-Fawler 2021	Place of residence; Race/	Place of residence: farm communities	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Race/ethnicity/culture/language: American Indian/Alaskan Native: intervention: 0.7%; control: 1.9%; Asian/Pacific Islander: intervention:1.4%; control: 1.3%; Black: intervention: 15.5%; control: 12.1%; White: intervention: 75.7%; control: 76.4%; Multiracial: intervention: 4.7%; control: 5.7; not one of the above: intervention 2%; control: 2.5%; Hispanic: intervention: 6.1%; control: 6.4% Occupation (parents): employed: intervention: 46.6%; control: 45.2%; out of work: intervention: 10.1%; control: 14%; homemaker: intervention: 37.2%; control: 33.8%; student/retired: intervention: 6.1%; control: 7% Gender/sex: intervention: 43.9% boys; control: 51.6% boys Religion: NR Education (parents): highest year of school: high school or less: intervention: 16.2%; control: 22.9%; technical or vocational school: intervention: 4.7%; control: 4.5%; some college: intervention: 27.7%; control: 26.1%; college graduate: intervention: 37.8%; control: 38.9%; graduate or professional degree: intervention: 13.5%; control 7.6%; SES: households that receive the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in the past month: Intervention: 41.2%; control: 36.3% Households that received Supplemental Nutrition Assistance Program (SNAP) in the past month: intervention: 47.6%; control: 52.3% Annual household income: < USD 9999: 18.5%; USD 10,999 to 19,999: 20%; USD 20,000 to 34,999; USD 35,000 to 49,999: 34.5%; USD 49,999 to 74,999: 27% Social capital: NR	
Sichieri 2008	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: Metropolitan city Race/ethnicity/culture/language: race: intervention: White: 41.8%; Mulatto: 25.9%; Black: 32.3%; Control: White: 42.3%; Mulatto: 30.6%; Black: 26.9% Occupation (parents): NR Gender/sex: intervention: 46.9% boys; control: 47.4% boys Religion: NR Education (parents): NR SES: mostly students from families of low socioeconomic level Social capital: NR	NR
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9% Occupation (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Gender/sex: beverage-only intervention: 46% boys; multiple behaviour intervention: 43% boys; control: 55% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	NR
Viggiano 2018	Gender/Sex	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52% boys (measured at 8 months follow-up) Religion: NR Education (parents): NR SES: NR Social capital: NR	Gender/sex data were collected at the 8-month follow-up

Comparison: activity intervention vs control

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Barbeau 2007	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: 100% Black Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Barnes 2015	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): NR SES: SEIFA disadvantage classification: 1-2 (lowest): 0%; 3-4: 3%; 5-6: 36%; 7-8: 61%; 9-10 (highest): 0% Social capital: NR	See Notes on PROGRESS in Barnes 2021 above

Table 5. Description of PROGRESS characteristics *(Continued)*

Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: school remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NR	See Notes on PROGRESS in Barnes 2021 above
Breheny 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: See Notes on PROGRESS Race/ethnicity/culture/language: White British: 51.5%; South Asian: 16.2%; Black African Caribbean: 8.4%; Other/not specified: 23.9%; Occupation (parents): NR Gender/sex: 52.4% boys Religion: NR Education (parents): NR SES: index of multiple deprivation: deprivation fifth: 1 (most deprived): 52.5%; 2: 27.5%; 3: 12.3%; 4: 5.2%; 5 (least deprived): 2.5% Social capital: NR	Place of residence (postcode) and free school meal eligibility were obtained from school records, but data are not reported
Clemes 2020	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: urban (schools located in the city of Bradford) Race/ethnicity/culture/language: South Asian Heritage: 48%; White British: 36%; Other: 16% Occupation (parents): NR Gender/sex: 56% boys Religion: NR Education (parents): NR SES: half of the participating schools were located in an area with high levels of deprivation and the majority of the participating children were of South Asian heritage, a minority group more likely to live within the most deprived 10% of neighbourhoods in the United Kingdom Social capital: NR	NR
De Bock 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Place of residence: rural and non-rural Race/ethnicity/culture/language: immigrant background (non-German): 37% Occupation (parents): NR Gender/sex: 52% boys Religion: NR Education (parents): maternal education status: low: 25%; middle: 55%; high: 20% SES: See PROGRESS notes Social capital: NR	Immigrant refers to non-German nationality. Aggregate socioeconomic status (SES) of the preschool attendees was estimated by a tertile split based on information provided by the head teacher on the proportion of children from families

Table 5. Description of PROGRESS characteristics *(Continued)*

			with low SES or immigrant background (SES data not reported). The authors developed a structured protocol to categorise preschools' setting as either rural or non-rural (data not reported). Specifically, satellite views at a predefined altitude were examined independently by two research team members (Google Earth, accessed 6 June 2008). Rural sites were defined as those that had forest, parks and green spaces within the cutout but no highways or industrial areas. All other preschools were categorised as located in a non-rural area. In each case, ratings were compared and differences were discussed until consensus was reached.
de Greeff 2016	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 55% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Diaz-Castro 2021	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 100% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Donnelly 2009	Place of residence; Race/Ethnicity/Cul-	Place of residence: rural and urban schools Race/ethnicity/culture/language: Caucasian: 77.4%; African American: 6.2%; Hispanic: 10.1%;	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	ture/Language; Gender/Sex; Socioeconomic status		Native American: 1.65; Asian: 1.2%; Multi-Ethnic: 3.6% Occupation (parents): NR Gender/sex: 48.8% boys Religion: NR Education (parents): NR SES: participants that qualified for free or reduced lunch: 43% Social capital: NR	
Drummy 2016	See Notes on PROGRESS	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: See PROGRESS notes Religion: NR Education (parents): NR SES: NR Social capital: NR	Gender/Sex was measured, but data are not reported
Farmer 2017	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: New Zealand/European: 53%; Pacific Island: 12.3%; Asian: 8.7%: Unknown: 14.04% Occupation (parents): NR Gender/sex: 53.6% boys Religion: NR Education (parents): NR SES: decile 2: 12.5%; decile 3: 12.5%; decile 4: 25%; decile 5: 25%; decile 6: 25%. Social capital: NR	New Zealand schools are ranked into deciles from 1 to 10, where 1 indicates the 10% of schools with the highest proportion of pupils from low socioeconomic areas and decile 10 indicates the 10% of schools with the lowest proportion
Ford 2013	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52% boys (cohort that completed the intervention) Religion: NR Education (parents): NR SES: NR Social capital: NR	Gender/Sex data refer to the cohort that completed the intervention
Ha 2021	Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): employment status of parent: housewife: 35.1%; full-time: 23.4%; part-time: 0.5%; unemployed: 0.6%; did not report: 25.7% Gender/sex: 59.6 % boys Religion: NR Education (parents): parent's education primary of below: 2%; secondary: 42%; non-degree: 15%; degree: 11%; master or above: 6%; did not report: 25% SES: household income: HKD 0 to 19,999: 17%; HKD 20,000 to 39,999: 23%; HKD 40,000 to 59,999: 13%; HKD 60,000 to 79,999: 4%; HKD 80,000 or more: 3%	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Social capital: NR	
Howe 2011	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: 100% Black Occupation (parents): NR Gender/sex: 100% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: urban district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4% Social capital: NR	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one measured in the study population
Jones 2015	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: cultural background: Australian: 81.1%; Asian: 8.1%; European: 0%; Other: 10.8% English spoken at home: 89.2% Occupation (parents): NR Gender/sex: 54% boys Religion: NR Education (parents): highest level of parental education: high school: 36.5%; technical: 24.3%; diploma: 10.8%; university: 21.6%; post-graduate: 6.7% SES: parental income (both parents): < AUD 60K: 56.8%; AUD 61K to 80K: 13.5%; AUD 81K to 120K: 18.9%; > AUD 120K: 10.8% Social capital: NR	NR
Ketelhut 2022	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52% boys Religion: NR Education (parents): NR SES: Schools were located in a socially disadvantaged area Social capital: NR	NR
Khan 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: Intervention: White: 47%; Black or African American: 23%; Asian: 15%; Other and multiracial: 15% Control: White: 53%; Black or African American: 26% Asian: 9%; Other and multiracial: 12%	Socioeconomic status was determined by using a trichotomous index based on participa-

Table 5. Description of PROGRESS characteristics *(Continued)*

			Occupation (parents): See Notes on PROGRESS Gender/sex: 53.2% boys Religion: NR Education (parents): See Notes on PROGRESS SES: socioeconomic status: Intervention: low: 39%; medium: 24%; high: 37%; control: low: 45%; medium: 23%; high: 32%; Social capital: NR	tion in free or reduced-price meal programme at school, the highest level of education obtained by the mother and father, and the number of parents who worked full time. Occupation and education data are not reported
Kovalskys 2016	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: town Race/ethnicity/culture/language: eligible children comprised mainly a Caucasian population Occupation (parents): NR Gender/sex: 48% boys Religion: NR Education (parents): NR SES: eligible children comprised mainly a middle and low-middle class population Social capital: NR	NR
Kriemler 2010	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education		Place of residence: rural and urban Race/ethnicity/culture/language: migrant families: 27% Occupation (parents): NR Gender/sex: 48.8% boys Religion: NR Education (parents): no formal parental education: 9.3% SES: NR Social capital: NR	Migrant status defined as both parents from Eastern or Southern European countries, Africa, Asia, Central or South America, or other less developed countries
Lau 2016	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 68.7% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Lazaar 2007	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 49.9% boys (total cohort) Religion: NR Education (parents): NR SES: NR Social capital: NR	PROGRESS data refers to all participants
Li 2010	Place of residence; Gender/Sex	Gender/Sex	Place of residence: urban Beijing Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.3% boys Religion: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Education (parents): NR SES: NR Social capital: NR	
Martinez-Vizcaino 2014	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education	Gender/Sex; Education	Place of residence: rural schools: 90% Race/ethnicity/culture/language: born abroad: intervention: girls: 12.7%; boys: 12%; control: girls: 14.2%; boys 17.1% Occupation (parents): highest parental employment status: housewife, student or unemployed: intervention: girls: 9%; boys: 7.1%; control: girls: 9.2%; boys: 9.2%. Employee: intervention girls: 38.7%; boys: 54.8%; control: girls: 40.5%; boys: 39.9%. Self-employed: intervention girls: 52.3%; boys: 38.1%; control: girls: 50.3%; boys: 51% Gender/sex: 48.6 boys Religion: NR Education (parents): highest parental educational level: primary or lower: intervention: girls: 7.3%; boys: 3.6%; control: girls: 8.7%; boys: 5.2%; secondary: intervention: girls: 65.1%; boys: 81%; control: girls: 73.3%; boys: 75.2%; university: intervention: girls: 27.5%; boys: 15.5%; control: girls: 18%; boys: 19.6% SES: NR Social capital: NR	NR
Martinez-Vizcaino 2020	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 50.1% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Data for the familiar socioeconomic level were gathered using self-reported occupation and education questions answered by both the father and mother. An index of socioeconomic level was calculated using data on the parent's education and occupation.
Martinez-Vizcaino 2022	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: mainly rural schools Race/ethnicity/culture/language: NR Occupation (parents): See Notes on PROGRESS Gender/sex: 47.8% boys Religion: NR Education (parents): See Notes on PROGRESS SES: Intervention boys: lower/lower middle: 26.9%; middle: 50.9%; middle upper/upper: 22.2% Intervention girls: lower/lower middle: 20.3%; middle: 49.6%; middle upper/upper: 30.1% Control boys: lower/lower middle: 18.3%; middle: 55.0%; middle upper/upper: 26.7% Control girls: lower/lower middle: 20.5%; middle: 51.5%; middle upper/upper: 28.0% Social capital: NR	The Spanish Epidemiology Society Scale was used to assess the family socioeconomic status. Parents' occupation and education were measured and data were used to calculate socioeconomic status. Family socioeconomic status was estimated using the Spanish Epi-

Table 5. Description of PROGRESS characteristics *(Continued)*

			demiology Society Scale. Mothers and fathers reported their respective educational levels and employment status, and an index was calculated considering both. Occupation and education data are not reported.
Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status	Place of residence: urban Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.1% boys Religion: NR Education (parents): mother's educational level: low (illiterate): intervention: 0.2%; control: 0.4%; middle (primary or junior middle school): intervention: 33.1%; control: 39.4%; high (senior middle school or above): intervention: 66.6%; control: 60.2% SES: income capita per month (yuan, RMB): < 750 RMB: control: 14.2%; nutrition intervention: 10.9%; physical activity intervention: 16.7%; 750 to 2500 RMB: control: 67.1%; nutrition intervention: 66.8%; physical activity intervention: 64.2%; ≥ 2501 RMB: control: 18.7%; nutrition intervention: 22.4%; physical activity intervention: 19.1% Social capital: NR	PROGRESS data are from the Beijing cohort only
Morgan 2019	Occupation; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): father post-school qualification: 94% SES: deprivation index: 1-2 (lowest) 0; 3-4: 28%; 5-6: 48%; 7-8: 19%; 9-10 (highest): 20% Social capital: NR	Socioeconomic status by population decile as reported in the Australian Bureau of Statistics Socio-economic Indexes for Areas (SEIFA) tool for relative socioeconomic advantage and disadvantage
Muller 2016	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 50.5% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Muller 2019	Place of residence; Race/Ethnicity/Culture/Language;	Place of residence: townships school: 57%; Northern Area schools: 43% Race/ethnicity/culture/language: the study population consisted of coloured children (mixed race	The study area has been detrimentally affected by extreme poverty

Table 5. Description of PROGRESS characteristics *(Continued)*

	Occupation; Gender/Sex; Socioeconomic status	ancestry), usually Afrikaans speaking, and black African children, mainly Xhosa speaking Occupation (parents): NR Gender/sex: 51.1% boys Religion: NR Education (parents): NR SES: all schools were classified as quintile 3. Overall socioeconomic index: 0 (see PROGRESS notes). Social capital: NR	and high rates of unemployment, due to past government policies, as well as current public health and economic challenges faced by the country (data on occupation not reported). Government schools in South Africa are classified into 5 groups, called quintiles, mainly for the purpose of allocating financial resources, with quintile 1 being the poorest and quintile 5 being the "least poor". Schools in quintiles 1, 2 and 3 are proclaimed as no-fee schools, while schools in quintiles 4 and 5 are fee-paying schools. The eight schools participating in the DASH study belong to quintiles 3. Socioeconomic status is based on self-reported household characteristics and assets, and calculated based on factor scores of principal component analysis.
Newton 2014	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: African-American: 59% Occupation (parents): NR Gender/sex: 44% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Rhodes 2019	Race/Ethnicity/Culture/Language; Occupation; Gen-	Place of residence: NR Race/ethnicity/culture/language: predominately white	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	der/Sex; Education; Socioeconomic status	Visible minority: education condition: 17%; education + planning condition: 7.7%; Occupation (parents): currently employed: 72% Gender/sex: 48% boys Religion: NR Education (parents): college educated: 64% SES: moderate to high incomes (> CAD 74,000): 56% Social capital: NR	
Sacchetti 2013	Place of residence; Gender/Sex	Place of residence: city, plain, hills (see PROGRESS notes) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51.5% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Note regarding location of schools: The schools in the hills showed some disadvantageous characteristics compared to other schools, in the lower availability of sports facilities and, sometimes, the lack of a gym. These classes were equally represented in intervention and control groups.
Salmon 2022	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: suburban primary schools Race/ethnicity/culture/language: country of birth: Australia: 66.9%; other: 33.1% Occupation (parents): NR Gender/sex: 44.2% boys Religion: NR Education (parents): maternal education level: low schooling (< 12 years): 14.6%; medium schooling (12 years): 43.2%; tertiary education (university): 42.2% SES: school socioeconomic status: low: 40%; medium: 55%; high: 5% Social capital: NR	The self-reported highest level of maternal education was used as a proxy measure of socioeconomic position and classified as low (schooling < 12 years), medium (schooling = 12 years) and high (tertiary education). Schools were in the first (low), third (mid) and fifth (high) quintiles of socioeconomic status areas according to the Australian Bureau of Statistics' Socio-Economic Index for Areas (suburb disadvantage score). PROGRESS characteristics reported for the sub-sample described in Carson 2013 (n =293)

Table 5. Description of PROGRESS characteristics *(Continued)*

Simon 2008	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	Place of residence: residence location with < 50,000 inhabitants: intervention: 44.5%; control: 48.2% Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: intervention: 46.3% boys; control: 51.8% boys Religion: NR Education (parents): NR SES: socio-occupational status: low: intervention: 13.7%; control: 14.7%; medium: intervention: 62.7%; control: 69.8%; high: intervention: 23.6%; control: 15.5% Greater Strasbourg outside low economic environment: intervention: 23.3%; control: 21.9% Greater Strasbourg in low economic environment: intervention: 32.2%; control: 29.9% Social capital: NR	The highest socio-occupational category of either parent was taken as an approximation of family socio-occupational status, which was classified as low, medium or high
Tanskey 2017	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Race/Ethnicity/Culture/Language	Place of residence: urban, suburban and peri-urban schools Race/ethnicity/culture/language: Race/Ethnicity: White: 37%; Hispanic: 365; Black: 7%; Asian: 4%; Multi-ethnic: 6%; Other/no response: 10% Occupation (parents): NR Gender/sex: 44% boys Religion: NR Education (parents): highest level of parent education attained: < 4-year college degree: 62%; 4-year college degree or higher: 38% SES: eligible for free or reduced-price lunch: 58% Social capital: NR	NR
Telford 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: outer suburb Race/ethnicity/culture/language: children's ethnic descent (1 or both parents): White: 86%; Asian: 8%; Australian Aboriginal or Torres Strait Islander: 3%; Polynesian: 1%; missing data: 2% Occupation (parents): NR Gender/sex: 51.3% boys Religion: NR Education (parents): NR SES: average household income approximates the mean for Australian city dwellers (data from Telford 2009) Social capital: NR	NR
Thivel 2011	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 49.7% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
van de Berg 2020	Race/Ethnicity/Culture/Language; Gen-		Place of residence: NR Race/ethnicity/culture/language: Ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7%	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	der/Sex; Socioeconomic status		Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	
Vizcaino 2008	Place of residence; Gender/Sex	Place of residence; Gender/Sex	Place of residence: urban, suburban and rural. Except for the provincial capital (population 48 000), all the towns were small (population 1800 to 6500) and their main economic activities were farming, food processing and mechanical industries. Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 50.6% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Wang 2018	Place of residence; Gender/Sex		Place of residence: urban districts Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: Intervention: 53.2% boys; control: 52.8% boys Religion: NR Education (parents): See Notes on PROGRESS SES: NR Social capital: NR	Parents' education level (≤ 9 years, 10 to 12 years and > 12 years) was measured, but data are not reported
Wendel 2016	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: White: 74.6%; Hispanic: 7.85; Black: 7.3%; Other: 10.4% Occupation (parents): NR Gender/sex: 49.7% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Yin 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: schools in urban, suburban, and rural community settings within a metropolitan area Race/ethnicity/culture/language: White: 32%; African-American: 66% Occupation (parents): NR Gender/sex: 47% boys Religion: NR Education (parents): NR SES: qualified for school lunch programme: 65% Social capital: NR	NR
Comparison: dietary and activity intervention vs control				

Table 5. Description of PROGRESS characteristics *(Continued)*

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Adab 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: rural and urban areas Race/ethnicity/culture/language: Ethnicity: White British: 45.3%; South-Asian: 30.5%; Black African-Caribbean: 7.9%; Other: 16.2%; unknown: 1.1 Occupation (parents): NR Gender/sex: 51.1% boys Religion: NR Education (parents): NR SES: deprivation fifth (index of multiple deprivation: 1 (most deprived): 54.9%; 2: 19%; 3:10.1%; 4: 8.3%; 5 (least deprived): 7.6% Social capital: NR	NR
Annesi 2016	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: White: 11.4%; African-American: 75.4%; Hispanic; 11.4%; other 1.8% Occupation (parents): NR Gender/sex: 46.5% boys Religion: NR Education (parents): NR SES: based on the location of participants' elementary schools, their median family income of USD 62,200 was moderate Social capital: NR	NR
Annesi 2017	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: White: 31% White; black: 65%; other: 4% Occupation (parents): NR Gender/sex: 55% boys Religion: NR Education (parents): NR SES: socioeconomic strata based on participants' after-school care site location (a middle median family income of USD 74,000/year) Social capital: NR	NR
Baranowski 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: 100% African-American or Black (as identified by parents) Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): maximum household education: some high school: 0%; high school graduate: 5.7%; tech school/some college: 37.1%; college graduate/post graduate: 57.1% SES: total household income, %: < USD 20,000; 11.4%; USD 20,000 to 40,000: 34.3%; > USD 40,000: 54.3%; home owned: 57.1% Social capital: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

Baranowski 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: urban middle school students in Texas (75%) and rural middle school students in North Carolina (25%) Race/ethnicity/culture/language: White: 39.9%; African American: 24.2%; Hispanic: 28.1%; other: 7.8% Occupation (parents): NR Gender/sex: 56.2% boys Religion: NR Education (parents): highest household education: some college or less: 31.4%; college degrees or more: 68.6% SES: sample was predominantly low-income students Social capital: NR	NR
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: school remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NR	See Notes on PROGRESS in Barnes 2021 above
Beech 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: 100% African-American or Black (as identified by parents) Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): education of parents/caregivers: high school graduate or less: 11.7%; tech school/some college: 56.7%; college grad/post grad: 31.7% SES: total household income: < USD 20,000: 35%; USD 20,000 to 40,000: 33.3%; > USD 40,000: 31.6% Home owned: 55% Social capital: NR	NR
Bohnert 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: urban Race/ethnicity/culture/language: ethnicity: African-American: 36%; Latina: 60%; Caucasian: 4% Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): NR SES: schools with low-income status: 72.3% to 98.1% Social capital: NR	School income status reported as indicated by city report

Table 5. Description of PROGRESS characteristics *(Continued)*

Brandstetter 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: migration background: intervention: 36.8%; control: 28.9% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 53.5% boys Religion: NR Education (parents): mothers with schooling > 10 years: intervention: 19.3%; control: 33.5%. Fathers with schooling > 10 years; intervention: 26.8%; control: 42.6% SES: See PROGRESS notes Social capital: NR	Migration background was assumed if at least one parent was born abroad or if at least one parent mainly spoke a foreign language during the children's first years of life. This definition should also include people who were born in Germany but still follow their traditional lifestyle, such as second-generation immigrants. Higher education was assumed for schooling of more than 10 years. Parental education can serve as a surrogate for socioeconomic status to differentiate between lower and higher social class.
Brown 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: Indian reservations Race/ethnicity/culture/language: 100% Native American Occupation (parents): NR Gender/sex: 50% boys Religion: NR Education (parents): NR SES: See PROGRESS notes Social capital: NR	American Indian communities are defined deprived by Story 1999
Caballero 2003	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Gender/Sex	Place of residence: American-Indian schools located primarily in rural settings Race/ethnicity/culture/language: 100% American Indian ethnicity Occupation (parents): NR Gender/sex: 51.7 boys Religion: NR Education (parents): NR SES: See PROGRESS notes Social capital: NR	American Indian communities are defined deprived by Story 1999
Cao 2015	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 53.8% boys Religion: NR Education (parents): NR	Socioeconomic status was measured, but data are not reported. Schools were randomised ac-

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: See PROGRESS notes Social capital: NR	cording to the economic level of the communities in which the schools were located and the condition of school sports fields and canteens.
Chen 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: 100% Chinese American children Occupation (parents): See PROGRESS notes Gender/sex: 56.7% boys Religion: NR Education (parents): mean mother's education years: 14.03 (SD 4.55); mean father's education years: 15.59 (SD 3.69) SES: See PROGRESS notes Social capital: NR	Parents' occupation and family income were measured, but data are not reported
Choo 2020	Gender/Sex; Education; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 54.8 boys Religion: NR Education (parents): parents higher degree: college or higher: 42%; lower than college: 58% SES: socioeconomic status perceived as: high: 42.3%; low: 57.7% Monthly income: high: 66.1%; low: 33.9% (poverty level) Social capital: NR	NR
Crespo 2012	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: children born in USA: 86.2 %; parent born outside United States: 71.8% Occupation (parents): employed outside the home (vs homemaker): 38.9% Gender/sex: 50% boys Religion: NR Education (parents): completed high school or less: 67% Country of formal education: Mexico or other country: 62.5%; USA: 37.6% SES: poverty (monthly income < USD 1720/family of 4): 35.3% Social capital: NR	Home ownership (% of renting) and parent acculturation score were measured, but data are not reported
De Heer 2011	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: the majority of the participants were hispanic school children Children with limited English proficiency across participating schools (average): 47% Occupation (parents): NR Gender/sex: intervention: 54.1% boys; control: 55.4% boys; spillover: 48.6% Religion: NR	Percentage of socioeconomically disadvantaged students was similar to the school district's average (70%)

Table 5. Description of PROGRESS characteristics *(Continued)*

			Education (parents): NR SES: socioeconomically disadvantaged students (average/school): 72% similar to the school district's average (70%) Social capital: NR	
Duncan 2019	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: Intervention: European: 65.9%; Maori: 10.4%; Pacific Island: 6.4%; Asian: 13.1%; Other: 4%. Control: European: 70.5%; Maori: 5.5%; Pacific Island: 1.8%; Asian: 13.1%; 19.1%; Other: 3% Occupation (parents): NR Gender/sex: 48.3% boys Religion: NR Education (parents): NR SES: School socioeconomic status: decile 1-3: intervention: 14.5%; control: 0%; decile 4-7: intervention: 33.5%; control: 49.2%; decile 8-10: intervention: 52%; control: 50.8% Social capital: NR	Socioeconomic decile ratings of participating schools (determined by the NZ Ministry of Education) ranged from 1 to 10 (where 1 indicates 'low' and 10 indicates 'high'). Schools were stratified by decile rating prior to randomisation.
Elder 2014	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex; Education	Place of residence: urban (primarily in the city of San Diego) Race/ethnicity/culture/language: Latino: 41.2% Occupation (parents): See PROGRESS notes Gender/sex: 45.1% boys Religion: NR Education (parents): See PROGRESS notes SES: families with a monthly household income > USD 5000: 49.4% Social capital: NR	Parental education and employment were measured, but data are not reported
Fairclough 2013	Place of residence; Race/Ethnicity/Culture/Language; Socioeconomic status	Gender/Sex; Socioeconomic status	Place of residence: eligible schools were identified within pre-defined geographical units known as Neighbourhood Management Areas (data not reported); home postcodes were measured and used to generate the household indices of multiple deprivation. Race/ethnicity/culture/language: White British ethnicity: 95% (representative of the school age population in Wigan) Occupation (parents): NR Gender/sex: See PROGRESS notes Religion: NR Education (parents): NR SES: indices of multiple deprivation score: intervention: 29.2 (SD 18.5); control: 24.2 (SD 14.3) Social capital: NR	Gender/Sex was measured, but data are not reported. Family socioeconomic status was defined using home postcode to generate indices of multiple deprivation (IMD) scores. IMD scores are a composite of seven domains of deprivation (income, employment, education, health, crime, access to services and living environment) with higher scores representing higher degrees of deprivation. IMD scores were ranked and the median calculated. Participants

Table 5. Description of PROGRESS characteristics *(Continued)*

				in the upper and lower 50th percentiles represented low and high socioeconomic status groups, respectively.
Foster 2008	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: urban public schools Race/ethnicity/culture/language: Race: Black: 45.5%; Asian: 21.8%; Hispanic: 15%; White: 12.2%; Other: 5.5% Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: children eligible for free/reduced-price meals: 80% Social capital: NR	NR
Fulkerson 2022	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: rural Race/ethnicity/culture/language: Ethnicity: Non-Hispanic/Latino: 93%; Hispanic/Latino: 7% Race: not White or multiracial: 7%; White: 93% Occupation (parents): NR Gender/sex: 41.2% boys Religion: NR Education (parents): education ≤ high school: 11.5%; some college: 22.1%; associated degree: 14.2%; bachelor's degree or higher: 52.2% SES: food Insecurity: insecure: 18.4%; secure: 81.6%; economic assistance: receives assistance: 28.1%; does not receive assistance: 71.9% Social capital: NR	NR
Gentile 2009	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: urban (Cedar Rapids) and suburban (Lakeville) Race/ethnicity/culture/language: White: Lakeville schools: 96%; Cedar Rapid schools: 93% Occupation (parents): NR Gender/sex: 47% boys Religion: NR Education (parents): > 12 years of education: Lakeville: 95%; Cedar Rapids: 85% SES: income > USD 36.000: Lakeville: 96%; Cedar Rapids: 74%; income > USD 100.00: Lakeville: 45%; Cedar Rapids: 18% Social capital: NR	NR
Greve 2015	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: Municipality of Odense (fourth-largest municipality in Denmark) Race/ethnicity/culture/language: non-Western immigrant: intervention: 14.3%; control: 21.6% Occupation (parents): mother not working: intervention: 26.3%; control: 25.2%; father not working: intervention: 15.6%; control: 16.4% Mother low wage earner: intervention: 34.6%; control: 38.1%; father low wage earner: intervention: 35%; control: 36.1%	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Mother employed, medium/high: intervention: 36.7%; control: 33.7%; father employed, medium/high: intervention: 36.1%; control : 34% Gender/sex: intervention: 51.4% boys; control: 50.9% boys Religion: NR Education (parents): mother education: basic education: intervention: 19.5%; control : 20.3%; vocational: intervention: 38.1%; control: 40.6%; further education: intervention: 38.8%; control: 35.5%; missing: intervention: 2.7%; control: 2.6% Father education: basic education: intervention: 17.8%; control: 18.7%; vocational: intervention: 41.1%; control: 41.1%; further education: intervention: 34%; control: 33.6%; missing: intervention: 6.7%; control: 5.9% SES: schools in low-income strata: 51.5%; schools in high-income strata: 48.5% Social capital: NR	
Griffin 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: urban local authority Race/ethnicity/culture/language: ethnicity: White British: 39.5%; non-White British: 60.5% Main spoken language: English: 86.1%; Urdu: 2.3%; Punjabi: 2.3%; Spanish: 2.3%; Turkish: 2.3%; Missing: 2.3% Occupation (parents): NR Gender/sex: 100% boys Religion: NR Education (parents): highest level of qualification: GCSE, CSE, O level or equivalent: 30.2%; A level/AS level or equivalent: 11.6%; degree level or higher: 48.85%; other: 4.7%; missing: 4.7% SES: index of multiple deprivation quintile: 1 (least deprived): 2.3%; 2: 4.7%; 3: 14%; 4: 20.9%; 5 (most deprived): 53.5%; missing: 4.7% check definition Social capital: NR	A level, Advanced level; AS level, Advanced Subsidiary level; CSE, Certificate of Secondary Education; GCSE, General Certificate of Secondary Education; O level, Ordinary level. Based on postal code of residence, the Index of Multiple Deprivation (IMD) was used to determine socioeconomic status
Grydeland 2014	Place of residence; Gender/Sex; Education	Gender/Sex; Education	Place of residence: largest towns or municipalities Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51.4% boys Religion: NR Education (parents): parental education (years): < 12: 29.4%; 13 to 16: 36.4%; > 16: 34.2% SES: NR Social capital: NR	If both parents provided level of education, only the parent with the highest level of education was included analyses, otherwise data provided by either parent were used
Habib-Mourad 2014	Place of residence; Gender/Sex; Religion; Socioeconomic status		Place of residence: city Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 54.5% boys Religion: 2 private schools comprised mainly of general Muslim families and 2 schools comprised mainly of Christian families. Two public schools comprised of Muslim Shiite families and 2 public schools comprised of Muslim Sunni families.	Socioeconomic class based on the type of school, with private schools representing the higher socioeconomic status population (annual

Table 5. Description of PROGRESS characteristics *(Continued)*

			Education (parents): NR SES: high: 50%; low: 50%; Social capital: NR	fees 2000 to 4000 USD) and public schools representing the lower socioeconomic status population (annual fees 100 USD)
Habib-Mourad 2020	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 46.3% boys Religion: NR Education (parents): NR SES: private schools (medium to high socioeconomic status): 45.5%; public school (low socioeconomic status): 54.5% Social capital: NR	Type of school was used as a proxy for socioeconomic status
Haire-Joshu 2010	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status		Place of residence: primarily urban and suburban population Race/ethnicity/culture/language: race: Intervention: White: 54.35; Other: 45.7%. Control: White: 62.4%; Other: 37.6% Occupation (parents): employed: intervention: 73.6%; control: 79.2% Gender/sex: 49.2% boys Religion: NR Education (parents): some college: intervention: 72.4%; control: 54.2%; high school graduate or less: intervention: 27.6%; control: 40.3% SES: < 15K USD: intervention: 17.8%; control: 18.3%; 15K to < 30K USD: intervention: 12.2%; control: 29.6%; 30K to < 50K USD: intervention: 21.25; control: 28.2%; ≥ 50K USD: intervention: 41.5%; control: 23.9% Social capital: NR	NR
HEALTHY Study Group 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence; Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: Hispanic: 54.2%; Black: 18%; White: 19.3%; Other: 8.5% Occupation (parents): NR Gender/sex: 47.3% boys Religion: NR Education (parents): highest education level attained by head of household: less than high school: 12.4%; some high school: 14.3%; high school diploma: 25%; some college or specialised training: 28.55; college or university degree: 13.9%; postgraduate training or degree: 5.9% SES: students that qualified for free/reduced meals: intervention: 77% (47% to 100%); control: 74% (49% to 100%) Social capital: NR	NR
Hendy 2011	Place of residence; Gender/Sex		Place of residence: Small town Race/ethnicity/culture/language: NR Occupation (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

		Gender/sex: 49.5% boys (of the 200 average-weight participants that were included in the analysis) Religion: NR Education (parents): NR SES: NR Social capital: NR	
Hopper 2005	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: predominantly rural area Race/ethnicity/culture/language: Caucasian: 83%; Native American: 5%; Asian: 5%; Hispanic: 5%; African American: 2% Occupation (parents): NR Gender/sex: 51% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Hull 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: metropolitan area Race/ethnicity/culture/language: 100% Hispanic population Mother country of birth: Mexico: intervention: 74%; control: 72%; Other Latin American country: intervention: 26%; control: 28% Parent English-speaking ability: not at all: intervention: 12%; control: 14%; a little: intervention: 58%; control: 59%; somewhat/good/very good: intervention: 29%; control: 28% Child country of birth: Mexico: intervention: 3%; control: 6%; Other Latin American country: intervention: 3%; control: 1%; USA: intervention: 94%; control: 93% Child usual language spoken: mostly/only Spanish: intervention: 33%; control: 37%; English/Spanish equally: intervention: 53%; control: 55%; mostly/only English: intervention: 14%; control: 19% Occupation (parents): NR Gender/sex: intervention: 46% boys; control: 50% boys Religion: NR Education (parents): less than high school degree: intervention: 64%; control: 67%; high school degree or higher: intervention: 36%; control: 33% SES: monthly family income: less than USD 1000: intervention: 15%; control: 22%; USD 1000 to 1999: intervention: 60%; control: 54%; USD 2000 or greater: intervention: 25%; control: 24% Social capital: NR	NR
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: urban district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4% Social capital: NR	measured in the study population
Jansen 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: inner city Race/ethnicity/culture/language: Dutch: Grades 3 to 5 intervention: 14.3%; Grades 3 to 5 control: 6.9%; Grades 6 to 8 intervention: 13.6%; Grades 6 to 8 control: 8.0% Surinam: Grades 3 to 5 intervention: 9.4%; Grades 3 to 5 control: 11.0%; Grades 6 to 8: intervention: 11.3%; Grades 6 to 8 control: 12.7% Antillean: Grades 3 to 5 intervention: 5.6%; Grades 3 to 5 control: 4.1%; Grades 6 to 8: intervention: 4.8%; Grades 6 to 8 control: 2.8% Moroccan: Grades 3 to 5 intervention: 26.8%; Grades 3 to 5 control: 36.4%; Grades 6 to 8: intervention: 22.1%; Grades 6 to 8 control: 34.6% Turkish: Grades 3 to 5 intervention: 21.9%; Grades 3 to 5 control: 20.3%; Grades 6 to 8: intervention: 23.7%; Grades 6 to 8 control: 22.5% Capeverdean: Grades 3 to 5 intervention: 4.0%; Grades 3 to 5 control: 4.0%; Grades 6 to 8: intervention: 5.1%; Grades 6 to 8 control: 4.7% Other/missing: Grades 3 to 5 intervention: 18.0%; Grades 3 to 5 control: 17.4%; Grades 6 to 8: intervention: 19.4%; Grades 6 to 8 control: 14.7% Occupation (parents): NR Gender/sex: Grade 3 to 5 intervention: 49.5% boys; Grade 3 to 5 control 49% boys Grade 6 to 8 intervention: 47.2% boys; Grade 6 to 8 control: 51% boys Religion: NR Education (parents): NR SES: the study is set in low-income neighbourhoods Social capital: NR	Postal code data were collected and used to determine neighbourhood income level. Ethnic background was determined by country of birth of mother and father according to definitions of Statistics Netherlands.
Kain 2014	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 53.4% boys Religion: NR Education (parents): NR SES: the trial targets low-income students Social capital: NR	Schools were randomised based on the school's vulnerability index (a proxy for socioeconomic status), which is a measure of the number of free breakfast and lunch food rations ther school is entitled to receive, but socioeconomic status data are not reported
Keller 2009	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Occupation (parents): NR Gender/sex: 46.6% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	
Kipping 2008	Place of residence; Gender/Sex; Socioeconomic status		Place of residence: urban area Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 57.1% boys Religion: NR Education (parents): NR SES: Schools deprivation scores 21% to 54% Social capital: NR	The English Government's deprivation indicator was used to measure deprivation. This is a measure of income deprivation using the income characteristics of the area of residence for each child on the school roll. The percentage of families with children getting Child Tax Credits and/or Working Tax Credits informs the deprivation indicator. A score of 100% represents the most deprived schools in England. The 19 schools were grouped into low (≤ 35%), medium (> 35 < 45%) and high (≥ 45%) deprivation after initial inspection of the distribution of deprivation scores to give 3 roughly even groups
Kipping 2014	Place of residence; Gender/Sex; Socioeconomic status		Place of residence: urban and rural areas Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: school deprivation score: intervention: low: 30%; medium: 35%; high: 36%; control: low: 40%; medium: 30%; high: 30% Social capital: NR	NR
Klesges 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Educa-	Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: 100% African-American Occupation (parents): NR Gender/sex: 100% girls	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	tion; Socioeconomic status	Religion: NR Education (parents): adult participant education: high school or less: 16.5%; some college/technical school: 52.8%; college graduate: 30.7% SES: annual household income: < USD 20,000; 24.1%; USD 20,000 to 39,999: 39.9%; USD 40,000 to 59,999: 20.8%; USD 60,000 to 79,999: 8.3%; USD 80,000 or more: 6.9% Social capital: NR	
Kobel 2017	Race/Ethnicity/Culture/Language; Gender/Sex; Education	Place of residence: NR Race/ethnicity/culture/language: study targets children with migration background that were spoken to in language other than German in first 3 years of life Occupation (parents): NR Gender/sex: 48.6% boys Religion: NR Education (parents): parents' tertiary family educational level: 24% SES: NR Social capital: NR	NR
Kocken 2016	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: See Notes on PROGRESS Race/ethnicity/culture/language: Ethnicity: Western: 85%; Non-western: 11.3% Occupation (parents): NR Gender/sex: 48% boys Religion: NR Education (parents): See Notes on PROGRESS SES: See Notes on PROGRESS Social capital: NR	Matched pairs of schools were formed with similar socioeconomic status (based on national registry on neighbourhood deprivation scores), educational levels and urbanisation of region (data not reported)
Kubik 2021	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: urban school district: 80%; suburban school district: 20% Race/ethnicity/culture/language: White: 37%; Hispanic: 23%; Black: 21%; Other: 19% Occupation (parents): NR Gender/sex: 51% boys Religion: NR Education (parents): parent education ≤ high school: 17%; some college: 27%; associate degree: 16%; ≥ Bachelor's degree: 40% SES: receiving economic assistance: 59% Food security: secure: 70%; insecure, no hunger: 19%; insecure, with hunger: 11% Social capital: NR	NR
Levy 2012	Place of residence; Gender/Sex; Socioeconomic status	Place of residence: urban and rural schools Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: Intervention: 48.4% boys; control: 50.3% boys Religion: NR Education (parents): NR	Socioeconomic status was calculated by obtaining the children's age, sex, housing characteristics and possession of goods. A socioeco-

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: intervention: low: 34.9%; medium: 33.7%; high: 31.4%. Control: low: 34.1%; medium: 39.3%; high: 26.5% Social capital: NR	nomic index was calculated using the principal components method, with 7 variables, where the first principal component explained 40.2% of the total variance. This, in turn, was divided into tertiles to obtain socioeconomic levels
Li 2019	Place of residence; Gender/Sex; Education; Socioeconomic status	Gender/Sex; Education	Place of residence: urban schools Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 54.5% boys Religion: NR Education (parents): mother's highest education level: lower education/none: 0.1%; school education (primary and middle schools): 19.2%; occupation college: 18.4%; university education (undergraduate level): 54.7%; postgraduate education: 7.5% SES: schools in the study were in Guangzhou, the largest and one of the most socioeconomically advanced cities in South China Social capital: NR	NR
Lichtenstein 2011	See Notes on PROGRESS		Place of residence: NR Race/ethnicity/culture/language: See Notes on PROGRESS Occupation (parents): NR Gender/sex: See Notes on PROGRESS Religion: NR Education (parents): See Notes on PROGRESS SES: NR Social capital: NR	Nationality, gender/sex and level of education were measured, but data are not reported
Liu 2019	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: schools with minor ethnic groups were not included Occupation (parents): NR Gender/sex: 51.7% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Liu 2022	Gender/Sex; Education	Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51.5% boys Religion: NR Education (parents): maternal educational level: high school or below: 41.4%; above high school: 58.6%	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: the study was set in 3 socioeconomically distinct regions: above average developed area (Beijing): 35.3%; average developed area (Shanxi): 28.7%; below average developed area (Xingjiang): 36% Social capital: NR	
Llargues 2012	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education	Education;	Place of residence: NR Race/ethnicity/culture/language: immigrant: intervention: 17.3%; control: 20.7% Occupation (parents): unemployed father: intervention: 1.4%; control: 2.2%; unemployed mother: intervention: 6.9%; control: 12.1% Gender/sex: 54% boys Religion: NR Education (parents): father secondary/tertiary education: intervention: 75%; control: 55.5% Mother secondary/tertiary education: intervention: 78.2%; control: 65.4% SES: See Notes on PROGRESS Social capital: NR	Schools were stratified based on socioeconomic status of the local neighbourhood (data are not reported). PROGRESS data extracted from Mora 2015
Lloyd 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	Place of residence: urban and rural schools Race/ethnicity/culture/language: Ethnicity: White: 95.8% Pupils with English as an additional language/Non-White British: 4.1% Occupation (parents): NR Gender/sex: 48.7% boys Religion: NR Education (parents): NR SES: Median School Index of Multiple Deprivation score: 13.933 (IQR 11592) Median Child Index of Multiple Deprivation: 14,935 (IQR 11,450) Percentage of children eligible for free school meals: 20%; schools with < 19% of pupils receiving free school meals: 56.2%; schools with ≥ 19% of pupils receiving free school meals: 43.8% Social capital: NR	NR
Magnusson 2012	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: Native children (Caucasian-White): 97% Occupation (parents): NR Gender/sex: 44.3 boys Religion: NR Education (parents): mothers with university degree: intervention: 52%; control: 63% Fathers with university degree: intervention: 44%; control: 46% SES: families in lowest category for income: intervention: 11%; control: 14% Social capital: NR	NR
Marcus 2009	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Ed-		Place of residence: blocks of flats and detached houses Race/ethnicity/culture/language: parents categorised as immigrants varied between 5% and	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	ucation; Socioeconomic status		10% (range) in both intervention and control schools Occupation (parents): NR Gender/sex: 50.8% boys Religion: NR Education (parents): parents reporting an academic level of education (higher than upper secondary school): intervention: 23% to 46%; control: 26% to 46% SES: low-income households (range across schools): intervention: 8% to 22%; control: 7% to 22% Participating schools had a mixed pupil population with children from middle and working class families living both in blocks of flats and in detached houses Social capital: NR	
Morgan 2011	Gender/Sex; Socioeconomic status	Gender/Sex; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 53.5% boys Religion: NR Education (parents): NR SES: Deprivation index: 1-2 (lowest): 1.9%; 3-4: 9.4%; 5-6: 41.5%; 7-8: 35.8%; 9-10 (highest): 11.3% (see PROGRESS notes) Social capital: NR	Socioeconomic status was based on the postal code of residence using the Index of Relative Socioeconomic Advantage and Disadvantage from the Australian Bureau of Statistics census-based Socio-Economic Indexes for Areas
Morgan 2014	Place of residence; Occupation; Gender/Sex; Socioeconomic status	Place of residence; Gender/Sex; Socioeconomic status	Place of residence: rural local government areas Race/ethnicity/culture/language: NR Occupation (parents): study setting is 2 local government areas with high rates of mining and shift work-based employment Gender/sex: 55% boys Religion: NR Education (parents): NR SES: Deprivation index: 1-2 (lowest): 0%; 3-4: 3%; 5-6: 36%; 7-8: 61%; 9-10 (highest): 0% (see PROGRESS notes) Social capital: NR	Socioeconomic status was based on the postal code of residence using the Index of Relative Socioeconomic Advantage and Disadvantage from the Australian Bureau of Statistics census-based Socio-Economic Indexes for Areas. Background details and socio-demographic variables were collected by questionnaire including age, marital status, occupation, gross annual family income, educational level, ethnic origin, language spoken at home,

Table 5. Description of PROGRESS characteristics *(Continued)*

			socioeconomic status and post-code (only socioeconomic status data are reported).
NCT02067728 2014	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 46.5% boys (of total participants age group 4 to 18) Religion: NR Education (parents): NR SES: NR Social capital: NR Comments on PROGRESS	PROGRESS characteristics data refer to participants aged 4 to 17 years
Nemet 2011a	Race/Ethnicity/Culture/Language; Gender/Sex; Religion	Place of residence: NR Race/ethnicity/culture/language: Jewish children Occupation (parents): NR Gender/sex: 53% boys Religion: Jewish-Israeli Education (parents): NR SES: low socioeconomic status communities Social capital: NR	Socioeconomic status was measured but not reported. Socioeconomic status was determined with criteria set by the Israeli Central Bureau of Statistics. Briefly, a scale of 1 to 10 refers to the socioeconomic status, whereas low socioeconomic status is defined by a score of 1 to 4. The score comprises the level of education, employment/unemployment status, income level, number of children per family, number of people per household and additional standard of living characteristics (e.g. brand and model of cars)
Nemet 2011b	Race/Ethnicity/Culture/Language; Gender/Sex; Religion; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: Arab-Israeli community Occupation (parents): NR Gender/sex: intervention: 58% boys; control: 55% boys Religion: Arab-Israeli (Muslim Arabs who were born in the state of Israel) Education (parents): NR	See Nemet 2011a above

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: all preschools were from low socioeconomic areas Social capital: NR	
Nollen 2014	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: Race: African-American: 83.7%; Bi- or Multi-racial: 8.2%; American Indian/Alaska Native: 6.1%; Asian/Pacific Islander: 2% Ethnicity: Hispanic/Latina: 7.8% Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): adults with bachelor degree or above: 5.7% SES: Neighborhood Economic Disadvantage: % of children living in poverty: mean 32.4 (SD 16.5) Median annual household income: mean 27,388 (SD 11,196) Social capital: NR	NR
Nyberg 2015	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: mixed types of housing: blocks of flats, semi-detached houses and detached houses Race/ethnicity/culture/language: parents were born in Sweden: 70%; parents were born in in Europe: 7%; parents were born in outside of Europe: 23% Occupation (parents): NR Gender/sex: 51% boys Religion: NR Education (parents): low level of education: intervention: 33%; control: 40% SES: population of the municipality was low to medium socioeconomic status (see PROGRESS notes) Social capital: NR	The highest level of parental education for the mother or father was used as an indicator of socioeconomic status and was divided into low (4 years or less of upper secondary school) or high (more than 4 years of upper secondary school)
Nyberg 2016	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex; Education; Socioeconomic status	Place of residence: See Notes on PROGRESS Race/ethnicity/culture/language: parents born outside the Nordic region: 80.4% Occupation (parents): low employment area Gender/sex: 49.5% boys Religion: NR Education (parents): parental low education per family: 47.1% SES: areas of low socioeconomic status (see PROGRESS notes) Social capital: NR	Area of residence and parental educational level were used as indicators of socioeconomic status (SES). Data on place of residence not reported. Parental educational level was self-reported and the highest level of education attained by either of the parents was used as an indicator of SES. The variable was dichotomised with low education corresponding to primary and sec-

Table 5. Description of PROGRESS characteristics *(Continued)*

			ondary school (≤ 12 years of schooling) and high (> 12 years of schooling) corresponding to third level education. Parents were also asked to indicate their region of birth as "Sweden/the Nordic region", "Europe" or "Outside Europe". It was also possible to specify the country.
O'Connor 2020	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: language spoken at home: English: 0%; Spanish: 83.3%; Both English and Spanish: 16.7% Country of birth (if outside the United States): Mexico: 69.4%; El Salvador: 8.3%; Honduras: 5.6%; Other/unknown: 5.6% Acculturation: Hispanic: 3.6 (SD 0.48); Non-Hispanic: 2 (SD 0.8) Occupation (parents): employment status: not currently employed: 0%; part-time: 8.3%; full time: 50%; more than full-time: 41.7% Occupation: construction: 44.4%; machinist or factory worker: 19.4%; skilled tradesman: 22.2%; office or sales: 11.1; other: 2.8 Gender/sex: 43.8% boys Religion: NR Education (parents): sixth grade or less: 25%; eighth grade or less: 19.4%; attended some high school: 19.4%; high school graduate or general education development (GED): 27.8%; technical school: 5.6%; college graduate: 2.8% SES: income: less than USD 25,000: 38.9%; USD 25,000 to 46,999: 55.6%; over USD 47,000: 5.6% Social capital: NR	NR
Pena 2021	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: not Chilean nationality: intervention: 21.9%; control: 29.5% Occupation (parents): NR Gender/sex: 66.8% boys Religion: NR Education (parents): NR SES: See PROGRESS notes Social capital: NR	Type of school (% of students in public, private-subsidised and private) and vulnerability was defined as the percentage of students in the school classified as priority or preferential and used as an index of socioeconomic status (data not reported)

Table 5. Description of PROGRESS characteristics *(Continued)*

Puder 2011	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Gender/Sex	Place of residence: German vs French part of Switzerland: 51% Race/ethnicity/culture/language: mainly speaking foreign language at home (any language other than German or French): 40% Parental migration status: neither parent: 28%; one parent: 24%; both parents: 48% Most common migration regions: former Yugoslavia: 25%; Portugal: 17%; rest of Europe (predominantly Mediterranean and Eastern Europe): 31%; Africa: 12%; rest of the world (predominantly Asia, Middle East, and South America): 15% Occupation (parents): NR Gender/sex: 50% boys Religion: NR Education (parents): parental low educational level: neither parent: 62%; one parent: 21%; both parents: 17% SES: NR Social capital: NR	Classes were randomised stratified by linguistic region. Parental migrant status was defined as born outside Switzerland. For descriptive analyses, migrant status and low parental education were divided into 3 categories (no migrant parent/with low education, one migrant parent/with low education, both migrant parents/with low education). Parent educational level was defined as the highest grade of school completed (5 levels). Low parental educational level was defined as a maximum of 9 years of education (mandatory school years).
Ramirez-Rivera 2021	Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51.2% boys Religion: NR Education (parents): father's education: basic level: 18.9%; high school: 27.9%; college (university): 40.5%; postgraduate: 13.5% Mother's education: basic level: 9.75%; high school: 34.1%; college (university): 51.2%; postgraduate: 9.75% SES: NR Social capital: NR	NR
Rerksuppaphol 2017	Place of residence; Gender/Sex		Place of residence: township Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 49% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Rosario 2012	Place of residence; Gen-		Place of residence: urban schools Race/ethnicity/culture/language: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	der/Sex; Education		Occupation (parents): NR Gender/sex: 48.5% boys Religion: NR Education (parents): mother's education: up to 9 years: 64%; 10 to 12 years: 23.1%; > 12 years: 10.6% Father's education: up to 9 years: 69%; 10 to 12 years: 19%; > 12 years: 12% SES: NR Social capital: NR	
Rosenkranz 2010	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: towns of 4000 to 50,000 population Race/ethnicity/culture/language: Non-Hispanic Caucasian: intervention: 79.4%; control: 75% Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): college graduates: intervention: 56.3%; control: 48.75 SES: low socioeconomic status: intervention: 28.1%; control: 35% Social capital: NR	NR
Rush 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: rural schools: 76%; urban schools: 24% Race/ethnicity/culture/language: New Zealand European: 59%; Maori: 34%; Pacific Islands: 4%; Asian: 3%; Other: 1% Occupation (parents): NR Gender/sex: 50.4% boys Religion: NR Education (parents): NR SES: school decile 1-3: 38.2%; decile 4-7: 30.5% (see PROGRESS notes) Social capital: NR	Socioeconomic status was calculated using school deciles obtained from a national register. A scale from 1 to 10 was used with 1 linked to the lowest 10% of affluence and 10 linked to the highest 10% of affluence.
Safdie 2013	Place of residence; Gender/Sex; Socioeconomic status		Place of residence: urban area Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 50% boys Religion: NR Education (parents): NR SES: students of low socioeconomic status Social capital: NR	Schools were classified by the Ministry of Education as having students of low socioeconomic status and receiving benefits from the Federal School Breakfast Program
Sahota 2001	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: outside inner city schools Race/ethnicity/culture/language: children from ethnic minorities in schools: 1% to 42% Occupation (parents): NR Gender/sex: 55% boys Religion: NR Education (parents): NR SES: children were entitled to free school meals: 7% to 29% Social capital: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

Sahota 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: town Race/ethnicity/culture/language: White-British: intervention: 73.9%; control: 65.9%; Pakistani: intervention: 19.2%; control: 18.2%; Gypsy/Roma: intervention: 0%; control: 9.4% Occupation (parents): NR Gender/sex: 51.1% boys Religion: NR Education (parents): NR SES: schools with > 17% of pupils eligible for free school meals (proxy for socioeconomic status): 50% Social capital: NR	NR
Santos 2014	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence; Gender/Sex; Socioeconomic status	Place of residence: rural schools: 49%; urban schools: 51%. Dissemination areas inside Winnipeg are assigned urban status, whereas those outside Winnipeg are assigned rural status. Race/ethnicity/culture/language: First Nations (i.e. indigenous): 28.3%; non-First Nations: 71.7% Occupation (parents): NR Gender/sex: 52% boys Religion: NR Education (parents): NR SES: income quintiles: Q1 (lowest): 29.9%; Q2: 19.6%; Q3: 10.6%; Q4: 23.5%; Q5 (highest): 4.5% Social capital: NR	Average household incomes for each dissemination area are publicly available and can be allocated to 5 area-level income quintiles, each comprising 20% of the population
Sekhavat 2014	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: Race: Southeast Asian: 7.7%; West Asian: 4.2%; White: 21.4%; Asian: 6.5%; Black: 19.2%; Latin American: 8.9%; Arab: 6.0%; Native: 0.6%; South Asian: 22.6%; Mixed: 1.8%; Guyana: 0.6%; Missing: 0.6% Aboriginal person: 98.2% Country of birth: developing: 25.6%; developed: 74.4% Language: English/French: 88.1%; others: 11.9% Occupation (parents): hours at work: regular day time: 49.4%; regular evening shift: 6.5%; regular night shift: 3.6%; rotating shift: 15.5% not working: 19.6%; missing; 5.4% Gender/sex: 52.4% boys Religion: NR Education (parents): no post-secondary degree, diploma: 12.5%; trade certificate or diploma: 13.1%; non-university degree or diploma: 16.7%; university certificate below bachelor: 6%; bachelor's degree: 16.1%; university degree above bachelor: 32.7%; missing: 3% SES: parents with income < CAD 50,000 per year: 74.4% Social capital: NR	NR
Sgambato 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; So-		Place of residence: metropolitan area Race/ethnicity/culture/language: Black: intervention: 24.4%; control: 23.5%; White: intervention: 23.1%; control: 27.6%; Mixed race: intervention: 52.5%; control: 48.9% Occupation (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

	cioeconomic status		Gender/sex: intervention 51.9% boys; control 52.1% boys Religion: NR Education (parents): NR SES: study setting was one of the poorest municipalities in the state of Rio de Janeiro with most students at public schools having a low socioeconomic status Social capital: NR	
Sherwood 2019	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Gender/Sex	Place of residence: metropolitan area Race/ethnicity/culture/language: Non-Hispanic White: 69.1%; Hispanic: 6.9% Occupation (parents): full- or part-time employment: 83.7% Gender/sex: 50.6% boys Religion: NR Education (parents): college or graduate degree: 71.5% SES: eligible for free or reduced price school lunch: 19.7% Owns home: 79.5% Social capital: NR	NR
Siegrist 2013	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51.6% boys Religion: NR Education (parents): See Notes on PROGRESS SES: See Notes on PROGRESS Social capital: NR	Education was used as a proxy for socioeconomic status, but data not reported: "Socioeconomic status were obtained by a personal standardized questionnaire. Socioeconomic status was assigned as the highest academic level achieved by either parent (low: < 9 years, middle: 10–12 years, and high: > 13 years of school education)".
Siegrist 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: city area schools; 80%; schools outside the greater city area: 20% Race/ethnicity/culture/language: children were mainly Caucasian Occupation (parents): NR Gender/sex: 57% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Measurement of socioeconomic index (questionnaire concerning eating pattern, sitting behaviour, smoking, drinking, school level parents, nationality children and parents) was listed as a secondary outcome in the trial registration, but

Table 5. Description of PROGRESS characteristics *(Continued)*

			data are not reported
Spiegel 2006	Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: NR Religion: NR Education (parents): NR SES: all schools were entitled to free/reduced lunch and percent of children receiving free/reduced lunch was between 1% (SD 0) and 57.7 % (SD 5) Social capital: NR	Districts represented varying socioeconomic levels as indicated by free and reduced lunch enrolment and other demographic criteria
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex	Place of residence: NR Race/ethnicity/culture/language: beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; Control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9% Occupation (parents): NR Gender/sex: beverage-only intervention: 46% boys; multiple behaviour intervention: 43% boys; control: 55% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Stolley 1997	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status	Place of residence: urban Race/ethnicity/culture/language: 100% African-American Occupation (parents): unemployed: intervention; 56% %; control: 60% Gender/sex: 100% girls Religion: NR Education (parents): years of education: intervention: 11.4 (SD 1.9); control: 11.3 (SD 1.4) SES: index of social status: intervention: 18 (5); control: 18 (SD 9) Social capital: NR	Socioeconomic status was calculated using the Four Factor Index of Social Status (Hollingshead 1975). A socioeconomic score of 18 corresponds to a low socioeconomic strata.
Story 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: children's ethnicity: Biracial: 13% Parent/caregiver ethnicity: African-American: 83%; Biracial: 5.6%; Caucasian only: 11.4% Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): education of parents/caregivers: high school graduate or less: 35.3%; tech school/some college: 45.1%; college grad/post grad: 19.6% SES: total household income: < USD 20,000; 25%; USD 20,000 to 40,000: 46.2%; > USD 40,000: 28.8% Home owned: 40.7%	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Social capital: NR	
Story 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: Native American communities in Pine Ridge Reservation Race/ethnicity/culture/language: children were of American Indian heritage: 99.3% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 51% boys Religion: NR Education (parents): NR SES: relative socioeconomic status (rSES) score: 3.0 (SD 1) Social capital: NR	Almost all children were from what is commonly known as the Oglala Sioux Tribe, but more correctly the Lakota people. Owing to the overall level of poverty on the reservation, a measure of relative socioeconomic status (rSES), applicable only to families on this reservation, was developed using data comprised of parental education level attained, material resources in the home, household income, work status of family members and public assistance, using a principal components factor analysis. The development of the rSES measure was informed based on the paper by Filmer and Pritchett.
Topham 2021	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: rural schools Race/ethnicity/culture/language: Euro-American: 72%; American-Indian: 18.5%; Latino: 4.5%; African-American: 2.5%; Multiethnic: 2.1%; Other: 0.2% Occupation (parents): NR Gender/sex: 51.7% boys Religion: NR Education (parents): maternal education: college degree: 33.7% SES: children in the sample who were on free or reduced-price lunch (a proxy for poverty at the school level): 65% Social capital: NR	PROGRESS characteristics are for the whole cohort of participants; data are extracted for the at-risk participants only
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: Ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	
Wang 2012	See Notes on PROGRESS		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: NR Religion: NR Education (parents): NR SES: NR Social capital: NR	Baseline characteristics of the participants are not reported
White 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: mostly rural communities Race/ethnicity/culture/language: White: 68%; Hispanic: 14%; Black: 12%; Asian: 1%; Native American: 3%; Other: 2% Occupation (parents): NR Gender/sex: 45% boys Religion: NR Education (parents): < high school: 5%; high school: 12%; some college/associates degree: 39%; bachelor's degree: 29%; advanced degree: 14% SES: mostly low-income communities Social capital: NR	NR
Williamson 2012	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Race/Ethnicity/Culture/Language	Place of residence: rural location Race/ethnicity/culture/language: African-American: 68.4%; White: 31.6% Occupation (parents): NR Gender/sex: 41.5% boys Religion: NR Education (parents): NR SES: low: 77%; low to moderate: 7.5%; moderate to high: 15.4% Social capital: NR	Enrolment in the free or reduced-cost lunch programme was used as an indicator of socioeconomic status
Xu 2015	Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: See Notes on PROGRESS Occupation (parents): NR Gender/sex: intervention: 53.9% boys; control: 59.2% boys Religion: NR Education (parents): parents' education ≤ 9 years: intervention: 18.7%; control: 22.8% SES: NR Social capital: NR	Study variables collected in the questionnaire survey also included ethnicity, but data are not reported
Xu 2017 (5 other cities)	Place of residence; Gender/Sex; Education; Socioeconomic status		Place of residence: urban Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: Intervention: 50.9% boys; control: 50.6% boys Religion: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			Education (parents): mother's educational level: low (illiterate): 0.7%; middle (primary or junior middle school): 61.5%; high (senior middle school or above): 37.8% SES: family's economic level (Yuan/month/per family member): ≤ 1500: intervention: 41%; control: 44.9%; 1501 to 2500: intervention: 28.2%; control: 26.8%; > 2500: intervention: 30.8%; control: 28.3% Social capital: NR	
Comparison: activity intervention vs dietary intervention				
Study ID	**Reported PROGRESS characteristics[a]**	**Analysed PROGRESS characteristics[b]**	**Details**	**Notes on PROGRESS**
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: school remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NR	See Notes on PROGRESS in Barnes 2021 above
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4% Social capital: NR	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one measured in the study population
Meng 2013 (Beijing)	Place of residence; Gender/Sex; Education; Socioeconomic status		Place of residence: urban Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.1% boys Religion: NR Education (parents): mother's educational level: low (illiterate): intervention: 0.2%; control: 0.4%; middle (primary or junior middle school): intervention: 33.1%; control: 39.4%; high (senior mid-	PROGRESS data are from the Beijing cohort only

Table 5. Description of PROGRESS characteristics *(Continued)*

			dle school or above): intervention: 66.6%; control: 60.2% SES: income capita per month (yuan, RMB): < 750 RMB: control: 14.2%; nutrition intervention: 10.9%; physical activity intervention: 16.7%; 750 to 2500 RMB: control: 67.1%; nutrition intervention: 66.8%; physical activity intervention: 64.2%; ≥ 2501 RMB: control: 18.7%; nutrition intervention: 22.4%; physical activity intervention: 19.1% Social capital: NR	
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: Ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	NR

Comparison: dietary and activity intervention vs dietary intervention

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: school remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NR	See Notes on PROGRESS in Barnes 2021 above
Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: urban district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: students were socioeconomically disadvantaged. Free lunch was available to all students in	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one measured in the study population

Table 5. Description of PROGRESS characteristics *(Continued)*

			the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4% Social capital: NR	
Stettler 2015	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: beverage-only intervention: White 63%; Black 33%; Multiple or other: 4%; Latino/Hispanic 4%; Multiple behaviour intervention: White 32%, Black 63%, Multiple or other 5%, Latino/Hispanic 8%; Control: White 70%, Black 24%, Multiple or other 6%, Latino/Hispanic 9% Occupation (parents): NR Gender/sex: beverage-only intervention: 46% boys; multiple behaviour intervention: 43% boys; control: 55% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: Ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	NR

Comparison: dietary and activity intervention vs activity intervention

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Barnes 2021	Place of residence; Gender/Sex; Religion; Socioeconomic status	Gender/Sex	Place of residence: school remoteness classification: 75% urban (major cities); 25% regional (inner/outer regional/remote) Student remoteness classification: 80% urban (major cities); 20% regional (inner/outer regional/remote) Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.2% boys Religion: 100% Catholic schools Education (parents): NR SES: SEIFA disadvantage classification: most disadvantaged: 69%; least disadvantaged: 30.1% (see PROGRESS notes) Social capital: NRe	See Notes on PROGRESS in Barnes 2021 above

Table 5. Description of PROGRESS characteristics *(Continued)*

Ickovics 2019	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: urban district with > 21,000 students Race/ethnicity/culture/language: Hispanic: 47.2%; Non-Hispanic Black: 35%; Non-Hispanic White: 17.8% (see PROGRESS notes) Occupation (parents): NR Gender/sex: 46.2% boys Religion: NR Education (parents): NR SES: students were socioeconomically disadvantaged. Free lunch was available to all students in the district because eligibility is high overall, exceeding 60% in all schools. Students eligible for free lunch (mean): 71.4% Social capital: NR	The reported racial/ethnic categorisation is the one that generally reflected the distribution of students in the district, not the one measured in the study population
Robinson 2003	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: 100% African-American or Black (as identified by parents) Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): highest parent/caregiver level of education: some high school: 4.9%; high school graduate: 22.9%; some college or technical school: 52.5%; college graduate/post graduate; 19.7% SES: total household income: < USD 20,000: 31.1%; USD 20,000 to 40,000: 41%; > USD 40,000: 27.9% Home owned: 19.7% Social capital: NR	NR
Robinson 2010	Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: 100% African-American or Black (as identified by parents) Occupation (parents): NR Gender/sex: 100% girls Religion: NR Education (parents): maximum household education level: high school graduate or less: 27%; some college/technical school: 47%; college graduate: 26% SES: annual total household income: < USD 20,000: 41%; USD 20,000 to 40,000: 28%; USD 40,000 to 59,000: 18%; USD 60,000 to 79,999: 5%; > USD 80,000: 7% Home owned: 23% Social capital: NR	NR
van de Berg 2020	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: NR Race/ethnicity/culture/language: Ethnicity: Black 18%; Hispanic 42.4%; White 19.9%; Other 19.7% Language at home: English 72.5%; Spanish 26%; Other 1.4% Occupation (parents): NR Gender/sex: 49.2% boys Religion: NR Education (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: food insecurity: almost never/never 56.6%; sometimes: 29.9%; almost always 13.4% Free/reduced lunch: 77.8% Social capital: NR	

Studies not included in the meta-analyses

Study ID	Reported PROGRESS characteristics[a]	Analysed PROGRESS characteristics[b]	Details	Notes on PROGRESS
Anand 2007	Place of residence; Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education; Socioeconomic status; Social capital		Place of residence: Aboriginal National Reservation Race/ethnicity/culture/language: Aboriginal Community Occupation (parents): employed adults > 18 years: intervention: 70.7%; control: 75.0% Gender/sex: intervention: 37.5% boys; control: 39.5% boys Religion: NR Education (parents): adults > 18 years with high school education: intervention: 78.0%; control: 72.5% SES: Study set in a relatively low socioeconomic status community Social capital: children and teens 5 to 18 years currently in school: intervention: 42.%6; control: 60.9%	NR
Branscum 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: suburban county Race/ethnicity/culture/language: African American: intervention: 14%; control: 6%; Caucasian: intervention: 73%; control: 82%; Asian: intervention: 5%. Control: 12%; Hispanic: intervention: 3%; control 0%; Mixed Race: intervention: 5%; control: 0% Occupation (parents): NR Gender/sex: intervention: 47% boys; control: 57% boys Religion: NR Education (parents): NR SES: middle to upper class families Social capital: NR	Socioeconomic status based on low enrolment of children in free and reduced-priced, federally subsidised lunches as reported by the school district
Carlin 2021	Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: phase 1: 44% boys; phase 2: 56% boys Religion: NR Education (parents): NR SES: all families in Phase 1 were from low socioeconomic class. For Phase 1: "Participants families were enrolled in the Safe Wellbeing Eating & Exercise Together (SWEET), a community-based obesity prevention and management program aimed at children and families across a number of sites (community organizations, healthy living centers, etc) in the Western Trust area of Northern Ireland.	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			It aims to work with families in areas of high economic deprivation." Social capital: NR	
Di Maglie 2022	Place of residence; Gender/Sex	Gender/Sex	Place of residence: city Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.75% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Epstein 2001	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 47% boys Religion: NR Education (parents): NR SES: See PROGRESS notes Social capital: NR	Socioeconomic status was assessed using Hollingshead's Four-Factor Index of Social Status, but data are not reported
Gortmaker 1999	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: metropolitan area Race/ethnicity/culture/language: intervention: White: 69%; African-American: 11%; Hispanic: 11%; Asian/Pacific Islander: 9%; American Indian: 2%; Other: 5% Control: White: 63%; African-American: 15%; Hispanic: 16%; Asian/Pacific Islander: 7%; American Indian: 2%; Other: 9% Occupation (parents): NR Gender/sex: 52% boys Religion: NR Education (parents): NR SES: the median household income of zip code areas where the schools were located averaged USD 36,020 among intervention schools and USD 34,200 among control schools, according to 1990 Census data. This median is lower than that for all households in Massachusetts in the 1990 Census (USD 41,000) but similar to the US figure (USD 33,952). Social capital: NR	The median household income is lower than that for all households in Massachusetts in the 1990 Census (USD 41,000) but similar to the US figure (USD 33,952)
Hannon 2018	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: urban setting Race/ethnicity/culture/language: ethnicity: Hispanic or Latino: mothers only: 77.6%; mothers + children: 71.2%; English as primary language: mothers only: 84.4%; mothers + children: 82.8% Race: African-American: mothers only: 57.8%; mothers + children; 57.1%; Caucasian: mothers only: 28.1%; mothers + children: 275; Others: mothers only: 14.1%; mothers + children: 15.9% Occupation (parents): NR Gender/sex: mother only intervention: 53.4% boys; mother and children intervention: 55.6% boys Religion: NR Education (parents): NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: income: < USD 15K: mothers only intervention: 9.5%; mother + children intervention: 10.9%; USD 15K to 25K: mothers only: 11.1%; mother + children: 7.8%; USD 25K to 35K: mothers only: 12.7%; mother + children: 7.8%; USD 35K to 50K: mothers only: 14.3%; mother + children: 10.9%; USD 50K to 75K: mothers only: 3.2%; mother + children: 15.6%; > USD 75K; mothers only 11.1%; mother + children: 7.8% Social capital: NR	
Hooft van Huysduynen 2014	Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: intervention: 58% boys; control 57% boys Religion: NR Education (parents): high education: 74.2% SES: NR Social capital: NR	High education includes completing university or higher vocational education
Huys 2020	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: parents' ethnic background: Caucasian: 90.7% Occupation (parents): employment status: 85% employed Gender/sex: 49.9% boys Religion: NR Education (parents): NR SES: high socioeconomic status: parents: 54.7%; children: 58.2% Social capital: NR	Municipalities from the tertile with the highest unemployment rates (5.2% to 12.5%) were randomly selected
Johnston 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex	Race/Ethnicity/Culture/Language	Place of residence: suburban Race/ethnicity/culture/language: Hispanic: intervention: 21.3%; control: 16.4%; Black: intervention: 16.0%; control: 29.4%; Asian: intervention: 29.7%; control: 26.0%; White: intervention: 33.0%; control: 28.2% Occupation (parents): NR Gender/sex: intervention: 53.3% boys; control: 45.8% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Gender/sex and ethnicity data are from the children that were in the normal weight group
Lynch 2016	Race/Ethnicity/Culture/Language; Occupation; Gender/Sex; Education		Place of residence: NR Race/ethnicity/culture/language: White: 60.8%; Non-White: 39.2% Occupation (parents): caregiver employment: full-time: 64.7%; part-time/not employed: 35.3% Gender/sex: 51% boys Religion: NR Education (parents): educational level: high school diploma or less: 27.4%; some college/2-year degree: 31.4%; college degree/4-year degree/post-baccalaureate: 41.2% SES: See Notes on PROGRESS	Socioeconomic status data were not reported, but data on medical insurance status were reported: government/uninsured: 37.1%; private insurance: 56.9%

Table 5. Description of PROGRESS characteristics *(Continued)*

			Social capital: NR	
Macias-Cervantes 2009	Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 56.4% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Madsen 2013	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status		Place of residence: urban school district Race/ethnicity/culture/language: African-American: 12%; Asian: 32%; Latino: 42%; White: 0%; Other: 14% Occupation (parents): NR Gender/sex: 60% boys Religion: NR Education (parents): mother's education level: high school or less: 56%; some college: 30%; college graduate: 14% SES: students were eligible for free or reduced-price meals: 61% (range 44% to 89% across schools) Social capital: NR	NR
Marsigliante 2022	Place of residence; Gender/Sex	Gender/Sex	Place of residence: city Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 48.7% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Muzaffar 2019	Race/Ethnicity/Culture/Language; Gender/Sex		Place of residence: NR Race/ethnicity/culture/language: White: intervention: 45%; control: 55%; Black: intervention: 42%; control: 23%; Asian: intervention: 8%; control: 13%; Latino/a: intervention: 4%; control: 16%; Other: intervention: 6%; control: 14% Occupation (parents): NR Gender/sex: 33% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	Home address (for school verification) and participation in federal free or reduced lunch were measured but not reported
Pindus 2015	Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status		Place of residence: NR Race/ethnicity/culture/language: intervention: White: 69%; Black or African American: 6%; Asian: 6%; Other and multiracial: 19%. Control: White: 63%; Black or African American: 0% Asian: 6%; Other and multiracial: 25% Occupation (parents): NR Gender/sex: 38.9 boys Religion: NR Education (parents): NR	Parent education and occupational status was measured and used to calculate the children's socioeconomic status. Socioeconomic status was assessed with a trichotomous index based on

Table 5. Description of PROGRESS characteristics *(Continued)*

			SES: intervention: high: 31%; medium: 50%; low: 19%; control: high: 6%; medium: 56%; low: 38% (see PROGRESS notes) Social capital: NR	parental reports of: 1) child's participation in free or reduced-price lunch programme at school, 2) the highest level of education obtained by mother and father, and 3) the number of parents who work full-time
Razani 2018	Place of residence; Race/Ethnicity/Culture/Language; Education; Socioeconomic status		Place of residence: urban Race/ethnicity/culture/language: parent Race/Ethnicity: African American: 67%; Non-Latino White 5%; Latino 15%; Other (Native American, Middle Eastern, API): 13% Parent Primary Language: English: 79%; Spanish: 9%; Arabic 4%; Other (Nepali, Tongan, Mandinca, Fulanis, Ahmaric, French, Farsi): 8% Parent Country of birth: United States: 82%; not United States: 17%; missing: 1% Occupation (parents): NR Gender/sex: See Notes on PROGRESS Religion: NR Education (parents): no high school degree: 15%; high school graduate: 64%; college graduate: 18%; missing: 3% SES: Federal Poverty Level (FPL): < 100%: 14%; 100 ± 199%: 54%; 200% or more FPL: 15%; 400% or more FPL: 12%; missing: 5% Social capital: NR	Gender of the children was measured, but data are not reported. The percent of federal poverty level is based on the family income.
Riiser 2020	Place of residence; Gender/Sex	Gender/Sex	Place of residence: urban and rural Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 52.2% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	NR
Salmon 2008	Place of residence; Gender/Sex; Socioeconomic status	Gender/Sex	Place of residence: suburbs in metropolitan area Race/ethnicity/culture/language: NR Occupation (parents): NR Gender/sex: 51% boys Religion: NR Education (parents): NR SES: all selected schools were located in low socioeconomic suburbs (based on socioeconomic index for areas scores) Social capital: NR	NR
Tessier 2008	Place of residence; Occupation; Gender/Sex		Place of residence: urban and rural schools; principal home located in a city: 21.4% Race/ethnicity/culture/language: NR	NR

Table 5. Description of PROGRESS characteristics *(Continued)*

		Occupation (parents): both parents work or study: 67%; only one parent works or studies: 32.74%; no parent works or studies: 0.23% Gender/sex: 51% boys Religion: NR Education (parents): NR SES: NR Social capital: NR	
Treviño 2004	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Socioeconomic status	Place of residence: urban (Inner-city neighbourhood) Race/ethnicity/culture/language: intervention: Asian 6.2%; African-American 13.1%; Mexican-American 76.7%; Other ethnic groups 4%; Control: Asian 5.5%; African-American 7%; Mexican-American 82.5%; other ethnic groups 5% Occupation (parents): NR Gender/sex: intervention 50% boys; control 51% boys Religion: NR Education (parents): NR SES: students from disadvantaged households: intervention: 94.4%; control: 95.1% check definition Social capital: NR	Disadvantaged students were defined as those eligible for free lunch
Warren 2003	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education	Place of residence: urban (schools were in close proximity to the Oxford Brookes University) Race/ethnicity/culture/language: children of Caucasian origin: 89% Occupation (parents): See Notes on PROGRESS Gender/sex: 50.9% boys Religion: NR Education (parents): parents with degree or a postgraduate qualification: 39% SES: NR Social capital: NR	Parents' occupation was measured using a questionnaire, but data are not reported
Zota 2016	Place of residence; Race/Ethnicity/Culture/Language; Gender/Sex; Education; Socioeconomic status	Place of residence: living in the Attica region: multicomponent intervention: 68.4%; environmental intervention: 52%; school near Roma establishments: multicomponent intervention: 10.4%; environmental intervention: 16.1% Race/ethnicity/culture/language: Greece as maternal country of birth: multicomponent intervention: 68.5%; environmental intervention: 69.3%; Greece as paternal country of birth: multicomponent intervention: 71.7%; environmental intervention: 73%; Greece as child country of birth: multicomponent intervention: 96.4%; environmental intervention: 96.9%; Occupation (parents): See Notes on PROGRESS Gender/sex: multicomponent intervention: 50.7 % boys; environmental intervention: 48.8% Religion: NR Education (parents): multicomponent intervention: maternal education: low: 29.3%; medium: 55.8%; high: 21.5%; paternal education: low: 29.3%; medium: 53.2%; high: 17.5%	Family Affluence Scale (FAS) is composed of 4 items (own bedroom; car; holiday; computers); a composite score was calculated for each participating student. For the present analysis, a 3-point ordinal scale was used, in which FAS score 0 to 2, 3 to 5 and 6 to 9 indicated low, middle and high FAS affluence, respectively. Parental educational level was categorised as fol-

Table 5. Description of PROGRESS characteristics *(Continued)*

	Environmental intervention: maternal education: low: 21%; medium: 55.5%; high: 23.5%; paternal education: low: 26.2%; medium: 52.3%; high: 21.5% SES: Family Affluence Scale (FAS): multicomponent intervention: low: 31.4%; medium: 52.5%; high: 16.1%; environmental intervention: low: 27.7%; medium: 55%; high: 17.3% Food security: multicomponent intervention: 48.2%; environmental intervention: 52.7%. Food insecurity (food insecurity without hunger; food insecurity with medium hunger; food insecurity with serious hunger): multicomponent intervention: 51.8%; environmental intervention: 47.3%; Social capital: NR	lows: (1) low: illiteracy, primary and middle school (B9 years); (2) medium: high school or corresponding technical high school (10 to 12 years); and (3) high: university or higher education (C13 years). Parental occupation was measured, but data are not reported.

Abbreviations:
IQR: interquartile range; NR: not reported; PROGRESS: Place, Race, Occupation, Gender, Religion, Education, Socioeconomic status, Social capital; RMB: Renminbi; SD: standard deviation; SE: standard error; SEIFA: (Australian Bureau of Statistics census-based) Socio-Economic Indexes for Areas; SES: socioeconomic status; USD: United States dollar.

Table 6. Description of studies and/or outcome(s) not included in meta-analyses

Narrative results

Study ID	Comparison	Reported outcome(s)	Outcome(s) not included in meta-analyses	Results as reported by authors	Direction of effect	Comments
Anand 2007	Dietary and activity intervention vs control	BMI	BMI short-term	The authors reported that one of the limitations of our study included not being powered to detect differences in BMI	No effect	NR
Hooft van Huysduynen 2014	Dietary intervention vs control	BMI	BMI short-term	The authors reported that the intervention did not affect children's BMI (P = 0.390)	No effect	NR
Madsen 2013	Activity intervention vs control	zBMI	zBMI short-term	The authors reported that in adjusted models, there was no difference between groups in change of zBMI	No effect	NR

Non-usable data

Study ID	Comparison	Reported outcome	Outcome(s) not included in meta-analyses	Results as reported by authors	Direction of effect	Comments

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

Di Maglie 2022	Activity intervention vs control	BMI	BMI short-term	The authors reported that the change in body mass index in the intervention group (-2.4 ± 0.6 kg/m^2) was significantly different from that in control group (3.01 ± 1.8 kg/m^2)	Beneficial effect	It is unclear whether the results are from BMI or percentile measurements and whether the authors reported a standard deviation or a standard error
Gortmaker 1999	Dietary and activity intervention vs control	BMI	BMI long-term	NR	n/a	BMI was measured, but results are not reported; data are reported as the proportion of children that had a weight status classified as obesity according to an index based on BMI and tricep skinfold measures
Johnston 2013	Dietary and activity intervention vs control	zBMI	zBMI long-term	Overall, 10.8% of students with a normal-weight status became overweight (10.4%) or obese (0.4%) at 24 months. No differences were found between the professional-facilitated intervention and self-help conditions in terms of the likelihood of normal-weight students becoming overweight or obese compared to normal-weight control (OR 1.66)	No effect	Results are reported as the percentage of students that had their weight status changed to overweight or obesity after intervention, where classification of obesity and overweight was based on zBMI
Lynch 2016	Dietary and activity intervention vs control	BMI	BMI short-term	There was no statistical difference in improvement of BMI in the intervention group compared with the control group	No effect	Results are reported as median (IQR) BMI
Macias-Cervantes 2009	Activity intervention vs control	BMI	BMI short-term	BMI did not change	No effect	Results are reported as median (IQR) BMI
Marsigliante 2022	Dietary intervention vs control	BMI	BMI short-term	The authors reported that participants had a mean body mass index of 18.3 ± 2.7 kg/m^2 and its variation in the intervention group (-2.7 ± 0.5 kg/m^2) was significantly different from that in the control group (3.41 ± 0.8 kg/m^2). In the experimental group, there were significant differences between the proportion of children who	Beneficial effect	It is unclear whether the results are from BMI or percentile measurements and whether the authors reported a standard deviation or a standard error

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

				were overweight, underweight, normal weight or obese before and after intervention.		
Pindus 2015	Activity intervention vs control	BMI; BMI percentile	BMI medium-term; BMI percentile medium-term	The authors reported that no significant differences between intervention and control groups were noted at post-test BMI	No effect	Results reported as median (interquartile range, IQR) BMI and BMI percentile
Riiser 2020	Activity intervention vs control	Proportion of children with BMI ≥ 25	BMI short-term; BMI long-term	The authors reported that there were no significant differences in any of the trajectories for the children with an age- and gender-adjusted baseline BMI of < 25 vs a BMI of ≥ 25	No effect	Results reported as the proportion of children with BMI ≥ 25
Salmon 2008	Activity intervention vs control	BMI	BMI medium-term	The authors reported that there was a significant intervention effect from baseline to post-intervention, and from baseline to follow-up, on age- and sex-adjusted BMI in the intervention groups compared with controls	Beneficial effect	Results are reported as BMI units of difference from the sex-age population median; we are unsure how to interpret the effect estimate
Warren 2003	Dietary intervention vs control Activity intervention vs control Dietary and activity intervention vs control Activity intervention vs dietary intervention Dietary and Activity intervention vs dietary intervention Dietary and activity intervention vs activity intervention	zBMI	zBMI long-term	The authors reported that no significant changes in the rates of overweight and obesity were seen as a result of the intervention	No effect	Results are reported as the percentage of participants that are overweight or obese. We excluded the results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to means

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

Zota 2016	Dietary intervention vs control	Odds ratio of changing from a weight status classification of overweight or obese to a normal weight status	BMI medium-term	The authors reported that body mass index (BMI) was calculated (kg/m^2) from parent-reported weight and height, and students were then categorised as lean, normal weight, overweight and obese, according to the International Obesity Task Force BMI cut-off points. Children in the intervention group had 61% higher odds of improving BMI from overweight/obese to normal.	Beneficial effect	Results are reported as odds ratios of changing the weight status from overweight or obese classification to normal weight

The comparison is not eligible for meta-analyses (the comparison is between the same type of intervention)

Study ID	Comparison	Reported but not eligible/measured but not reported/planned but not measured	Details of missing evidence	Results	Direction of effect	Comments
Branscum 2013	Dietary and activity intervention vs dietary and activity intervention	BMI percentile	BMI percentile short-term	The authors reported that no significant differences were found in the interaction (group-by-time) for BMI percentile	No effect	NR
Epstein 2001	Dietary and activity intervention vs dietary and activity intervention	zBMI; proportion of children with weight status classification of overweight	zBMI short-term; zBMI medium-term	The authors reported that children showed a stable percentage of overweight over time	No effect	NR
Hannon 2018	Dietary and activity intervention vs dietary and activity intervention	BMI percentile	BMI percentile short-term; BMI percentile medium-term	The authors reported that participating children (mothers and children intervention group) had a reduction in BMI percentile at 3 months (-1.77, P = 0.014), 6 months (-3.0, P = 0.002) and 12 months (-2.91, P = 0.004). No evidence of beneficial effect of the intervention was observed in the mothers-only group.	Beneficial effect of the intervention that included both mothers and children	NR

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

Muzaffar 2019	Dietary and activity intervention vs dietary and activity intervention	BMI percentile	BMI percentile short-term; BMI percentile medium-term	The authors reported that significant differences were not found between the control and treatment groups regarding change in BMI percentile	No effect	NR
Tessier 2008	Activity intervention vs activity intervention	BMI	BMI short-term	The authors reported that multiple short-term sessions (3 or 4 sessions) of PE compared with 1 or 2 session(s) did not change the speed of increase in BMI	No effect	NR

The outcome(s) was measured at follow-up(s) but results are not reported

Study ID	Comparison	Measured outcome	Outcome(s) not included in meta-analyses	Results as reported by authors	Direction of effect	Comments
Huys 2020	Dietary and activity intervention vs control	zBMI	zBMI medium-term	NR	n/a	zBMI data at follow-up are not reported. zBMI listed a secondary outcome in the trial registration but not in the main article. Quote: "Measurements were performed at baseline (April–September 2016) and after 1 year (March–August 2017)." We are unsure if BMI was measured at follow-up.
Treviño 2004	Dietary and activity intervention vs control	BMI	BMI short-term	n/a	NR	BMI measured and used to derive body fat measure but is not reported at follow-up. Quote: "Body fat was measured using bioelectric impedance analysis (Tanita Corporation of America Inc, Arlington Heights, Ill) and body mass index. Bioelectric impedance analysis was used for body fat measurement because body fatness has been shown to relate closely to atherogenic and diabetogenic risk factors in children and because body mass index may not represent true body fatness in prepubertal children. The children, in indoor clothing, were asked to remove their shoes and socks and step on the metal box. Within 30 seconds, the instru-

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

						ment prints out percentage of body fat and weight. Students, in indoor clothing and barefooted, also had their height measured using a wall stop measuring tape (stadiometer) (Seca Bodymeter 206; Seca Corp, Hanover, Md). Body mass index was calculated as weight in kilograms divided by the square of height in meters using the Quetelet Index measure."

Measurement of the outcome at follow-up(s) was planned, but results are not reported (there is no evidence that it was measured)

Study ID	Comparison	Planned outcome	Follow-up	Results as reported by authors	Direction of effect	Comments
Carlin 2021	Dietary and activity intervention vs control	zBMI	Short-term	NR	n/a	zBMI was measured at baseline but not at follow-up. zBMI is listed as secondary outcome in the trial registration but not in the main article
Razani 2018	Activity intervention vs activity intervention	BMI	Short-term	NR	n/a	BMI measurements were planned, but data are not reported. Based on the study protocol, the authors planned to measure BMI in clinic at baseline, 1 month and 3 months out by using weight and an average of 3 measurements of height. The study reported a comparison between groups that were allocated to the same type of interventions (activity vs activity).

Missing evidence from studies included in meta-analyses

Study ID	Comparison	Measured outcome	Outcome(s) not reported	Results as reported by authors	Direction of effect	Comments
Cunha 2013	Dietary intervention vs control	BMI	BMI short-term	NR	n/a	The results are not eligible for inclusion in the meta-analyses. BMI was measured at 6 months and at 9 months from baseline; results are for the group coefficient and group x time coefficient. We only extracted data at the 9-month follow-up for inclusion in the meta-analysis.

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

Donnelly 2009	Activity intervention vs control	BMI percentile	BMI percentile long-term	There were no significant differences in change in BMI percentile (baseline to year 3) for intervention vs control and this finding was not influenced by gender	No effect	Results for BMI percentile are reported as a narrative only. There were no significant differences in change in BMI percentile (baseline to year 3) for intervention vs control.
Liu 2022	Dietary and activity intervention vs control	BMI; zBMI;	BMI long-term; zBMI long-term	NR	n/a	BMI and zBMI measurement at the last follow-up (21 months after baseline as reported in the study protocol) were planned, but results are not reported in the main article
Muller 2016	Activity intervention vs control	zBMI	zBMI long-term	The authors reported that at the 4-year follow-up, 24 (10.2%) of the remaining 236 students were overweight or obese (intervention 11 (8.3%), control 13 (12.5%), P = 0.49) and 18 (6.9%) were underweight (intervention 7 (5.3%), control 11 (10.6%), P = 0.25). Students in the intervention group were more likely to have healthy BMI in comparison to the control group within the 10th to 90th percentile (intervention 86.4%, control 78.2%, P = 0.13). At follow-up, the intervention group had a lower rate of BMI percentile > 90th. More adolescents in the intervention than in the control group who were overweight or with obesity at baseline developed normal BMI after 4 years of intervention (8 in the intervention and 2 in the control groups, respectively), while in both groups, 5 students (2 boys, 3 girls each) with initially normal BMI percentile became overweight.	Beneficial effect	The results are not eligible for meta-analysis: data for the long-term follow-up (4 years) are reported as the percentage of participants that are overweight or obese. We excluded these results from meta-analyses because the sample sizes did not meet our threshold for implementing transformations from proportions to mean.
Salmon 2022	Activity intervention vs control	zBMI	zBMI short-term	NR	n/a	BMI was measured at T2 (5 to 9 months), T3 (18 months) and T4 (30 months) but T2 data are not reported. Quote: "Children's height (cm) and

Table 6. Description of studies and/or outcome(s) not included in meta-analyses *(Continued)*

						weight (kg) were measured twice at each time point with a portable stadiometer."
Tanskey 2017	Activity intervention vs control	BMI; zBMI	BMI short-term; zBMI short-term	NR	n/a	The results are not eligible for inclusion in the meta-analysis: the regression coefficient for study group (relative to control) is described as a factor associated with mean change in BMI/zBMI expressed on a per-month basis. We only extracted data at the 12-month follow-up.
Topham 2021	Dietary and activity intervention vs control	zBMI	zBMI short-term	NR	n/a	The results are not eligible for inclusion in the meta-analyses. zBMI measurements were made at 4 time points: 0, 0.3, 1.3 and 3.3 years. Data reported as coefficient for 'intervention condition' from a random intercept model. We were only able to extract the data from measurements at the 3.3 years follow-up.

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations

BMI: body mass index; CI: confidence interval; IQR: interquartile range; n/a: not applicable; NR: not reported; OR: odds ratio; vs: versus; PE: physical education; zBMI: standardised body mass index.

Table 7. Risk of bias due to missing evidence

Comparison: dietary intervention vs control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short-term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 1096 participants. Results from 512 participants in Cunha 2013 are not reported and no information regarding the direction of the effect is reported; results from 186 participants in Hooft van Huysduynen 2014 show no evidence of an effect of the intervention; results from 398 participants in Marsigliante 2022 suggest a beneficial effect of the intervention. Meta-analysis of results from 2107 participants shows no evidence of an effect of the intervention. The proportion of missing data is very large (52%) and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium-term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 2556 participants from Zota 2016 and reported results suggest a beneficial effect of the intervention. Meta-analysis of results from 6815 participants shows no evidence of an effect of the intervention. The proportion of missing data is relatively large (37.5%) and there is potential for missing results to

Table 7. Risk of bias due to missing evidence *(Continued)*

		impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Data from 218 participants are missing from Warren 2003, and results show a beneficial effect of the intervention. Meta-analysis of results from 5150 participants shows no evidence of an effect of the intervention. The proportion of missing data is small (4%) and therefore missing data do not have an impact on the effect estimate.
BMI percentile short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: activity intervention vs control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 1103 participants. Results from 160 participants in Di Maglie 2022 show a beneficial effect of the intervention; results from 62 participants in Macias-Cervantes 2009 and from 361 participants in Riiser 2020 show no effect of the intervention; results from 520 participants in Tanskey 2017 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 4069 participants shows no evidence of an effect of the intervention. Although the proportion of missing data is relatively small (27%), there is some potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 327 participants. Results from 32 participants from Pindus 2015 show no evidence of an effect of the intervention; results from 295 participants in Salmon 2008 show a beneficial effect of the intervention. Meta-analysis of results from 21,286 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is very small compared to the number of participants included in the meta-analysis (1.5%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI long-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 567 participants. Results from 299 participants from Riiser 2020 show no evidence of an effect of the intervention; results from 268 participants in Salmon 2008 show a beneficial effect of the intervention. Meta-analysis of results

Table 7. Risk of bias due to missing evidence *(Continued)*

		from 8302 participants shows no evidence of an effect of the intervention. The proportion of missing data is small compared to the number of participants included in the meta-analysis (7%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI short-term	High risk of bias	Serious concerns over results missing from included studies. Data are missing from 1240 participants. Results from 156 participants in Madsen 2013 show no evidence of an effect of the intervention; results from 564 participants in Salmon 2022 and from 520 participants in Tanskey 2017 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results of 3580 participants shows no evidence of an effect of the intervention. The proportion of missing data is relatively large (35%) and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Data are missing from 450 participants. Data from 218 and 232 participants are missing from Warren 2003 and from Muller 2016, respectively. Results from Warren 2003 show no effect of the intervention, and results from Muller 2016 show some beneficial effect of the intervention. Meta-analysis of results from 6810 participants shows no evidence of an effect of the intervention. The proportion of missing data is relatively small (7%) and therefore missing data do not have an impact on the effect estimate.
BMI percentile short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium-term	Some concerns	Some concerns over results missing from included studies. Data from 32 participants are missing from Pindus 2015, and results show no evidence of an effect of the intervention. Meta-analysis results from 621 participants show a beneficial effect of the intervention. The proportion of missing data is small compared to the number of participants included in the meta-analysis (5%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile long-term	High risk of bias	Serious concerns over results missing from included studies. Data from 1490 participants are missing from Donnelly 2009, and results show no evidence of an effect of the intervention. Meta-analysis results from 860 participants show no evidence of an effect of the intervention. The proportion of missing data is very large compared to the number of participants included in the meta-analysis (173%), and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
Comparison: dietary and activity intervention vs control		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 1509 participants. Results from 93 participants in Anand 2007 and from 31 participants in Lynch 2016 show no evidence of an effect of the intervention; data from 1419 participants in Treviño 2004 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of re-

Table 7. Risk of bias due to missing evidence *(Continued)*

		sults from 16,066 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is small (9%) and therefore missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. Results from 1295 participants in Gortmaker 1999 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 22,098 participants shows no evidence of an effect of the intervention. The proportion of missing data is small (9%) and therefore missing data do not have an impact on the effect estimate.
zBMI short-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 249 participants. Results from 17 participants in Epstein 2001 show no beneficial effect of the intervention; results from 198 participants in Topham 2021 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 12,784 participants shows no evidence of an effect of the intervention. The proportion of missing data is very small compared to the number of participants included in the meta-analysis (2%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI medium-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 185 participants. Results from 17 participants in Epstein 2001 show no beneficial effect of the intervention; results from 168 participants in Topham 2021 are not reported and no information regarding the direction of the effect is reported. Meta-analysis of results from 20,998 participants shows some evidence of a beneficial effect of the intervention. The proportion of missing data is very small compared to the number of participants included in the meta-analysis (1%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI long-term	Some concerns	Some concerns over results missing from included studies. Data are missing from participants. Results from 477 participants in Johnston 2013 show no evidence of an effect of the intervention; results from 418 participants in Warren 2003 show some evidence of beneficial effects of the intervention. Meta-analysis of results from 23,594 participants shows no evidence of an effect of the intervention. The proportion of missing data is relatively small compared with the number of participants included in the meta-analysis (4%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: activity intervention vs dietary intervention		

Table 7. Risk of bias due to missing evidence *(Continued)*

Meta-analysis outcome	Risk of bias	Supporting statement
BMI short-term	n/a	No meta-analysis
BMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long-term	n/a	No meta-analysis
zBMI short-term	n/a	No meta-analysis
zBMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long-term	n/a	No meta-analysis
BMI percentile short-term	n/a	No meta-analysis
BMI percentile medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: activity and dietary intervention vs dietary intervention		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short-term	n/a	No meta-analysis
BMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long-term	n/a	No meta-analysis
zBMI short-term	n/a	No meta-analysis
zBMI medium-term	Some concerns	Some concerns over results missing from included studies. Data are missing from 17 participants in Epstein 2001, and the results show no beneficial effect of the intervention. Meta-analysis results from 456 participants show no evidence of an effect of the intervention. The proportion of missing data is small compared to the number of participants included in the meta-analysis (4%) and therefore the missing data do not have an impact on the effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
zBMI long-term	n/a	No meta-analysis
BMI percentile short-term	n/a	No meta-analysis
BMI percentile medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.

Table 7. Risk of bias due to missing evidence *(Continued)*

BMI percentile long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
Comparison: activity and dietary intervention vs activity intervention		
Meta-analysis outcome	**Risk of bias**	**Supporting statement**
BMI short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI short-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
zBMI long-term	High risk of bias	Serious concerns over results missing from included studies. Data from 218 participants are missing from Warren 2003, and results show no evidence of an effect of the intervention. Meta-analysis results from 131 participants show no evidence of an effect of the intervention. The proportion of missing data is very large compared to the number of participants included in the meta-analysis (167%), and there is potential for missing results to impact on the synthesised effect estimate. Some concerns over potential for missing studies that are likely to have eligible results.
BMI percentile short-term	n/a	No meta-analysis
BMI percentile medium-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.
BMI percentile long-term	Some concerns	Some concerns over potential for missing studies that are likely to have eligible results. No missing results in the included studies.

Short-term follow-up: 12 weeks from baseline to < 9 months. Medium-term follow-up: 9 months from baseline to < 15 months. Long-term follow-up: 15 months or more.

Abbreviations

BMI: body mass index; n/a: not applicable; vs: versus; zBMI: standardised body mass index.

APPENDICES

Appendix 1. Criteria for judging certainty in the evidence

We evaluated the five GRADE domains for assessing certainty in our results using the following criteria.

Domain	Explanation

(Continued)

Risk of bias	Based on results of our risk of bias assessments, we downgraded confidence in the evidence base if most evidence was from studies that we judged at high risk of bias, according to the following rules. • No serious concerns (no downgrade): contributing weight of evidence at high risk < 30%. • Serious concerns (one point down): contributing weight of evidence of high risk of bias > 30%. • Very serious concerns (two points down): contributing weight of evidence of high risk of bias > 60%.
Imprecision	We downgraded confidence in the evidence base if the estimate of the effect size from a meta-analysis was not precise, according to the following rules. • No serious concerns (no downgrade): > 3000 participants or clear evidence of an effect larger than ± 1/5 of a typical standard deviation (which corresponds to 0.2 for zBMI, 0.5 for BMI or 6 for BMI percentile). • Serious concerns (one point down): < 3000 participants without clear evidence of an effect larger than ± 1/5 of a typical standard deviation. • Very serious concerns (two points down): not considered.
Inconsistency	We downgraded confidence in the evidence base if there was unexplained heterogeneity or variability in results across studies, according to the following rules. • No serious concerns (no downgrade): estimated heterogeneity variance (tau) = 0 or results all in the same direction. • Serious concerns (one point down): estimated heterogeneity variance (tau) > 0 and the direction of the results is inconsistent. • Very serious concerns (two points down): not considered.
Indirectness	We downgraded confidence in the evidence base if we had concerns that the population was highly specific and reducing the generalisability of the results, according to the following rules. • No serious concerns (no downgrade): no study populations of concern, or contributing weight of studies in highly specific populations < 30%. • Serious concerns (one point down): contributing weight of studies in highly specific populations > 30%. • Very serious concerns (two points down): not considered.
Publication bias	We downgraded our confidence in the evidence base due to within-study non-reporting (outcome non-reporting bias) if there was (i) evidence of outcome measurement and (ii) indication of unreported result(s) with no evidence of effect, and (iii) potential for the missing result(s) to impact on the meta-analysis, according to the following rules. • No serious concerns (no downgrade): no missing outcome data, or studies with missing outcome data were not large enough to impact on meta-analyses. • Serious concerns (one point down): we had evidence of measured outcomes being missing and an indication that missing results were reporting evidence of effect and able to affect the meta-analyses result. • Very serious concerns (two points down): not considered. We considered that any wholly missing studies were likely to be small, whereas many included studies are large. We therefore did not have strong reasons to rate down for publication bias in addition to selective non-reporting within studies.

Abbreviations

BMI: body mass index; zBMI: standardised body mass index.

Appendix 2. Search strategies

2.1 Rolling search (2021 update)

Ovid MEDLINE(R) ALL <1946 to September 24, 2021>

Date limited: March to September 2021

1 exp overweight/ 238864

2 exp body weight changes/ 76584

3 body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ 198957

4 Body mass index/ or adiposity/ 146076

5 (obes* or adipos*).mp. 500168

6 (weight gain or weight loss).mp. 181416

7 (overweight or over weight or overeat* or over eat*).mp. 85000

8 weight change*.mp. 12443

9 ((bmi or body mass index) adj2 (alter* or measur* or gain or loss or change)).mp. 12092

10 or/1-9 830029

11 exp Behavior Therapy/ 81430

12 social support/ 74861

13 exp Psychotherapy, Group/ 27306

14 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).mp. 85774

15 (group therapy or family therapy or cognitive therapy).mp. 17855

16 ((lifestyle or life style) adj (chang* or intervention*)).mp. 17670

17 counsel?ing.mp. 129697

18 social support.mp. 96918

19 (peer adj2 support).mp. 5992

20 (children adj3 parent* adj3 therapy).mp. 133

21 or/11-20 366576

22 exp Obesity/dh [Diet Therapy] 8132

23 exp Diet Therapy/ 58036

24 Fasting/ 36683

25 (diets or diet or dieting).mp. 527093

26 (diet* adj (modif* or therapy or intervention* or strateg*)).mp. 77944

27 (low calorie or calorie control* or healthy eating).mp. 12044

28 (fasting or modified fast*).mp. 130206

29 exp Dietary Fats/ 93688

30 (fruit or vegetable*).mp. 147052

31 (high fat* or low fat* or fatty food*).mp. 59146

32 formula diet*.mp. 700

33 or/22-32 807308

34 exp Exercise/ 217427

35 exp Exercise Therapy/ 56426

36 exercis*.mp. 417380

37 (aerobics or physical therapy or physical activity or physical inactivity).mp. 183405

38 (fitness adj (class* or regime* or program*)).mp. 977

39 (aerobics or physical therapy or physical training or physical education).mp. 76087

40 dance therapy.mp. 473

41 sedentary behavio?r.mp. 14736

42 or/34-41 591641

43 exp Complementary Therapies/ 239044

44 (alternative medicine or complementary therap* or complementary medicine).mp. 27279

45 (hypnotism or hypnosis or hypnotherapy).mp. 12696

46 (acupuncture or homeopathy or homoeopathy).mp. 36037

47 (chinese medicine or indian medicine or herbal medicine or ayurvedic).mp. 47638

48 or/43-47 282249

49 ((diet or dieting or slim*) adj (club* or organi?ation)).mp. 28

50 (weightwatcher* or weight watcher*).mp. 145

51 (correspondence adj (course* or program*)).mp. 93

52 (fat camp* or diet* camp*).mp. 27

53 or/49-52 293

54 exp Health Promotion/ 81232

55 exp Health Education/ 253760

56 (health promotion or health education).mp. 178600

57 (media intervention* or community intervention*).mp. 2649

58 health promoting school*.mp. 376

59 ((school* or community) adj4 program*).mp. 35625

60 School health services/ 17840

61 ((school* or community) adj4 intervention*).mp. 21247

62 (family intervention* or parent* intervention).mp. 2513

63 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).mp. 26219

64 or/54-63 365140

65 exp Health Policy/ 111172

66 ((health or school or food or nutrition*) adj3 (policy or policies)).mp. 120211

67 65 or 66 151124

68 exp Obesity/pc [Prevention & Control] 20422

69 exp Primary Prevention/ 162740

70 (primary prevention or secondary prevention).mp. 68528

71 (preventive measure* or preventative measure*).mp. 28824

72 (preventive care or preventative care).mp. 6173

73 (obesity adj2 (prevent* or treat*)).mp. 22250

74 or/68-73 281599

75 exp Cell Phones/ or Social media/ or Mobile Applications/ or Electronic Mail/ 37010

76 (app or apps or text messag* or texting or social media or facebook or mobile technolog* or e-mail* or email* or smartphone* or mobile phone*).ti,ab. 92063

77 75 or 76 103417

78 10 and (21 or 33 or 42 or 48 or 53 or 64 or 67 or 74 or 77) 286872

79 exp child/ or adolescent/ 3170185

80 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teenage* or young people or young person or schoolchild* or juvenile).tw. 1974681

81 79 or 80 3801892

82 78 and 81 64232

83 exp animals/ not humans.sh. 4890266

84 (animal* or rodent* or mouse or mice or rat or rats or murine).ti. 1593937

85 82 not (83 or 84) 62698

86 controlled clinical trial.pt. 94426

87 randomi#ed.ab. 639710

88 placebo.ab. 221714

89 randomly.ab. 366508

90 (clinical trials as topic or controlled clinical trials as topic).sh. 202924

91 trial.ti. 248175

92 exp randomized controlled trial/ or exp randomized controlled trials as topic/ 689840

93 or/86-92 1496200

94 85 and 93 9617

95 (202103* or 202104* or 202105* or 202106* or 202107* or 202108* or 202109*).ep,ez. 893938

96 ("2021 Mar*" or "2021 Apr*" or "2021 May*" or "2021 Jun*" or "2021 Jul*" or "2021 Aug*" or "2021 Sep*").dp. 678587

97 (2021 03* or 2021 04* or 2021 05* or 2021 06* or 2021 07* or 2021 08* or 2021 09*).dp. 234439

98 limit 94 to yr=2021- 388

99 95 or 96 or 97 1092323

100 94 and 99 303

101 98 or 100 391

****

Ovid Embase <1974 to 2021 September 24>

Date limited: March to September 2021

1 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ 267785

2 *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ 44609

3 *body mass/ or *waist to height ratio/ or *waist hip ratio/ 36395

4 (obes* or adipos*).mp. 742525

5 (weight gain or weight loss).mp. 308464

6 (overweight or over weight or overeat* or over eat*).mp. 121599

7 weight change*.mp. 26001

8 ((bmi or body mass index) adj2 (alter* or measur* or gain or loss or change)).mp. 19810

9 or/1-8 1019356

10 *Behavior Therapy/ 16388

11 *social support/ 24496

12 *family therapy/ 6717

13 *group therapy/ 10256

14 ((psychological or behavio?r*) adj (therapy or modif* or strateg* or intervention*)).mp. 111599

15 (group therapy or family therapy or cognitive therapy).mp. 74992

16 ((lifestyle or life style) adj (chang* or intervention*)).mp. 26120

17 counsel?ing.mp. 220349

18 social support.mp. 112851

19 (peer adj2 support).mp. 8315

20 (children adj3 parent* adj3 therapy).mp. 189

21 or/10-20 496871

22 exp *Diet Therapy/ 98711

23 (diets or diet or dieting).mp. 777251

24 (diet* adj (modif* or therapy or intervention* or strateg*)).mp. 75017

25 (low calorie or calorie control* or healthy eating).mp. 17252

26 (fasting or modified fast*).mp. 177877

27 exp *fat intake/ 17057

28 (fruit or vegetable*).mp. 230164

29 (high fat* or low fat* or fatty food*).mp. 86965

30 formula diet*.mp. 861

31 or/22-30 1095249

32 exp *Exercise/ 155651

33 exp *kinesiotherapy/ 35308

34 exercis*.mp. 570034

35 (aerobics or physical therapy or physical activity or physical inactivity).mp. 277386

36 (fitness adj (class* or regime* or program*)).mp. 1277

37 (aerobics or physical therapy or physical training or physical education).mp. 56302

38 dance therapy.mp. 708

39 sedentary behavio?r.mp. 8604

40 or/32-39 782671

41 exp *alternative medicine/ 35261

42 (alternative medicine or complementary therap* or complementary medicine).mp. 55867

43 (hypnotism or hypnosis or hypnotherapy).mp. 15869

44 (acupuncture or homeopathy or homoeopathy).mp. 57978

45 (chinese medicine or indian medicine or herbal medicine or ayurvedic).mp. 98826

46 or/41-45 208909

47 ((diet or dieting or slim*) adj (club* or organi?ation)).mp. 47

48 (weightwatcher* or weight watcher*).mp. 236

49 (correspondence adj (course* or program*)).mp. 81

50 (fat camp* or diet* camp*).mp. 30

51 or/47-50 394

52 exp *Health Education/ 117203

53 (health promotion or health education).mp. 226187

54 (media intervention* or community intervention*).mp. 3429

55 health promoting school*.mp. 450

56 ((school* or community) adj4 program*).mp. 45545

57 *school health service/ 7413

58 ((school* or community) adj4 intervention*).mp. 26744

59 (family intervention* or parent* intervention).mp. 3302

60 (parent* adj2 (behavio?r or involve* or control* or attitude* or educat*)).mp. 49137

61 or/52-60 369532

62 *health care policy/ 69961

63 ((health or school or food or nutrition*) adj3 (Policy or policies)).mp. 239520

64 62 or 63 239520

65 exp Obesity/pc [Prevention & Control] 16674

66 primary Prevention/ 42819

67 (primary prevention or secondary prevention).mp. 89810

68 (preventive measure* or preventative measure*).mp. 38213

69 (preventive care or preventative care).mp. 7719

70 (obesity adj2 (prevent* or treat*)).mp. 30589

71 or/65-70 175662

72 *mobile application/ or *text messaging/ or exp *mobile phone/ or *e-mail/ or *social media/ 35056

73 (app or apps or text messag* or texting or social media or facebook or mobile technolog* or e-mail* or email* or smartphone* or mobile phone*).ti,ab. 134604

74 72 or 73 142358

75 9 and (21 or 31 or 40 or 46 or 51 or 61 or 64 or 71 or 74) 363429

76 child/ or preschool child/ or school child/ or juvenile/ or adolescent/ 2957200

77 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teenage* or young people or young person or juvenile* or schoolchild*).tw. 2508471

78 76 or 77 3737806

79 75 and 78 70228

80 exp animal/ not human/ 4983435

81 (animal* or rodent* or mouse or mice or rat or rats or murine).ti. 1746540

82 79 not (80 or 81) 68027

83 randomized controlled trial/ or "randomized controlled trial (topic)"/ 884751

84 crossover procedure/ 68184

85 "double blind procedure"/ 187998

86 "single-blind procedure"/ 43827

87 ((doubl* or singl*) adj blind*).tw. 249100

88 placebo/ or placebo.tw. 478469

89 (cross adj over).tw. 34400

90 (random* or factorial* or crossover).tw. 1774825

91 or/83-90 2220300

92 82 and 91 10585

93 limit 92 to yr="2021" 535

94 (202103* or 202104* or 202105* or 202106* or 202107* or 202108* or 202109* or 2021*).dd,dc. 1876487

95 (spring 2021 or summer 2021 or autumn 2021).dp. 505

96 (mar* 2021 or 0* mar* 2021 or 1* mar* 2021 or 2* mar* 2021 or 3* mar* 2021 or apr* 2021 or 0* apr* 2021 or 1* apr* 2021 or 2* apr* 2021 or 3* apr* 2021 or may* 2021 or 0* may* 2021 or 1* may* 2021 or 2* may* 2021 or 3* may* 2021 or jun* 2021 or 0* jun* 2021 or 1* jun* 2021 or 2* jun* 2021 or 3* jun* 2021 or jul* 2021 or 0* jul* 2021 or 1* jul* 2021 or 2* jul* 2021 or 3* jul* 2021 or aug* 2021 or 0* aug* 2021 or 1* aug* 2021 or 2* aug* 2021 or 3* aug* 2021 or sep* 2021 or 0* sep* 2021 or 1* sep* 2021 or 2* sep* 2021 or 3* sep* 2021).dp. 841606

97 94 or 95 or 96 1903232

98 92 and 97 780

99 93 or 98 789

****

Ovid APA PsycInfo <1806 to September Week 3 2021>

2019 to 2020

1 exp overweight/ 27609

2 weight control/ 5141

3 (obes* or adipos*).ti. 17415

4 obesity.tw. 37939

5 (weight loss or weight gain).ti. 4977

6 (overweight or over weight).tw. 16357

7 weight loss/ 4106

8 weight gain/ 3310

9 (overeat* or over eat*).tw. 2784

10 weight change*.tw. 2349

11 ((bmi or body mass) adj3 (alter* or measur* or gain or loss or change)).tw. 3069

12 or/1-11 55473

13 (adolescence 13 17 yrs or childhood birth 12 yrs or preschool age 2 5 yrs or school age 6 12 yrs).ag. 824848

14 (teenage* or young people or young person or juvenile or schoolchild*).tw. 75214

15 (child or children or childhood or adololescen*).tw. 714760

16 (pediatr* or paediatr*).mp. 53867

17 (boy or boys or boyhood or girl or girlhood or girls or youth or youths).tw. 209081

18 or/13-17 1194126

19 12 and 18 18989

20 exp treatment effectiveness evaluation/ 26596

21 clinical trials/ 11978

22 placebo/ 6085

23 placebo*.tw. 42334

24 ((singl* or doubl* or trebl* or tripl*) adj3 (blind* or mask*)).tw. 27668

25 random*.tw. 218305

26 trial.ti. 33645

27 ((clinical adj3 trial*) or (evaluat* adj3 stud*)).tw. 108150

28 or/20-27 346310

29 19 and 28 2505

30 limit 29 to yr="2019 - 2021" 371

31 (2019* or 2020* or 2021*).up,yr,an. 518276

32 29 and 31 474

33 30 or 32 474

34 (BMIz or (BMI* adj2 (z-scor* or zscor*))).tw. 942

35 ((bmi or body mass index) adj3 outcome?).tw. 515

36 34 or 35 1394

37 18 and 28 and 36 320

38 (33 or 37) 794

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2.2 New search of the education databases 1990 onwards

Australian Education Index (AEI) (ProQuest)

Searched 26 September 2021

Search history

[*Condition*]

#1 MAINSUBJECT.EXACT("Body weight") (85) or MAINSUBJECT.EXACT("Obesity") (215)

#2 (obes*) (249)

#3 (weight N/5 gain*) or (weight N/5 los*) (36)

#4 (overweight or “over weight”) (83)

#5 (overeat* or (over P/1 eat*)) (5)

#6 (weight N/5 chang*) (14)

#7 (bmi or bmiz or “body mass index”) (38)

#8 ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes)) (117)

#9 (1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8) (433)

[*Study Design Filter*]

#10 MAINSUBJECT.EXACT("Intervention") (2177)

#11 (RCT or cRCT or randomized or randomised or (control* P/3 group*) or (control* P/3 trial*) or (control* P/3 stud*)) (1508)

#12 noft(random* or groups or trial or placebo or matched) (37,586)

#13 (10 OR 11 OR 12) (39233)

#14 (9 AND 13) (130)

(MAINSUBJECT.EXACT("Body weight") OR obes* OR ((weight N/5 gain*) or (weight N/5 los*)) OR (overweight or “over weight”) OR (overeat* or (over P/1 eat*)) OR (weight N/5 chang*) OR (bmi or bmiz or “body mass index”) OR ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) AND (MAINSUBJECT.EXACT("Intervention") OR (RCT or cRCT or randomized or randomised or (control* P/3 group*) or (control* P/3 trial*) or (control* P/3 stud*)) OR noft(random* or groups or trial or placebo or matched))

Date Limited (1990-01-01 to 2021-09-26), n=126

[Record Type: Journal articles (43); Theses (41); Conference Papers (14); Journal Articles Overseas (13); Book Chapters (10); Research Reports (2); Books (1); Conference Proceedings (1); Government Reports (1)]

British Education Index (BEI) (EBSCOhost)

Searched 26 September 2021

Search history [Boolean Search]

[Condition]

S1 obes* (495)

S2 (weight N5 gain*) or (weight N5 los*) (58)

S3 (overweight or "over weight") (138)

S4 (overeat* or (over W1 eat*)) (9)

S5 (weight N5 chang*) (21)

S6 (bmi or bmiz or "body mass index") (169)

S7 ((adiposity or fat or weight) AND (goal or goals or outcome or outcomes)) (110)

S8 (S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7) (692)

[Study Design Filter]

S9 (RCT or cRCT or randomized or randomised) (1271)

S10 ((control* N3 group*) or (control* N3 trial*) or (control* N3 stud*)) (3365)

S11 (random* or groups or trial or placebo) (33,876)

S12 (matched N5 (class or classes or cluster or clusters or school or schools or community or communities or population or populations) (73)

S13 (S9 OR S10 OR S11 OR S12) (34370)

S14 (S8 AND S13) (238)

Date Limited (1990 onwards), n=238

[Record Type: Academic Journals (234); Magazines(4)]

ERIC (Education Resources Information Center) (EBSCOhost)

Searched 26 September 2021

Search history [Boolean Search]

[Condition]

S1 TI obes* OR AB obes* OR KW obes* OR SU obes* (3526)

S2 TI (weight N5 gain*) OR AB (weight N5 gain*) OR KW (weight N5 gain*) OR SU (weight N5 gain*) (326)

S3 TI (weight N5 los*) OR AB (weight N5 los*) OR KW (weight N5 los*) OR SU (weight N5 los*) (640)

S4 TI overeat* OR AB overeat* OR KW overeat* OR SU overeat* (73)

S5 TI (over W1 eat*) OR AB (over W1 eat*) OR KW (over W1 eat*) OR SU (over W1 eat*) (21)

S6 TI (weight N5 chang*) OR AB (weight N5 chang*) OR KW (weight N5 chang*) OR SU (weight N5 chang*) (266)

S7 TI ((bmi or bmiz or "body mass index")) OR AB ((bmi or bmiz or "body mass index")) OR KW ((bmi or bmiz or "body mass index")) OR SU ((bmi or bmiz or "body mass index")) (1278)

S8 TI (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR AB (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR KW (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) OR SU (((adiposity or fat or weight) AND (goal or goals or outcome or outcomes))) (1320)

S9 (S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8) (5762)

[Study Design Filter]

S10 TI ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR AB ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR KW ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) OR SU ((RCT or cRCT or randomized or randomised or randomization or randomisation or randomizing or randomising)) (7981)

S11 TI ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR AB ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR KW ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) OR SU ((random* AND (administ* or allocat* or assign* or class* or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or recruit* or split or subsitut* or treat*)))) (29063)

S12 TI "at random" OR AB "at random" OR KW "at random" OR SU "at random" (14001)

S13 AB (control* N3 group*) (22313)

S14 TI trial OR AB trial OR KW trial OR SU trial (15512)

S15 TI trial OR AB trial OR KW trial OR SU trial (806)

S16 AB (matched N5 (class or classes or cluster or clusters or school or schools or community or communities or population or populations) (1057)

S17 (S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16) (62683)

S18 (S9 AND S17) (637)

S19 (child* or adolescen* or pediatr* or paediatr* or boys or girls or youth or youths or teenage* or "young people" or "young person" or "young adult*") (500,370)

S20 TI school* OR AB school* OR KW school* OR SU school* (708643)

S21 TI communit* OR AB communit* OR KW communit* OR SU communit* (224783)

S22 (S19 OR S20 OR S21) (1,062,371)

S23 (S18 AND S22) (462)

S24 Limiters - Date Published: 19900101-20211231 n=435

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2.3 Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library

Issue 9 of 12, 2021

Date run: 26/09/2021

Rolling search

Limited Mar-Sept 2021

ID Search Hits

#1 MeSH descriptor: [Obesity] explode all trees 14800

#2 MeSH descriptor: [Body Weight Changes] explode all trees 9217

#3 (obes*):ti,ab,kw 46134

#4 (“weight gain” or “weight loss”):ti,ab,kw 32868

#5 (overweight or “over weight” or overeat* or (over next eat*)):ti,ab,kw 18432

#6 (weight next change*):ti,ab,kw 4229

#7 ((bmi or “body mass index”) near (gain or loss or change*)):ti,ab,kw 4292

#8 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 69612

#9 MeSH descriptor: [Behavior Therapy] explode all trees 17646

#10 MeSH descriptor: [Social Support] explode all trees 3439

#11 MeSH descriptor: [Psychotherapy, Group] explode all trees 3560

#12 ((psychological or behavio?r*) near (therapy or modif* or strateg* or intervention*)):TI,AB,KW 53803

#13 (“group therapy” or “family therapy” or “cognitive therapy”):ti,ab,kw 10896

#14 ((lifestyle or “life style”) near (chang* or intervention*)):ti,ab,kw 10017

#15 counsel?ing:ti,ab,kw 22739

#16 “social support”:ti,ab,kw 8569

#17 (peer near2 support):ti,ab,kw 102294

#18 (children near/3 parent* near/3 therapy):ti,ab,kw 388

#19 #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 173694

#20 MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [diet therapy - DH] 2003

#21 MeSH descriptor: [Diet Therapy] explode all trees 6228

#22 MeSH descriptor: [Fasting] this term only 3327

#23 (diets or diet or dieting):ti,ab,kw 67825

#24 (diet* near (modif* or therapy or intervention* or strateg*)):ti,ab,kw 28307

#25 (“low calorie” or (calorie next control*) or “healthy eating”):ti,ab,kw 4036

#26 (fasting or (modified next fast*)):ti,ab,kw 35052

#27 MeSH descriptor: [Dietary Fats] explode all trees 7743

#28 (fruit or vegetable*):ti,ab,kw 9710

#29 (high next fat*) or (low next fat*) or (fatty next food*):ti,ab,kw 7159

#30 (formula next diet*):ti,ab,kw 237

#31 #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 103927

#32 MeSH descriptor: [Exercise] explode all trees 26442

#33 MeSH descriptor: [Exercise Therapy] explode all trees 15023

#34 exercis*:ti,ab,kw 112202

#35 (aerobics or “physical therapy” or “physical activity” or “physical inactivity”):ti,ab,kw 44627

#36 (fitness near (class* or regime* or program*)):ti,ab,kw 1349

#37 (“physical training” or “physical education”):ti,ab,kw 4525

#38 “dance therapy”:ti,ab,kw 180

#39 (sedentary next behavio?r*):ti,ab,kw 2522

#40 #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 139600

#41 MeSH descriptor: [Complementary Therapies] explode all trees 20952

#42 (“alternative medicine” or (complementary next therap*) or “complementary medicine”):ti,ab,kw 3613

#43 (hypnotism or hypnosis or hypnotherapy):ti,ab,kw 1818

#44 (acupuncture or homeopathy or homoeopathy):ti,ab,kw 16425

#45 (“chinese medicine” or “indian medicine” or “herbal medicine” or ayurvedic):ti,ab,kw 11369

#46 #41 OR #42 OR #43 OR #44 OR #45 44532

#47 (diet* or slim*) near (club* or organi?ation):ti,ab,kw 128

#48 (weightwatcher* or (weight next watcher*)):ti,ab,kw 134

#49 (correspondence near (course* or program*)):ti,ab,kw 28

#50 ((fat or diet*) next camp*):ti,ab,kw 2

#51 #47 OR #48 OR #49 OR #50 291

#52 MeSH descriptor: [Health Promotion] explode all trees 6886

#53 MeSH descriptor: [Health Education] explode all trees 20741

#54 (“health promotion” or “health education”):ti,ab,kw 19796

#55 (“media intervention*” or “community intervention*”):ti,ab,kw 630

#56 (health next promoting next school*):ti,ab,kw 48

#57 ((school or community) near/2 program*):ti,ab,kw 2921

#58 ((school or community) near/2 intervention*):ti,ab,kw 4510

#59 ((family next intervention*) or (parent* next intervention*)):ti,ab,kw 1744

#60 (parent* near/2 (behavio?r* or involve* or control* or attitude* or educat*)):ti,ab,kw 5960

#61 #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #60 41158

#62 MeSH descriptor: [Health Policy] explode all trees 672

#63 ((health next polic*) or (school next polic*) or (food next polic*) or (nutrition next polic*)):ti,ab,kw 1462

#64 #62 OR #63 1595

#65 MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [prevention & control - PC] 1761

#66 MeSH descriptor: [Primary Prevention] explode all trees 4376

#67 (“primary prevention” or “secondary prevention”):ti,ab,kw 10932

#68 (preventive next measure*) or (preventative next measure*):ti,ab,kw 1396

#69 (“preventive care” or “preventative care”):ti,ab,kw 581

#70 (obesity near/2 (prevent* or treat*)):ti,ab,kw 5220

#71 #65 OR #66 OR #67 OR #68 OR #69 OR #70 21508

#72 (#19 OR #31 OR #40 OR #46 OR #51 OR #61 OR #64 OR #71) 420107

#73 #8 AND #72 42842

#74 MeSH descriptor: [Child] explode all trees 58448

#75 MeSH descriptor: [Infant] explode all trees 33346

#76 (child* or adolescen* or infant*):ti,ab,kw 289920

#77 (teenage* or “young people” or “young person” or (young next adult*)):ti,ab,kw 91369

#78 (schoolchildren or “school children”):ti,ab,kw 12811

#79 (pediatr* or paediatr*):ti,ab,kw 37240

#80 (boys or girls or youth or youths):ti,ab,kw 17734

#81 MeSH descriptor: [Adolescent] this term only 106993

#82 #74 OR #75 OR #76 OR #77 OR #78 OR #79 OR #80 OR #81 345686

#83 #73 AND #82 12799

[Additional terms for BMI]

#84 (BMIz or (BMI* near/2 (z-scor* or zscor*))):ti,ab 1102

#85 ((bmi or "body mass index") near/3 (assess* or calculat* or change? or changing or differ* or increas* or decreas* or reduc* or post-intervention* or "follow* up*" or followup*)):ti,ab 8093

#86 ((bmi or "body mass index") near/3 outcome?):ti,ab 1927

#87 ((adiposity or fat or weight) near/3 (goal? or outcome?)):ti,ab 5101

#88 #84 OR #85 OR #86 OR #87 14422

#89 #88 AND #72 AND #82 3596

#90 #89 NOT #83 625

2.4 Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library

New search (difference set)

Issue 9 of 12, 2021

Date run: 26/09/2021

#91 MeSH descriptor: [Marketing] explode all trees 530

#92 MeSH descriptor: [Persuasive Communication] this term only 314

#93 MeSH descriptor: [Communications Media] explode all trees 12804

#94 (marketing or advert* or campaign* or "mass media" or "social media" or blog* or vlog*):ti,ab,kw 8893

#95 (persuasive or persuasion or persuader*):ti,ab,kw 860

#96 MeSH descriptor: [Food Packaging] this term only 37

#97 MeSH descriptor: [Food Labeling] explode all trees 169

#98 ((food? or drink? or product? or nutrition* or diet* or carb* or sugar* or fat? or calori* or warning) NEAR/3 (label* or packag*)):ti,ab,kw 1855

#99 "traffic light*":ti,ab,kw 193

#100 (#91 OR #92 OR #93 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99) 23426

#101 MeSH descriptor: [Artificially Sweetened Beverages] this term only 5

#102 MeSH descriptor: [Beverages] this term only and with qualifier(s): [adverse effects - AE] 138

#103 MeSH descriptor: [Sweetening Agents] explode all trees 770

#104 (artificial* near/3 sweeten*):ti,ab,kw 248

#105 ((sugar* or sweeten* or unsweeten* or diet or "low calorie" or fizzy or carbonated) NEAR/3 (beverag* or drinks or juice? or cordial? or pop or smoothie? or snack?)):ti,ab,kw 1777

#106 (((fizzy or carbonated) near/3 (beverag* or drinks)) or soda?):ti,ab,kw 804

#107 ("low sugar" or "high sugar" or "high fat" or HFSS):ti,ab,kw 4083

#108 ((sugar or fat or food) near/2 (literacy or education)):ti,ab,kw 309

#109 (#101 OR #102 OR #103 OR #104 OR #105 OR #106 OR #107 OR #108) 7209

#110 MeSH descriptor: [Food Services] explode all trees 389

#111 MeSH descriptor: [Dietary Services] this term only 43

#112 (school* near/3 (breakfast? or catering or diet* or dinner? or dining or lunch* or meal? or food? or snack?)):ti,ab,kw 873

#113 ("breakfast club?" or "catering service?"):ti,ab,kw 173

#114 (mealtim* or "meal tim*" or "meal environment?"):ti,ab,kw 883

#115 ("packed lunches" or "tuck shops" or "snack shops"):ti,ab,kw 18

#116 "vending machine?":ti,ab,kw 23

#117 (#110 OR #111 OR #112 OR #113 OR #114 OR #115 OR #116) 2195

#118 ("after school" or out-of-school):ti,ab,kw 574

#119 MeSH descriptor: [Non-Medical Public and Private Facilities] explode all trees 5420

#120 MeSH descriptor: [Leisure Activities] explode all trees 19390

#121 MeSH descriptor: [Physical Education and Training] this term only 1621

#122 MeSH descriptor: [Sports and Recreational Facilities] explode all trees 118

#123 ((youth? or communit* or holiday* or vacation* or activit* or fitness or sport* or recreation* or leisure) near/3 (center? or centre? or camp? or club?)):ti,ab,kw 3740

#124 ((youth? or communit* or holiday* or vacation* or leisure) next based):ti,ab,kw 9610

#125 MeSH descriptor: [Movement] this term only 2461

#126 MeSH descriptor: [Fitness Trackers] this term only 123

#127 (((movement or activit* or fitness) near/2 (app or based or chang* or monitor* or measur* or track*)) or recreation* or sport* or play):ti,ab,kw 44174

#128 MeSH descriptor: [Sleep] explode all trees 6005

#129 sleep*:ti or ((sleep near/3 (duration or efficienc* or hygiene or problem* or quality)) or actigraph*):ti,ab,kw 25133

#130 (#118 OR #119 OR #120 OR #121 OR #122 OR #123 OR #124 OR #125 OR #126 OR #127 OR #128 OR #129) 101953

#131 ((parent* or family or families or guardian?) near/2 (advice or advisory or (behavi* near chang*) or coach* or educat* or focus* or intervention* or program* or project* or psychoeducat* or strateg* or study or support* or therap* or train* or trial)):ti,ab,kw 19851

#132 ((parent* or family or families or guardian?) next (based or centred or centered or focus* or tailored or target*)):ti,ab,kw 2863

#133 #131 OR #132 20617

#134 MeSH descriptor: [Religion] explode all trees 1271

#135 MeSH descriptor: [Culture] explode all trees 2923

#136 (religi* or church or spiritual or faith?):ti,ab,kw 3296

#137 ((cultur* or multicultur* or race or racial*) near/2 (adapted or appropriate or based or center* or centre* or competent or focus* or tailored or translat* or target*)):ti,ab,kw 2635

#138 #134 OR #135 OR #136 OR #137 9246

#139 MeSH descriptor: [Public Health] this term only 262

#140 "public health":ti,ab,kw 14709

#141 ((complex or co-ordinated or comprehensive or factorial or interdisciplinary or inter-disciplinary or multiple or "multi component?" or multicomponent? or multidisciplin* or "multi disciplin*" or multidimension* or "multi dimension*" or multifactor* or "multi factor*" or multifacet* or "multi facet*" or multilevel* or "multi level*" or multimodal* or "multi modal*" or multiparamet* or "multi paramet*" or multiecological or "multi* ecological") near (intervention? or program* or project? or strateg* or study or support* or system? or therap* or train* or trial)):ti,ab,kw 62757

#142 #139 OR #140 OR #141 76106

#143 MeSH descriptor: [Computer Communication Networks] explode all trees 4404

#144 MeSH descriptor: [Telecommunications] explode all trees 7443

#145 MeSH descriptor: [Mobile Applications] this term only 888

#146 MeSH descriptor: [Cell Phone] explode all trees 1992

#147 MeSH descriptor: [Therapy, Computer-Assisted] this term only 1358

#148 digital*:ti,kw OR (digital near/3 (assist* or based or deliver* or intervention? or pilot or platform? or program* or project? or strateg* or study or support* or system? or technolog* or therap* or train* or trial)):ab 5502

#149 (android or app or apps or avatar* or blog* or CD-ROM or "cell* phone*" or cellphone* or "chat room*" or chatroom* or cyber* or DVD or eHealth or e-health or "electronic health" or e-Portal or ePortal or ePsych* or e-Psych* or eTherap* or e-therap* or "electronic forum*" or gaming or "information technolog*" or "instant messag*" or ipad or i-pad or iphone or i-phone or ipod or i-pod or podcast or "smart phone" or smartphone or "social network* site*" or "social networking" or mHealth or m-health or multi-media or multimedia or "personal digital assistant" or PDA or SMS or smartwatch* or "smart watch*" or "social medi*" or telehealth* or tele-health* or telemed* or tele-med* or telemonitor* or tele-monitor* or telepsych* or tele-psych* or teletherap* or tele-therap* or texting):ti,ab,kw 27793

#150 (internet or technolog* or tele* or web):ti,kw or ((computer or e-mail* or email* or messaging or internet* or mobile or online* or on-line or software or technolog* or telecomm* or tele-comm* or "text messag*" or virtual* or web or WWW) near/3 (assist* or based or deliver* or intervention? or pilot or platform? or program* or project? or strateg* or study or support* or system? or technolog* or therap* or train* or trial)):ti,ab,kw 32308

#151 (gaming or gamification or "wearable device?" or wearables or videogame or "video game" or videoconferenc* or "video conferenc*"):ti,ab,kw 3342

#152 (synchronous or asynchronous or (electronic near/2 deliver*) or eLearning or e-learning or "blended learning"):ti,ab,kw 2642

#153 (screentime or "screen time"):ti,ab,kw 477

#154 ("self care" and (computers or internet or software)):kw 967

#155 #143 OR #144 OR #145 OR #146 OR #147 OR #148 OR #149 OR #150 OR #151 OR #152 OR #153 OR #154 60834

#156 #100 OR #109 OR #117 OR #130 OR #133 OR #138 OR #142 OR #155 255258

#157 MeSH descriptor: [Child] explode all trees 58448

#158 (child* or adolescen*):ti,ab,kw 260114

#159 (teenage* or “young people” or “young person” or (young next adult*)):ti,ab,kw 91369

#160 (schoolchildren or “school children”):ti,ab,kw 12811

#161 (pediatr* or paediatr*):ti,ab,kw 37240

#162 (boys or girls or youth or youths):ti,ab,kw 17734

#163 MeSH descriptor: [Adolescent] this term only 106993

#164 (#157 OR #158 OR #159 OR #160 OR #161 OR #162 OR #163) 318126

#165 ((#8 OR #88) AND #156 AND #164) 7331

#166 #165 NOT #83 1281

****

2.5 Pragmatic search for grey literature (theses – all years)

ProQuest Dissertations and Theses Global (www.proquest.com/pqdtglobal/dissertations/)

Date of search: 24 February 2022

[*Title*]ti((((randomised or randomized or "randomly allocated" or "randomly assigned" or "random assignment" or RCT or cRCT) AND (adolescent or adolescents or boys or girls or child or children or schoolchildren or childhood or parents or guardians or parental) AND (((obesity or overweight) and (prevent or preventing or prevention or promote or promotion or promoting)) or "weight management" or “weight gain” or “weight loss” or "physical activity" or "physical activities" or ((dietary or lifestyle) and (behaviours or behaviors or behavioural or behavioral or changes or intervention))) AND (cluster or cRCT or school or schools or schoolchildren or classroom or classrooms)))) OR
[*Abstract*] ab((((randomised or randomized or "randomly allocated" or "randomly assigned" or "random assignment" or RCT or cRCT) AND (adolescent or adolescents or boys or girls or child or children or schoolchildren or childhood or parents or guardians or parental) AND (((obesity or overweight) and (prevent or preventing or prevention or promote or promotion or promoting)) or "weight management" or “weight gain” or “weight loss” or "physical activity" or "physical activities" or ((dietary or lifestyle) and (behaviours or behaviors or behavioural or behavioral or changes or intervention))) AND (cluster or cRCT or school or schools or schoolchildren or classroom or classrooms)))) (214)

Electronic Theses Online Service (EThOS) - British Library (ethos.bl.uk/Home.do)

Date of search: 11 March 2022

Search terms (OR):

obesity and prevention and randomised (50)

obesity and prevention and randomized (14)

obesity and school(s) and randomised (18)

obesity and school(s) and randomized (9)

adiposity and randomised and children (9)

adiposity and randomized and children (4)

adiposity and randomised and school(s) (4)

adiposity and randomized and school(s) (0)

BMI and randomised and children (25)

BMI and randomized and children (11)

BMI and randomised and school(s) (13)

BMI and randomized and school(s) (7)

BMI and z-score and randomised (9)

BMI and z-score and randomized (3)

weight and randomised and children (50)

weight and randomized and children (25)

weight and randomised and school(s) (32)

weight and randomized and school(s) (24)

school-based and randomised (151)

school-based and randomized (159)

healthy and children and randomised (49)

healthy and children and randomized (17)

25 theses selected for screening (16 duplicates with PQDT)

9 new records to screen

DART - Europe e-theses Portal (https://www.dart-europe.org/basic-search.php)

Date of search: 31 March 2022

Search terms (OR):

obesity and prevention and children and randomised (7) (4 selected)

obesity and prevention and children and randomized (11) (4 selected)

obesity and prevention and adolescents and randomised (2) (2 duplicates)

obesity and prevention and adolescents and randomized (8) (4 selected, all duplicates)

obesity and randomised and schools (6) (3 selected; 2 duplicates)

obesity and randomized and schools (11) (5 selected; 3 duplicates)

adiposity and randomised and children (5) (4 selected; 2 duplicates)

adiposity and randomized and children (0 selected)

adiposity and randomised and adolescents (2) (1 selected)

adiposity and randomized and adolescents (3) (0 selected)

adiposity and randomised and schools (2) (2 selected, both duplicates)

adiposity and randomized and schools (0)

BMI and randomised and children (18) (3 selected, 2 duplicates)

BMI and randomized and children (23) (2 selected, both duplicates)

BMI and randomised and adolescents (10) (2 selected, all duplicates)

BMI and randomized and adolescents (15) (3 selected, 2 duplicates)

BMI and randomised and school(s) (5) (4 selected, all duplicates)

BMI and randomized and school(s) (11) (4 selected, all duplicates)

BMI and z-score and randomised and children (9) (2 selected, both duplicates)

BMI and z-score and randomised and adolescents (7) (2 selected, both duplicates)

BMI and z-score and randomized and children (15) (1 selected, 1 duplicates)

BMI and z-score and randomized and adolescents (12) (3 selected, all duplicates)

weight and randomised and children (46) (4 selected, 3 duplicates)

weight and randomized and children (71) (4 selected, 3 duplicates)

weight and randomised and adolescents (13) (1 duplicate)

weight and randomized and adolescents (24) (2 selected, both duplicates)

school-based and randomised (52) (4 selected, 2 duplicates)

school-based and randomized (81) (5 selected, 2 duplicates)

healthy and children and randomised (41) (5 selected, 4 duplicates)

healthy and children and randomized (82) (2 selected)

healthy and adolescents and randomised (12) (2 selected, 2 duplicate)

healthy and adolescents and randomized (27) (1 selected, 1 duplicate)

healthy and schools and randomised (12) (3 selected, 3 duplicates)

healthy and schools and randomized (10) (2 selected, both duplicates)

n=25 theses selected for screening

5 duplicates with PQDT and BL eTHOS

20 to screen

[Note. Several theses have also been retrieved from databases which index this type of literature, e.g. PsycINFO, Australian Education Index (AEI)]

****

2.6 Search for retractions/errata

Date of search: 6 April 2022

Ovid multifile search

APA PsycInfo <1806 to April Week 1 2022>

Embase <1974 to 2022 April 06>

Ovid MEDLINE(R) ALL <1946 to April 06, 2022>

1 exp overweight/ or exp body weight changes/ or body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ or body mass index/ or adiposity/ 1789517

2 1 use medall 539949

3 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ or *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ or *body mass/ or *waist to height ratio/ or *waist hip ratio/ 573049

4 3 use oemezd 340024

5 exp overweight/ or weight control/ or weight loss/ or weight gain/ 1035600

6 5 use psyh 35168

7 (2 or 4 or 6) 915141

8 (obes* or adipos* or weight gain or weight loss or overweight or over weight or overeat* or over eat* or weight change*).mp. 1737633

9 ((bmi? or body mass index) adj2 (alter* or assess* or calculat* or change? or changing or differ* or gain or increas* or decreas* or loss or reduc* or post-intervention* or postintervention* or follow* up* or followup*)).mp. 107069

10 (BMIz or BMI-z* or zBMI* or z-BMI*).mp. 14358

11 (BMI* adj2 (z-scor* or zscor*)).mp. 13076

12 or/7-11 2010782

13 exp child/ or preschool child/ or school child/ or adolescent/ 6930323

14 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or young people or young person? or schoolchild* or youth or youths).tw. 5491742

15 (school? adj (based or setting student?)).tw. 53821

16 or/13-15 9153070

17 (12 and 16) 376094

18 exp randomized controlled trial/ 1271931

19 randomized controlled trial.pt. 563745

20 Randomization/ or Random Allocation/ 200537

21 (randomi#ed or randomi#ation or randomi#ing).mp. 2512633

22 (RCT or cRCT).tw. 80040

23 "at random".ab. 31601

24 (random* adj3 (administ* or allocat* or assign* or class* or cluster or crossover or cross-over or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or pragmatic or quasi or recruit* or selected or split or subsitut* or treat*)).tw. 1799071

25 ((single or double or triple or treble) adj2 (blind* or mask* or dummy)).mp. 632841

26 trial.ti. 650175

27 (prevention adj (study or trial)).tw. 16015

28 (intervention and trial).tw. 321931

29 program.ti. and trial.tw. 24533

30 ((intervention or program) and control* and (group? or school? or communit*)).tw. 500989

31 ((intervention or program) adj5 (control* or group? or study or trial)).tw. 481711

32 controlled clinical trial.mp. 604659

33 or/18-32 4070222

34 (17 and 33) 46661

35 (retracted publication or "retraction of publication").pt. 21796

36 Tombstone.pt. 3894

37 Retracted article/ 11134

38 (retracted or retraction).ti. 29282

39 (35 or 36 or 37 or 38) 51319

40 (17 and 39) 88

41 remove duplicates from 40 74

42 erratum.pt. 250070

43 published erratum.pt. 113022

44 (erratum or errata).ti. 209724

45 (42 or 43 or 44) 379603

46 (34 and 45) 59

47 remove duplicates from 46 48

48 (47 not 41) 45

****

2.7 Search updates (Automated Searches; October 2022)

September 2021 onwards

Cochrane Library

Search name: Obesity-Living-Systematic-Review-1

#1 MeSH descriptor: [Obesity] explode all trees

#2 MeSH descriptor: [Body Weight Changes] explode all trees

#3 "body mass index":kw

#4 (obes* or adiposity):ti,ab,kw

#5 (“weight gain” or “weight loss” or (weight next change*) or (weight next fluctuat*)):ti,ab,kw

#6 (overweight or "over weight" or overeat* or (over next eat*) or overnutrition or "over nutrition"):ti,ab,kw

#7 ((fat or weight) near/3 (goal* or outcome*)):ti,ab,kw

#8 ((bmi or "body mass index") near/3 (assess* or calculat* or change* or changing or differ* or gain* or increas* or decreas* or reduc* or post-intervention* or (follow* next up*) or followup* or loss or outcome*)):ti,ab,kw

#9 (BMIz or BMI-z or zBMI or z-BMI or (BMI* near/2 (z-scor* or zscor*))):ti,ab

#10 ((waist near/2 height near/2 ratio*) or (waist near/2 hip* near/2 ratio*)):ti,ab,kw

#11 "weight control":ti,ab,kw

#12 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11)

#13 MeSH descriptor: [Child] this term only

#14 MeSH descriptor: [Child, Preschool] this term only

#15 MeSH descriptor: [Adolescent] this term only

#16 (child* or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or "young people" or (young next person*) or schoolchild* or (school next child*) or youth or youths):ti,ab,kw

#17 (school* next (based or setting or student*)):ti,ab,kw

#18 (#13 OR #14 OR #15 OR #16 OR #17)

#19 (#12 and #18)

Ovid multi-file search

APA PsycInfo <1806 to April Week 3 2022>

Embase <1974 to 2022 April 25>

Ovid MEDLINE(R) ALL <1946 to April 25, 2022>

1 exp overweight/ or exp body weight changes/ or body weight/ or ideal body weight/ or waist-height ratio/ or waist-hip ratio/ or body mass index/ or adiposity/

2 1 use medall

3 *overnutrition/ or exp *obesity/ or childhood obesity/ or adolescent obesity/ or *body weight/ or *body weight change/ or *body weight loss/ or *body weight control/ or *body weight fluctuation/ or *body weight gain/ or *ideal body weight/ or *body mass/ or *waist to height ratio/ or *waist hip ratio/

4 3 use oemezd

5 exp overweight/ or weight control/ or weight loss/ or weight gain/

6 5 use psyh

7 (2 or 4 or 6)

8 (obes* or adipos* or weight gain or weight loss or overweight or over weight or overeat* or over eat* or weight change*).mp.

9 ((bmi? or body mass index) adj2 (alter* or assess* or calculat* or change? or changing or differ* or gain or increas* or decreas* or loss or reduc* or post-intervention* or postintervention* or follow* up* or followup*)).mp.

10 (BMIz or BMI-z* or zBMI* or z-BMI*).mp.

11 (BMI* adj2 (z-scor* or zscor*)).mp.

12 or/7-11

13 exp child/ or preschool child/ or school child/ or adolescent/

14 (child or children or childhood or adolescen* or pediatr* or paediatr* or boy or boyhood or boys or girl or girlhood or girls or youth or youths or teen* or young people or young person? or schoolchild* or youth or youths).tw.

15 (school? adj (based or setting student?)).tw.

16 or/13-15

17 (12 and 16)

18 exp randomized controlled trial/

19 randomized controlled trial.pt.

20 Randomization/ or Random Allocation/

21 (randomi#ed or randomi#ation or randomi#ing).mp.

22 (RCT or cRCT).tw.

23 "at random".ab.

24 (random* adj3 (administ* or allocat* or assign* or class* or cluster or crossover or cross-over or control* or determine* or divide* or division or distribut* or expose* or fashion or number* or place* or pragmatic or quasi or recruit* or selected or split or subsitut* or treat*)).tw.

25 ((single or double or triple or treble) adj2 (blind* or mask* or dummy)).mp.

26 trial.ti.

27 (prevention adj (study or trial)).tw.

28 (intervention and trial).tw.

29 program.ti. and trial.tw.

30 ((intervention or program) and control* and (group? or school? or communit*)).tw.

31 ((intervention or program) adj5 (control* or group? or study or trial)).tw.

32 controlled clinical trial.mp.

33 or/18-32

34 (17 and 33)

35 remove duplicates from 34

****

Appendix 3. Extracted data

Appendix 2: Information extracted from study reports

We collected the following data from study reports.

- Methods: study design (including number of clusters in cluster-RCTs); total duration of study; details of any 'run in' period; number of study centres and location; study setting; date of study.
- Participants: numbers randomised, lost to follow-up/withdrawn and analysed; age (mean and range); sex; exclusion criteria.
- Baseline zBMI, BMI and/or BMI percentile.
  - For studies that did not report any of these measurements, we instead collected data on the prevalence of overweight/obesity at baseline (if available).
- Interventions: description of experimental and comparator interventions, such as type of intervention, duration of intervention, setting, theory behind the intervention, unit of intervention (who is targeted), who delivers the intervention.
- Outcomes: zBMI (mean and SD); BMI (mean and SD); BMI percentile (mean and SD); numbers of reported serious adverse events. For studies that did not report one of the three primary outcomes, we instead collected the prevalence of overweight/obesity at the follow-up time (if available).
  - Time points: as described under 'Types of outcome measures' in the Methods section.
  - Measurement: we recorded whether BMI and zBMI were self-reported (by parent or child) or measured by researchers.
  - Effect estimates (contrast-level data): we collected contrast-level data on BMI, zBMI and BMI percentile according to these preferences:
    - post-intervention difference in means adjusted for baseline zBMI/BMI/BMI percentile from analysis of covariance; in preference to
    - difference in mean change from baseline; in preference to
    - post-intervention difference in means (unadjusted).
  - Follow-up measurements (arm-level data): we collected arm-level data on BMI, zBMI and BMI percentile according to these preferences:
    - post-intervention means adjusted for baseline BMI/zBMI/percentile; in preference to
    - change from baseline means (change scores); in preference to
    - post-intervention means (unadjusted).
  - Effect estimates from cluster-RCTs: we collected BMI, zBMI and BMI percentile results that were adjusted for clustering in preference to results that are not adjusted for clustering.
- PROGRESS factors.
- Information about the costs of interventions (e.g. resources associated with the trial or the intervention or referenced a linked economic evaluation), for the purposes of secondary analysis by healthcare policymakers (we did not analyse costs in this review, but we have reported this information in a table).
- Notes: funding for trial, and notable conflicts of interest of trial authors.

Appendix 4. Statistical details

4.1 Details of statistical methods

4.1.1 Selecting outcome data

We aimed to combine data on mean differences between groups in change-from-baseline measures (of zBMI/BMI/percentile). Since most studies reported arm-level data rather than contrast-level data and because many contrast-level estimates came from models that were either not fully explained or involved a high level of covariate adjustment, we decided to prioritise arm-level data where available. Arm-level data were prioritised as follows: (i) follow-up means adjusted for baseline values, (ii) mean change from baseline (change scores), (iii) unadjusted baseline and follow-up means, (iv) unadjusted follow-up means without baseline data. In the absence of arm-level data, we collected contrast-level data if they could be interpreted as a measure of mean difference in change from baseline.

4.1.2 Calculation of mean differences from arm-level data

For options (i), (ii) and (iv) above, we calculate the mean difference (MD) and its standard error (SE) in the same way. We label the arm-level means as m_X, standard deviations (SDs) as s_X, and participant numbers (at follow up) as n_X where $X \in (A, B)$ represents the two intervention groups. The MD and SE are then calculated as follows:

$MD = m_A - m_B$

$SE = \sqrt{(s_A^2/n_A + s_B^2/n_B)}$.

For option (iii), we label the baseline variables with the subscript 0 and follow-up variables with the subscript 1. The MD and SE are then:

$MD = (m_{A1} - m_{A0}) - (m_{B1} - m_{B0})$

$SE = \sqrt{(s_{A0}^2/n_{A0} + s_{A1}^2/n_{A1} + s_{B0}^2/n_{B0} + s_{B1}^2/n_{B1} - 2\rho(s_{A0}s_{A1}/\sqrt{(n_{A0}n_{A1})} + s_{B0}s_{B1}/\sqrt{(n_{B0}n_{B1})}))}$,

where ρ is the correlation coefficient between baseline and follow-up measurements, given by:

$\rho = (s_0^2 + s_1^2 - s_{CS}^2)/2s_0s_1$,

where s_{CS} is the standard deviation on the change score (CS). Based on our analysis of similar studies (Spiga 2024), we imputed a value of ρ=0.95.

4.1.3 Cluster adjustment

The majority of studies were cluster-randomised. For each result, we assessed whether the authors had adjusted for clustering in their reported precision. For those that had not, we accounted for the effect of clustering by adjusting the standard error on the mean difference via:

$SE' = SE\sqrt{(1 + \text{ICC}(c-1))}$,

where SE' is the adjusted standard error, c is the mean cluster size (= number of participants divided by the number of clusters), and ICC is the intra-cluster correlation coefficient. We discuss choices for the value of ICC in Section 4.1.3.1. We decided not to adjust for clustering at the family level as the cluster sizes were very small.

4.1.3.1 Intra-cluster correlation coefficient

Most studies that required cluster adjustment did not report the relevant ICC. For these studies we used ICC = 0.02, a value imputed based on our previous analysis of similar studies (Spiga 2024). This value was consistent with the median ICC reported in trials in this data set (also equal to 0.02).

Some studies assumed an ICC value in their sample size calculations. These values were usually based on external evidence. The median across all the assumed ICCs was 0.04. In line with this result and our previous analysis of similar studies (Spiga 2024), we performed a sensitivity analysis using ICC = 0.04 and with ICC = 0 (i.e. no cluster adjustment).

4.2 Data extraction and imputation

4.2.1 General methods

4.2.1.1 Combining results from subgroups

Eighteen studies reported data on the subgroup level only. Usually this meant the results were stratified by sex. To use these results in the meta-analysis, we had to combine the subgroup results. We label the mean, standard deviation and number of participants in each subgroup as m_i, s_i and n_i where the subscript $i \in (a, b)$ labels subgroups a and b. The mean and standard deviation of the combined subgroups are calculated via Higgins 2019b:

$m_{a+b} = (n_a m_a + n_b m_b)/(n_a + n_b)$,
$s_{a+b}^2 = ((n_a-1)s_a^2 + (n_b-1)s_b^2)/(n_a+n_b-1) + ((n_a n_b/(n_a+n_b))(m_a 2 + m_b^2 - 2m_a m_b)/(n_a+n_b-1)$.

For results with more than two subgroups, these equations can be applied sequentially.

4.2.1.2 Multiple follow-up times

Follow-up times were categorised into three groups: (i) short-term (3 to < 9 months), (ii) medium-term (9 to < 15 months), (iii) long-term (> 15 months). For any studies that reported more than one follow-up time within categories (i) and (ii), we chose the time point that was closest to the mid-point of the interval (6 and 12 months respectively). For studies that reported more than one long-term time point, we chose the longest follow-up time.

4.2.1.3 Estimating zBMI from proportions of overweight/with obesity

In some studies, the only outcome data available were the proportion of participants classified as overweight or with obesity. Since definitions of overweight/obesity are based on zBMI or equivalent percentile cut-offs, we used these data to estimate zBMI means. The Centers for Disease Control and Prevention (CDC) charts define a child as being overweight if their BMI exceeds the 85th percentile for their

age and sex and define obesity as a BMI greater than or equal to the 95th percentile. The World Health Organization (WHO) classifies an overweight child as one whose zBMI exceeds 1 and obesity is defined as zBMI > 2. We can convert between zBMI and percentile cut-offs using the standard normal cumulative distribution:

$p_c = \Phi(z_c)$,
$z_c = \Phi^{-1}(p_c)$,

where z_c is the zBMI cut-off for overweight and obesity, p_c is the equivalent percentile cut-off and $\Phi(z) = Pr(Z \leq z)$ is the cumulative distribution function (CDF) of a variable z with a standard normal distribution. For each study we used the zBMI or percentile cut off reported by the growth chart or classification index used to define overweight/obesity in that study. In the following we will use η_c to represent the proportion of participants whose zBMI exceeds the threshold z_c

For a normally distributed variable X = μ + Zσ with mean μ and standard deviation σ the CDF is:

$Pr(X \leq x) = Pr(\mu + Z\sigma \leq x) = \Phi((x-\mu)/\sigma)$.

Furthermore, from the CDF we can write:

$Pr(Z > z) = 1 - \Phi(z)$.

Therefore, to estimate mean zBMI from the proportion of participants classified as overweight or with obesity, we assume that zBMI sampled within a trial follows a (non-standard) normal distribution, $X \sim N(\mu_z, \sigma_z^2)$, with mean μ_z and standard deviation σ_z. The probability that a sampled value of zBMI exceeds the zBMI cut off for overweight and obesity is then

$Pr(X > z_c) = Pr(Z > (z_c-\mu_z)/\sigma_z) = 1 - \Phi((z_c-\mu_z)/\sigma_z)$,

where $Z \sim N(0,1)$ represents a standard normal random variable. The proportion of participants, η_c, with zBMI greater than z_c is an estimate of the probability $Pr(X > z_c)$. Therefore, inserting this estimate into the above equation gives:

$\eta_c = 1 - \Phi((z_c-\mu_z)/\sigma_z)$,
$(z_c-\mu_z)/\sigma_z = \Phi^{-1}(1-\eta_c)$.

By definition, the population standard deviation of zBMI is equal to 1. Therefore, in order to estimate μ_z, we assume that the sample standard deviation is equal to the population standard deviation. Inserting $\sigma_z=1$ into the above equation gives:

$\mu_z \approx z_c - \Phi^{-1}(1-\eta_c)$.

This is the equation we used to convert overweight/obesity proportions into estimates of mean zBMI. If the study reported the proportions of participants that were classified as overweight and with obesity separately, then these values were summed to give the value of η_c. If the study only reported the prevalence of obesity, then we used this as η_c and replaced z_c with the zBMI cut off for obesity.

Because of the strong assumptions involved in this method (of normality with known standard deviations), to avoid unstable estimates of proportions we chose a threshold of 100 participants per arm for implementing transformations of proportions to means. Therefore, we omit from the meta-analysis any study that reports proportions of overweight/obesity as their only outcome and has fewer than 100 participants per arm at any time point.

4.2.1.4 Missing follow-up SDs and participant numbers

For any study that did not report standard deviations or any other measure of precision on their follow-up means, we set the follow-up SDs equal to the baseline SDs in each group. From inspection of other studies in the data set in which both baseline and follow-up precisions were reported, this was deemed a reasonable assumption as these values tended to be very similar.

In a similar vein, for any study that did not explicitly report the number of participants at follow-up or the number of dropouts during the study, we assumed that the number of participants at follow-up was equal to the number at baseline.

4.2.1.5 Missing precisions

For any study that reported no measure of precision on any of their zBMI means, we assumed a standard deviation of 1 (equal to the standard deviation of the population). This assumption was supported from inspection of studies that did report precision on zBMI as these SDs were approximately equal to 1.

To impute missing precisions on BMI percentiles, we performed a simulation. We sampled 10^4 zBMI values from a standard normal distribution (mean = 0, SD = 1) and converted each value to a percentile using the CDF of the standard normal, $p = \Phi(z)$. The standard

deviation of these percentiles was 28.9. This was similar to the median of percentile SDs in the rest of the data set (27.3). We therefore used 28.9 as our imputed SD for arm level percentile means.

For BMI studies with missing precisions, we imputed values from SDs reported in the rest of the data set. The median of SDs on arm level BMI means was 3.3. We observed little difference in SD at baseline compared to follow-up.

For missing precisions on change scores for all outcomes we assumed equal baseline and follow-up SDs (equal to the imputed arm level SDs) and a correlation coefficient of 0.95, and calculated:

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

4.2.1.6 Reading values from graphs

When studies only reported outcomes in the form of a graph we used the Engauge Digitizer 4.1 software (Mitchell 2020) to extract the plotted values.

4.2.2 Notes on specific trials

4.2.2.1 Adab 2018

Participants in this study were recruited in two waves (group 1 and group 2). Three long term follow-up values are reported. The longest follow-up includes only participants in the first group (group 1) and thus has only half the number of participants compared with the other two follow-up times. Therefore, we chose to use the second-longest follow-up.

4.2.2.2 Annesi 2016

This study is missing a measure of precision on baseline and follow-up percentile means. We imputed arm level percentile SDs using the methods described in Section 4.2.1.5.

4.2.2.3 Annesi 2017

This study is missing precision on follow-up means. We assumed SD at follow-up was equal to SD at baseline.

4.2.2.4 Coleman 2012

We imputed mean zBMI from the proportion of participants with obesity at baseline and follow-up using the methods described in Section 4.2.1.3.

This study includes two follow-up times but does not report group-specific participant numbers at the first follow-up. At baseline and the second follow-up, we calculate the ratio of the number of participants in each group relative to the total. We take the average of each ratio across the baseline and second follow-up. We assume the ratio of participants in each group relative to the total at the first follow-up is equal to the average ratio at the other times. We use this ratio and the total number of participants at the first follow-up to impute the group-specific values.

4.2.2.5 Cunha 2013

This study reports a time by interaction coefficient from a mixed model based on three time points: 0, 6 and 9 months. We converted the coefficient to a mean difference by multiplying by the longest time period (nine months).

The coefficient is reported alongside a P value. We converted this to a standard error using a two-tailed t-test (Higgins 2019b). We multiplied this value by nine months to convert it to the correct scale.

4.2.2.6 De Heer 2011

This study reports change scores with P values. We imputed SEs on the change scores using the P values and assuming a 2-tailed t-test (Higgins 2019b).

4.2.2.7 De Ruyter 2012

This study includes baseline measurements and three follow-up times: 6, 12 and 18 months. Measurements at all four time points are plotted on a graph. A change score is reported for the 18-month follow-up. We read the baseline, 6- and 12-month values (means and SEs) off the graph using the Engauge Digitizer software (Mitchell 2020).

4.2.2.8 Fulkerson 2010

This study is missing a measure precision on zBMI and percentiles. We imputed the SDs on arm-level means using the methods described in Section 4.2.1.5.

4.2.2.9 Greve 2015

This study takes place over three school years from 2009 to 2012. The number of participants in each grade (0, 1, 5, 9) in each school year (2009/10, 2010/11, 2011/12) are reported. The total number across the grades and across all school grades is also provided. The estimated coefficient uses all of this data. To calculate the total number of participants that contribute to the analysis we must not double count participants; students in grade 1 in the second year will have been in grade 0 in the first year and students in grade 1 in the third year will have been in grade 0 in the second year. Therefore, we subtracted the number of participants in grade 1 at year 2 and year 3 from the total number provided.

4.2.2.10 Ha 2021

This study is missing a measure of precision on BMI at all time points. We imputed SD on arm level BMI means using the method described in Section 4.2.1.5.

4.2.2.11 Han 2006

We imputed mean zBMI from the proportion of overweight and obese participants at baseline and follow-up using the methods described in Section 4.2.1.3. We could not identify what reference was used to define overweight and obesity in this study. Since the study is set in China, we used the definition provided by the Working Group for Obesity in China (WGOC) (Li 2008).

4.2.2.12 Hendy 2011

BMI percentile is plotted in figures at two follow-up times (three and nine months). Baseline percentile is only shown in the three-month figure. We read baseline and three-month follow-up values off the figure using the Engauge Digitizer software (Mitchell 2020). We excluded the nine-month figure as it is not shown with respect to a relevant baseline.

We imputed SDs on the arm level percentile means using the methods described in Section 4.2.1.5.

4.2.2.13 Hopper 2005

This study is missing a measure of precision on BMI at all time points. We imputed SD on arm level BMI means using the method described in Section 4.2.1.5.

4.2.2.14 Howe 2011

Results are presented for subgroups of 'attenders' and 'non-attenders'. In line with an intention-to-treat analysis, we combined results from the different subgroups using the methods outlined in Section 4.2.1.1.

4.2.2.15 Hull 2018

The study reports intervention effects at two follow-up times reported as the difference in 'growth rate' between the intervention and control groups. Growth rate is described in the paper as the 'outcome variable divided by the number of months between baseline and follow up'. Therefore, we multiplied each intervention effect and its SE by the number of follow-up months.

4.2.2.16 Ickovics 2019

This study presents results on a factorial level (diet vs no diet and activity vs no activity) and on a non-factorial level (diet vs activity vs diet and activity vs control). We chose to use the non-factorial results as this informs more comparisons.

Change scores are reported without a measure of precision, but they do report precision on baseline means. Therefore, we impute the SD on the change score using:

$$s_{cs} = s_0\sqrt{2(1 - \rho)}$$

assuming a correlation coefficient of 0.95 and that follow-up SDs are equal to baseline SDs.

4.2.2.17 Jansen 2011

We combined results from the different subgroups (grades) using the methods outlined in Section 4.2.1.1.

4.2.2.18 Jones 2015

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.19 Kain 2014

We combined BMI results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

zBMI results are presented per cluster. We take the weighted mean of these values with weights equal to the participant number in each cluster. We calculate the variance on these means as the sum of the between-cluster variance and the within-cluster variance. The between-

cluster variance is the square of the standard deviation across the cluster means (with no weighting). The within-cluster variance is the pooled SD:

$SD_W = \sqrt{(\sum_{i=1}^{N}(n_i - 1)s_i^2)/(\sum_{i=1}^{N}(n_i - 1))}$

where i labels each cluster, n_i is the number of participants in cluster i and s_i is the SD in cluster. We calculate the intra-cluster correlation coefficient as the between-cluster variance divided by the sum of the between-cluster variance and within-cluster variance. We then adjust the variance on each group mean using the ICC and mean cluster size.

4.2.2.20 Keller 2009

Here results are presented for two groups: those who wanted to participate (active) and those who did not (observed). Results for the observed group at follow-up are stratified by boys and girls.

We combined the follow-up means for the observed group in the two subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

In line with an intention-to-treat analysis, we combined results from the different subgroups (active and observed) using the methods outlined in Section 4.2.1.1.

4.2.2.21 Kobel 2017

This study reports the total number of participants per group at baseline and the total number of missing values per time point. That is, we do not know the number missing per group at each time point. We assumed the ratio of number missing in group A to number missing in group B is the same as the ratio of the total number in group A to the total number in group B at baseline. We then used the imputed missing values to calculate the number in each group at the follow-up times.

4.2.2.22 Lazaar 2007

Here, results are stratified by sex, but they do not report the number of participants per subgroup (boys and girls) in the two intervention groups. The study reports the number of boys and girls in the overall population. We assumed the ratio of boys to girls in each intervention arm is the same as the ratio of boys to girls in the total population.

We then combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.23 Levy 2012

We imputed mean zBMI at baseline and follow-up from the proportion of participants that were classified as overweight or with obesity using the methods described in Section 4.2.1.3.

We then combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.24 Marcus 2009

We imputed the missing SD on zBMI change scores using the methods described in Section 4.2.1.5.

4.2.2.25 Martinez-Vizcaino 2014

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.26 Martinez-Vizcaino 2020

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.27 Martinez-Vizcaino 2022

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.28 Nyberg 2015

This study reports a change score at short-term follow-up without a precision. We assume the follow-up SD is the same as the baseline SD (reported in the study) and a correlation coefficient of 0.95 to calculate:

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

We imputed mean zBMI at the second follow-up (medium-term) from the proportion of participants that were classified as overweight or with obesity at baseline and follow-up using the methods described in Section 4.2.1.3.

4.2.2.29 Pena 2021

This study does not report the group-specific participant numbers at follow-up. We used the group-specific participant numbers at baseline and the total number at follow-up to impute these values. We assumed that the rate of reduction in each group is the same and equal to the rate of reduction in the total population.

4.2.2.30 Rerksuppaphol 2017

We imputed the missing SD on BMI change score using the methods described in Section 4.2.1.5.

4.2.2.31 Robinson 2010

This study reports a 'change per year' from a regression analysis including baseline and four follow-up measurements: 6, 12, 18 and 24 months. We converted the change per year measurement to a mean difference by multiplying by 2 years (the maximum follow-up time).

4.2.2.32 Rush 2012

We combined results from the different subgroups (age categories) using the methods outlined in Section 4.2.1.1.

4.2.2.33 Senguin-Fawler 2021

We imputed SE on the mean difference from the reported P value using a two-tailed t-test (Higgins 2019b).

4.2.2.34 Sekhavat 2014

We combined results from the different subgroups (age categories and sex) using the methods outlined in Section 4.2.1.1.

4.2.2.35 Sgambato 2019

This study reports change scores without a measure of precision but reports a P value for a group by time interaction effect (without quoting the effect itself). We calculated the mean difference from the reported change scores and imputed a SE from the P value assuming a z-test (Higgins 2019b).

4.2.2.36 Simon 2008

BMI results at medium term follow-up are reported for non-overweight participants and participants without obesity only. Participant numbers for this subgroup are not reported at follow-up. We assumed the ratio of dropout in each group in the non-overweight/obese subset was equal to the ratio of dropout rate per group in the total population.

In this study, precision on baseline means at BMI medium-term are not adjusted for clustering, but precision at follow-up is adjusted for clustering. We converted the adjusted SEs to effective standard deviations and assumed that SD at baseline was equal to SD at follow-up. We then treated the resulting SEs from the analysis as adjusted.

4.2.2.37 Spiegel 2006

We imputed mean zBMI at baseline and follow-up from the proportion of participants that were classified as overweight and with obesity using the methods described in 4.2.1.3.

4.2.2.38 Tanskey 2017

This study reports regression coefficients described in the study as being the mean change in outcome (BMI or zBMI) in the intervention group relative to control 'expressed on a per month basis'. The final follow-up time is approximately one year, so we multiplied the coefficients and their SEs by 12 months to calculate MDs and SEs.

This is a multi-arm study without complete arm-level data. Therefore, we need to impute the covariance between the different arms of the study, which is equal to variance on the change score in the reference (control) arm. We converted each variance on MD to a variance on CS in the reference arm by assuming the standard deviation in all the arms are equal. We used the fact that the variance on the mean difference is a sum of the variances on change score in the two arms. Writing the variances in terms of standard deviations, and participant numbers, in each arm gives:

$$SE^2_{MD} = (s_A^2/n_A)+(s_B^2/n_B)$$

Then we assumed the standard deviations in the different arms are equal, $s_A = s_B$, and rearranged for s_B. Finally, we converted the standard deviation on the reference arm to a variance using the standard relation, $Var_B = SE^2_B = s^2_B/n_B$. We computed this for each of the arms in the trial and averaged the result.

4.2.2.39 Telford 2012

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

We then imputed the missing SD on BMI using the method described in 4.2.1.5.

4.2.2.40 Topham 2021

This study reports a coefficient for the 'intervention condition' from a random intercept model on 'BMI log transformed for skew'. The study also reports a coefficient of change (per year) in the control group on log transformed BMI. We assume that the coefficient for the intervention condition is equal to the difference between the coefficient of change in the intervention and control groups. We use this to impute the coefficient of change in the intervention group. We then convert the coefficients of change per year in each group to change scores by multiplying by 3.3 years (the maximum follow-up time).

We follow Method 3 of Higgins 2008 to convert the effect estimate to the linear scale. In this method we calculate the geometric mean using our imputed change scores as the means of the log-transformed values. The difference in means on the logarithmic scale (and its SE) is the coefficient for the intervention condition (and its SE) multiplied by the time difference (3.3 years). The effect estimate on the linear scale is then the difference in means on the logarithmic scale multiplied by the geometric mean. Similarly, the SE on the linear scale is the SE on the logarithmic scale multiplied by the geometric mean. We use this estimate as an imputed value of the mean difference and its SE.

This is a multi-arm study without complete arm level data. Therefore, we need to impute the covariance between the different arms of the study, which is equal to variance on the change score in the reference (control) arm. The study reports the SD on BMI at baseline in the control arm. We assume follow-up SD is equal to baseline SD and that the correlation coefficient is 0.95, such that we can calculate the standard deviation on the change score in the control arm using:

$s_{cs} = s_0\sqrt{2(1 - \rho)}$.

We then calculate the standard error on the change score by dividing the standard deviation by the square root of the sample size in the control arm. Finally, the variance in the reference arm (equal to the covariance between the intervention arms) is the square of the standard error.

4.2.2.41 Viggiano 2018

This study does not report standard deviations on baseline means. We imputed these by averaging the SDs reported at the two follow-up times.

4.2.2.42 Vizcaino 2008

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.43 Wang 2012

We imputed mean zBMI at baseline and follow-up from the proportion of participants that were classified as overweight and with obesity using the methods described in 4.2.1.3. We could not identify what reference was used to define overweight and obesity in this study. Since the study was set in China, we used the definition from the Working Group for Obesity in China (WGOC) (Li 2008).

4.2.2.44 Wendel 2016

This study reports data for intervention groups that:

- began with treatment and continued with treatment (TT);
- began with treatment and switched to control (TC);
- began with control and switched to treatment (CT);
- began with control and stayed on control (CC).

In line with an intention-to-treat analysis, we combined results from (i) TT and TC and (ii) CT and CC using the methods outlined in Section 4.2.1.1.

4.2.2.45 Williamson 2012

We combined results from the different subgroups (boys and girls) using the methods outlined in Section 4.2.1.1.

4.2.2.46 Xu 2017

Here, results are stratified by weight status: overweight/with obesity, normal weight and malnourished. We used the results for normal weight. However, the study does not report the number of participants in this subset. Instead, we have the total number of participants and the percentage with overweight/obesity. We assumed that the number of malnourished participants is small and took the number of normal weight participants to be equal to the number of participants without overweight or obesity.

Appendix 5. Supplementary data files for cluster adjustment

The following table lists all the cluster-randomised trials along with values of the original standard errors (using values reported in the trials) and standard errors that we subsequently adjusted for clustering. The table also includes the data used to calculate the adjusted errors.

Study	Outcome	Sample size	Number of clusters	Original SE	Is cluster adjustment required?	Mean cluster size	Reported ICC	ICC used in analysis	Cluster-adjusted SE
Adab 2018	zBMI long-term	1094	54	0.0281	Y	20.26	0.0051	0.0051	0.0294
Annesi 2016	BMI short-term	114	9	0.1255	Y	12.67	n/a	0.02	0.1394
Annesi 2016	BMI medium-term	114	9	0.1624	Y	12.67	n/a	0.02	0.1804
Annesi 2016	Percentile medium-term	114	9	1.7744	Y	12.67	n/a	0.02	1.9706
Annesi 2017	BMI short-term	141	9	0.0962	Y	15.67	n/a	0.02	0.1094
Annesi 2017	BMI medium-term	141	9	0.1603	Y	15.67	n/a	0.02	0.1823
Barnes 2015	zBMI short-term	48	40	0.0920	N	1.20	n/a	n/a	0.0920
Barnes 2021	zBMI medium-term	323	6	0.0404	Y	53.83	0.017	0.02	0.0579
Barnes 2021	zBMI medium-term	442	6	0.0383	Y	73.67	0.017	0.02	0.0600
Barnes 2021	zBMI medium-term	362	6	0.0393	Y	60.33	0.017	0.02	0.0581
Barnes 2021	BMI medium-term	323	6	0.1230	Y	53.83	0.017	0.02	0.1764
Barnes 2021	BMI medium-term	442	6	0.1156	Y	73.67	0.017	0.02	0.1811
Barnes 2021	BMI medium-term	362	6	0.1208	Y	60.33	0.017	0.02	0.1787
Brandstetter 2012	BMI long-term	945	32	0.0689	N	29.53	n/a	n/a	0.0689
Branscum 2013	Percentile short-term	70	12	2.0539	Y	5.83	n/a	0.02	2.1509
Breheny 2020	zBMI short-term	1643	40	0.0203	Y	41.08	0.005	0.005	0.0223
Breheny 2020		1670	40	0.0213	Y	41.75	0.001	0.001	0.0217
Caballero 2003	BMI long-term	1409	41	0.1658	N	34.37	n/a	n/a	0.1658
Cao 2015	zBMI medium-term	1706	14	0.0026	Y	121.86	n/a	0.02	0.0048

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Cao 2015	zBMI long-term	1813	14	0.0036	Y	129.50	n/a	0.02	0.0068
Choo 2020	zBMI short-term	104	8	0.0808	Y	13.00	n/a	0.02	0.0900
Clemes 2020	BMI short-term	166	8	0.1165	Y	20.75	n/a	0.02	0.1376
Coleman 2012	zBMI medium-term	480	8	0.0287	Y	60.00	n/a	0.02	0.0424
Coleman 2012	zBMI long-term	424	8	0.0317	Y	53.00	n/a	0.02	0.0453
Crespo 2012	zBMI medium-term	350	7	0.0370	Y	50.00	0.016	0.016	0.0494
Crespo 2012	zBMI medium-term	372	7	0.0370	Y	53.14	0.016	0.016	0.0501
Crespo 2012	zBMI medium-term	401	7	0.0345	Y	57.29	0.016	0.016	0.0475
Crespo 2012	zBMI long-term	217	7	0.0537	Y	31.00	0.016	0.016	0.0653
Crespo 2012	zBMI long-term	230	7	0.0487	Y	32.86	0.016	0.016	0.0599
Crespo 2012	zBMI long-term	262	7	0.0462	Y	37.43	0.016	0.016	0.0581
Crespo 2012	Percentile medium-term	350	7	0.9098	Y	50.00	0.016	0.016	1.2152
Crespo 2012	Percentile medium-term	372	7	0.8708	Y	53.14	0.016	0.016	1.1794
Crespo 2012	Percentile medium-term	401	7	0.8473	Y	57.29	0.016	0.016	1.1681
Crespo 2012	Percentile long-term	217	7	1.3602	Y	31.00	0.016	0.016	1.6548
Crespo 2012	Percentile long-term	230	7	1.3427	Y	32.86	0.016	0.016	1.6498
Crespo 2012	Percentile long-term	262	7	1.2367	Y	37.43	0.016	0.016	1.5559
Cunha 2013	BMI medium-term	559	20	0.0231	N	27.95	0.07	n/a	0.0231
Damsgaard 2014	zBMI short-term	823	9	0.0077	N	91.44	n/a	n/a	0.0077
Davis 2021	zBMI medium-term	3135	16	0.0361	Y	195.94	n/a	0.02	0.0798
Davis 2021	BMI medium-term	3135	16	0.1140	Y	195.94	n/a	0.02	0.2524

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Davis 2021	Percentile medium-term	3135	16	0.9485	Y	195.94	n/a	0.02	2.0993
De Bock 2013	BMI short-term	660	37	0.0404	Y	17.84	0.043	0.043	0.0531
De Bock 2013	BMI medium-term	572	37	0.0511	Y	15.46	0.043	0.043	0.0651
de Greeff 2016	BMI short-term	376	12	0.0700	N	31.33	n/a	n/a	0.0700
De Heer 2011	BMI short-term	568	85	0.1449	N	6.68	n/a	n/a	0.1449
De Heer 2011	Percentile short-term	568	85	1.6689	N	6.68	n/a	n/a	1.6689
Donnelly 2009	BMI long-term	1490	24	0.0986	N	62.08	n/a	n/a	0.0986
Drummy 2016	BMI short-term	107	14	0.1862	Y	7.64	n/a	0.02	0.1981
Duncan 2019	BMI short-term	589	16	0.0040	N	36.81	n/a	n/a	0.0040
Elder 2014	zBMI medium-term	488	30	0.0267	Y	16.27	0.038	0.038	0.0335
Elder 2014	zBMI long-term	489	30	0.0282	Y	16.30	0.038	0.038	0.0354
Elder 2014	BMI medium-term	488	30	0.1027	Y	16.27	0.038	0.038	0.1291
Elder 2014	BMI long-term	489	30	0.1307	Y	16.30	0.038	0.038	0.1644
Elder 2014	Percentile medium-term	488	30	0.7302	Y	16.27	0.038	0.038	0.9179
Elder 2014	Percentile long-term	489	30	0.7690	Y	16.30	0.038	0.038	0.9670
Fairclough 2013	zBMI short-term	221	12	0.1217	N	18.42	0.18	n/a	0.1217
Fairclough 2013	BMI short-term	221	12	0.2857	N	18.42	0.17	n/a	0.2857
Farmer 2017	zBMI medium-term	715	16	0.0264	Y	44.69	n/a	0.02	0.0361
Farmer 2017	zBMI long-term	624	16	0.0294	Y	39.00	n/a	0.02	0.0390
Farmer 2017	BMI medium-term	715	16	0.0803	Y	44.69	n/a	0.02	0.1099
Farmer 2017	BMI long-term	624	16	0.1146	Y	39.00	n/a	0.02	0.1520

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Foster 2008	zBMI long-term	843	10	0.0357	N	84.30	n/a	n/a	0.0357
Foster 2008	BMI long-term	843	10	0.1173	N	84.30	n/a	n/a	0.1173
Gentile 2009	BMI short-term	1201	10	0.1567	Y	120.10	n/a	0.02	0.2883
Gentile 2009	BMI medium-term	1116	10	0.0712	Y	111.60	n/a	0.02	0.1276
Greve 2015	BMI long-term	12919	31	0.0920	N	416.74	n/a	n/a	0.0920
Grydeland 2014	zBMI long-term	1324	37	0.0276	Y	35.78	0.02	0.02	0.0359
Grydeland 2014	BMI long-term	1324	37	0.0570	Y	35.78	0.02	0.02	0.0743
Ha 2021	BMI short-term	148	171	0.1698	N	0.87	n/a	n/a	0.1698
Ha 2021	BMI medium-term	118	171	0.1987	N	0.69	n/a	n/a	0.1987
Habib-Mourad 2014	BMI short-term	363	8	0.1576	Y	45.38	n/a	0.02	0.2165
Habib-Mourad 2020	zBMI long-term	806	36	0.0722	N	22.39	n/a	n/a	0.0722
Haire-Joshu 2010	zBMI short-term	223	112	0.2687	N	1.99	n/a	n/a	0.2687
Han 2006	zBMI long-term	2670	10	0.0122	Y	267.00	n/a	0.02	0.0307
Hannon 2018	Percentile short-term	144	92	1.3877	N	1.57	n/a	n/a	1.3877
Hannon 2018	Percentile medium-term	154	98	1.4719	N	1.57	n/a	n/a	1.4719
HEALTHY Study Group 2010	zBMI long-term	4603	42	0.0101	Y	109.60	n/a	0.02	0.0180
Hendrie 2011	zBMI short-term	140	93	0.0638	Y	1.51	n/a	0.02	0.0641
Hendrie 2011	BMI short-term	140	93	0.1839	Y	1.51	n/a	0.02	0.1848
Hopper 2005	BMI short-term	238	6	0.1379	Y	39.67	n/a	0.02	0.1836
Hull 2018	zBMI short-term	206	168	0.2587	N	1.23	0.393	n/a	0.2587
Hull 2018	zBMI long-term	169	142	0.3224	N	1.19	0.142	n/a	0.3224

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Hull 2018	BMI short-term	206	168	0.6260	N	1.23	0.257	n/a	0.6260
Hull 2018	BMI long-term	169	142	0.9673	N	1.19	0.064	n/a	0.9673
Ickovics 2019	Percentile long-term	265	6	1.1541	Y	44.17	0	0	1.1541
Ickovics 2019	Percentile long-term	291	6	1.1704	Y	48.50	0	0	1.1704
Ickovics 2019	Percentile long-term	265	6	1.1509	Y	44.17	0	0	1.1509
James 2004	zBMI medium-term	574	29	0.0383	N	19.79	0	n/a	0.0383
James 2004	zBMI long-term	434	29	0.0533	N	14.97	0	n/a	0.0533
James 2004	BMI medium-term	574	29	0.0982	N	19.79	0.01	n/a	0.0982
James 2004	BMI long-term	434	29	0.1608	N	14.97	0.01	n/a	0.1608
Jansen 2011	BMI short-term	2622	20	0.0470	Y	131.10	0.01	0.01	0.0713
Kain 2014	zBMI medium-term	1468	9	0.0620	N	163.11	n/a	n/a	0.0620
Kain 2014	BMI medium-term	1474	9	0.0467	Y	163.78	n/a	0.02	0.0963
Keshani 2016	BMI medium-term	171	8	0.1979	Y	21.38	n/a	0.02	0.2348
Kipping 2008	BMI short-term	472	19	0.1862	N	24.84	0.02	n/a	0.1862
Kipping 2014	zBMI short-term	1825	60	0.0146	Y	30.42	0.02	0.02	0.0184
Kipping 2014	zBMI long-term	1793	60	0.0152	Y	29.88	0.02	0.02	0.0191
Kobel 2017	BMI medium-term	479	91	0.0785	Y	5.26	n/a	0.02	0.0818
Kobel 2017	Percentile medium-term	479	91	0.8477	Y	5.26	n/a	0.02	0.8831
Kocken 2016	zBMI short-term	1064	43	0.0231	Y	24.74	n/a	0.02	0.0281
Kocken 2016	zBMI long-term	838	38	0.0258	Y	22.05	n/a	0.02	0.0308
Kovalskys 2016	zBMI long-term	760	8	0.0430	Y	95.00	n/a	0.02	0.0730

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Kriemler 2010	BMI medium-term	502	15	0.0799	Y	33.47	0.01	0.01	0.0919
Kriemler 2010	BMI long-term	296	15	0.1611	Y	19.73	0.01	0.01	0.1755
Lazaar 2007	zBMI short-term	325	19	0.0184	Y	17.11	n/a	0.02	0.0212
Lazaar 2007	BMI short-term	325	19	0.0414	Y	17.11	n/a	0.02	0.0477
Lent 2014	zBMI medium-term	596	10	0.0302	Y	59.60	n/a	0.02	0.0445
Lent 2014	zBMI long-term	511	10	0.0348	Y	51.10	n/a	0.02	0.0492
Lent 2014	BMI medium-term	596	10	0.1699	Y	59.60	n/a	0.02	0.2504
Lent 2014	BMI long-term	511	10	0.2153	Y	51.10	n/a	0.02	0.3046
Lent 2014	Percentile medium-term	596	10	0.7865	Y	59.60	n/a	0.02	1.1592
Lent 2014	Percentile long-term	511	10	0.8155	Y	51.10	n/a	0.02	1.1539
Levy 2012	zBMI short-term	997	60	0.0200	Y	16.62	n/a	0.02	0.0229
Li 2010	zBMI medium-term	4187	20	0.0139	Y	209.35	0.15	0.15	0.0790
Li 2010	zBMI long-term	4120	20	0.0205	Y	206.00	0.15	0.15	0.1158
Li 2010	BMI medium-term	4187	20	0.0363	Y	209.35	0.15	0.15	0.2063
Li 2010	BMI long-term	4120	20	0.0542	Y	206.00	0.15	0.15	0.3055
Li 2019	zBMI medium-term	1581	40	0.0206	Y	39.53	0.118	0.118	0.0485
Lichtenstein 2011	zBMI medium-term	414	9	0.0276	Y	46.00	n/a	0.02	0.0380
Lichtenstein 2011	zBMI long-term	326	9	0.0374	Y	36.22	n/a	0.02	0.0489
Liu 2019	zBMI short-term	1837	12	0.0180	Y	153.08	0.05	0.05	0.0528
Liu 2019	zBMI medium-term	1839	12	0.0178	Y	153.25	0.05	0.05	0.0522
Liu 2019	BMI short-term	1837	12	0.0515	Y	153.08	0.04	0.04	0.1369

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Liu 2019	BMI medium-term	1839	12	0.0537	Y	153.25	0.04	0.04	0.1431
Liu 2022	zBMI short-term	1373	24	0.0245	Y	57.21	n/a	0.02	0.0357
Liu 2022	zBMI medium-term	1362	24	0.0240	Y	56.75	n/a	0.02	0.0349
Liu 2022	BMI short-term	1373	24	0.0655	Y	57.21	n/a	0.02	0.0954
Liu 2022	BMI medium-term	1362	24	0.0657	Y	56.75	n/a	0.02	0.0956
Llargues 2012	BMI long-term	278	16	0.3401	N	17.38	n/a	n/a	0.3401
Lloyd 2018	zBMI long-term	1250	32	0.0221	Y	39.06	0.014	0.014	0.0273
Lloyd 2018	BMI long-term	1250	32	0.0673	Y	39.06	0.011	0.011	0.0802
Magnusson 2012	BMI long-term	185	6	0.1195	Y	30.83	n/a	0.02	0.1510
Marcus 2009	zBMI long-term	2838	10	0.0119	Y	283.80	n/a	0.02	0.0307
Martinez-Vizcaino 2014	BMI medium-term	469	20	0.1053	Y	23.45	n/a	0.02	0.1268
Martinez-Vizcaino 2020	zBMI short-term	1434	21	0.0240	Y	68.29	0.0996	0.0996	0.0666
Martinez-Vizcaino 2020	BMI short-term	1434	21	0.0415	Y	68.29	0.0695	0.0695	0.0989
Martinez-Vizcaino 2022	zBMI medium-term	396	10	0.0317	Y	39.60	n/a	0.02	0.0422
Martinez-Vizcaino 2022	BMI medium-term	396	10	0.1233	Y	39.60	n/a	0.02	0.1642
Meng 2013 (Beijing)	zBMI medium-term	1075	6	0.0922	Y	179.17	n/a	0.02	0.1969
Meng 2013 (Beijing)	zBMI medium-term	1050	6	0.0922	Y	175.00	n/a	0.02	0.1951
Meng 2013 (Beijing)	BMI medium-term	1075	6	0.2121	Y	179.17	n/a	0.02	0.4532
Meng 2013 (Beijing)	BMI medium-term	1050	6	0.2121	Y	175.00	n/a	0.02	0.4490

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Morgan 2011	zBMI short-term	71	53	0.0920	N	1.34	n/a	n/a	0.0920
Morgan 2014	zBMI short-term	132	93	0.0523	N	1.42	n/a	n/a	0.0523
Morgan 2014	BMI short-term	132	93	0.0920	N	1.42	n/a	n/a	0.0920
Morgan 2019	zBMI medium-term	153	115	0.0506	N	1.33	n/a	n/a	0.0506
Muller 2016	zBMI medium-term	182	7	0.0494	Y	26.00	0.046	0.046	0.0725
Muller 2016	Percentile long-term	376	18	1.1654	Y	20.89	0.046	0.046	1.6127
Muller 2019	zBMI medium-term	519	8	0.0417	Y	64.88	0.009	0.009	0.0523
Muzaffar 2019	Percentile short-term	101	7	1.8931	Y	14.43	n/a	0.02	2.1323
Muzaffar 2019		101	7	1.9307	Y	14.43	n/a	0.02	2.1745
NCT02067728 2014	zBMI short-term	89	12	0.1382	Y	7.42	n/a	0.02	0.1468
Nemet 2011a	BMI medium-term	725	30	0.0566	Y	24.17	n/a	0.02	0.0684
Nemet 2011a	Percentile medium-term	725	30	1.1314	Y	24.17	n/a	0.02	1.3686
Nemet 2011b	BMI medium-term	297	11	0.0849	Y	27.00	n/a	0.02	0.1046
Nemet 2011b		203	11	0.1265	Y	18.45	n/a	0.02	0.1469
Nemet 2011b	Percentile medium-term	297	11	1.7692	Y	27.00	n/a	0.02	2.1812
Nemet 2011b	Percentile long-term	203	11	2.4207	Y	18.45	n/a	0.02	2.8117
Nyberg 2015	zBMI short-term	234	14	0.0493	Y	16.71	n/a	0.02	0.0565
Nyberg 2015	zBMI medium-term	234	14	0.0414	Y	16.71	n/a	0.02	0.0475
Nyberg 2016	zBMI short-term	332	31	0.0510	N	10.71	n/a	n/a	0.0510
Nyberg 2016	zBMI medium-term	332	31	0.0510	N	10.71	n/a	n/a	0.0510
O'Connor 2020	zBMI short-term	46	27	0.0649	N	1.70	n/a	n/a	0.0649

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Paineau 2008	zBMI short-term	674	38	0.0523	Y	17.74	n/a	0.02	0.0605
Paineau 2008	zBMI short-term	669	38	0.0562	Y	17.61	n/a	0.02	0.0648
Paineau 2008	BMI short-term	674	38	0.0725	Y	17.74	n/a	0.02	0.0838
Paineau 2008	BMI short-term	669	38	0.0807	Y	17.61	n/a	0.02	0.0931
Pena 2021	zBMI short-term	1912	20	0.1097	N	95.60	0.015	n/a	0.1097
Pena 2021	BMI short-term	1912	20	0.3291	N	95.60	0.011	n/a	0.3291
Puder 2011	BMI medium-term	625	40	0.0405	Y	15.63	0.05	0.05	0.0533
Rosario 2012	zBMI short-term	294	7	0.0640	Y	42.00	n/a	0.02	0.0864
Rosario 2012	BMI short-term	294	7	0.1041	Y	42.00	n/a	0.02	0.1405
Rosenkranz 2010	zBMI short-term	72	7	0.0641	N	10.29	n/a	n/a	0.0641
Rosenkranz 2010	BMI short-term	72	7	0.2879	N	10.29	n/a	n/a	0.2879
Rosenkranz 2010	Percentile short-term	72	7	1.9043	N	10.29	n/a	n/a	1.9043
Rush 2012	zBMI long-term	1352	124	0.0175	Y	10.90	n/a	0.02	0.0191
Sacchetti 2013	BMI long-term	428	26	0.1315	Y	16.46	n/a	0.02	0.1504
Safdie 2013	BMI short-term	606	19	0.2351	Y	31.89	n/a	0.02	0.2990
Safdie 2013	BMI short-term	608	19	0.2215	Y	32.00	n/a	0.02	0.2819
Safdie 2013	BMI medium-term	606	19	0.2351	Y	31.89	n/a	0.02	0.2990
Safdie 2013	BMI medium-term	578	18	0.2385	Y	32.11	n/a	0.02	0.3038
Safdie 2013	BMI long-term	606	19	0.2509	Y	31.89	n/a	0.02	0.3191
Safdie 2013	BMI long-term	578	18	0.2714	Y	32.11	n/a	0.02	0.3457
Sahota 2001	zBMI medium-term	595	10	0.0510	N	59.50	n/a	n/a	0.0510

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Sahota 2019	zBMI long-term	311	8	0.2551	N	38.88	n/a	n/a	0.2551
Salmon 2022	zBMI long-term	232	10	0.0541	N	23.20	n/a	n/a	0.0541
Salmon 2022	zBMI long-term	208	10	0.0578	N	20.80	n/a	n/a	0.0578
Salmon 2022	zBMI long-term	212	10	0.0559	N	21.20	n/a	n/a	0.0559
Santos 2014	zBMI medium-term	647	20	0.0216	N	32.35	n/a	n/a	0.0216
Sgambato 2019	BMI short-term	2276	18	0.0510	Y	126.44	n/a	0.02	0.0956
Sichieri 2008	BMI short-term	927	47	0.0842	Y	19.72	0.024	0.024	0.1014
Siegrist 2013	zBMI medium-term	719	39	0.0257	Y	18.44	n/a	0.02	0.0298
Siegrist 2013		719	39	0.0778	Y	18.44	n/a	0.02	0.0903
Siegrist 2018	BMI long-term	434	15	0.1149	Y	28.93	n/a	0.02	0.1434
Simon 2008	zBMI long-term	531	8	0.0613	N	66.38	0.02	n/a	0.0613
Simon 2008	BMI medium-term	725	8	0.0700	N	90.63	n/a	n/a	0.0700
Simon 2008	BMI long-term	531	8	0.1569	N	66.38	0.039	n/a	0.1569
Spiegel 2006	zBMI short-term	1013	70	0.0199	Y	14.47	n/a	0.02	0.0224
Stettler 2015	zBMI medium-term	75	11	0.0481	Y	6.82	0.012	0.012	0.0497
Stettler 2015	zBMI medium-term	70	9	0.0444	Y	7.78	0.012	0.012	0.0462
Stettler 2015	BMI medium-term	75	11	0.3394	Y	6.82	0.012	0.012	0.3511
Stettler 2015	BMI medium-term	70	9	0.3287	Y	7.78	0.012	0.012	0.3418
Story 2012	zBMI long-term	454	14	0.0583	N	32.43	n/a	n/a	0.0583
Story 2012	BMI long-term	454	14	0.1495	N	32.43	n/a	n/a	0.1495
Tanskey 2017	zBMI medium-term	520	12	0.0438	N	43.33	n/a	n/a	0.0438

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Tanskey 2017	zBMI medium-term	508	12	0.0370	N	42.33	n/a	n/a	0.0370
Tanskey 2017	BMI medium-term	520	12	0.1880	N	43.33	n/a	n/a	0.1880
Tanskey 2017	BMI medium-term	508	12	0.1451	N	42.33	n/a	n/a	0.1451
Telford 2012	BMI long-term	620	29	0.0838	Y	21.38	n/a	0.02	0.0994
Tessier 2008	BMI short-term	939	52	0.0606	Y	18.06	0.1	0.1	0.0996
Thivel 2011	BMI short-term	355	19	0.0371	Y	18.68	n/a	0.02	0.0431
Topham 2021	zBMI long-term	198	10	0.0997	N	19.80	n/a	n/a	0.0997
Topham 2021	zBMI long-term	168	13	0.0981	N	12.92	n/a	n/a	0.0981
Topham 2021	zBMI long-term	205	8	0.1048	N	25.63	n/a	n/a	0.1048
Topham 2021	zBMI long-term	210	13	0.1065	N	16.15	n/a	n/a	0.1065
van de Berg 2020	Percentile medium-term	621	14	1.1039	N	44.36	n/a	n/a	1.1039
van de Berg 2020	Percentile medium-term	632	14	1.0706	N	45.14	n/a	n/a	1.0706
van de Berg 2020	Percentile medium-term	643	14	1.0837	N	45.93	n/a	n/a	1.0837
Viggiano 2018	zBMI short-term	1007	10	0.0212	Y	100.70	n/a	0.02	0.0367
Viggiano 2018	zBMI long-term	456	10	0.0522	Y	45.60	n/a	0.02	0.0718
Vizcaino 2008	BMI medium-term	1044	20	0.0689	Y	52.20	n/a	0.02	0.0980
Wang 2012	zBMI medium-term	931	6	0.0205	Y	155.17	n/a	0.02	0.0414
Wang 2018	zBMI medium-term	9858	48	0.0141	Y	205.38	n/a	0.02	0.0319
Wang 2018	BMI medium-term	9858	48	0.0283	Y	205.38	n/a	0.02	0.0638
Wendel 2016	BMI long-term	193	24	0.1545	Y	8.04	n/a	0.02	0.1650
Wendel 2016	Percentile long-term	193	24	1.9417	Y	8.04	n/a	0.02	2.0739

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Williamson 2012	zBMI long-term	1059	11	0.0316	N	96.27	n/a	n/a	0.0316
Williamson 2012	zBMI long-term	1085	12	0.0310	N	90.42	n/a	n/a	0.0310
Xu 2015	zBMI medium-term	1125	8	0.1082	N	140.63	n/a	n/a	0.1082
Xu 2015	BMI medium-term	1125	8	0.3608	N	140.63	n/a	n/a	0.3608
Xu 2017 (5 other cities)	zBMI medium-term	5283	30	0.0173	Y	176.10	n/a	0.02	0.0368
Xu 2017 (5 other cities)	BMI medium-term	5283	30	0.0358	Y	176.10	n/a	0.02	0.0759
Yin 2012	zBMI medium-term	527	18	0.0317	N	29.28	n/a	n/a	0.0317
Yin 2012	zBMI long-term	481	18	0.0343	N	26.72	n/a	n/a	0.0343

Abbreviations: ICC: intra-cluster correlation coefficient; N: no; n/a: not applicable; SE: standard error; Y: yes.

Appendix 6. Sensitivity analysis

6.1 Excluding high risk of bias studies

The following table shows the results of all meta-analyses in the main analysis (mean difference, 95% confidence interval, I^2, number of studies and number of participants) alongside the equivalent results excluding studies evaluated as high risk of bias.

Comparison: Dietary intervention vs control										
	Main analysis					Excluding high risk of bias studies				
Meta-analysis outcome	**MD**	**95% CI**	**I²**	**n studies**	**n participants**	**MD**	**95% CI**	**I²**	**n studies**	**n participants**
BMI short-term	0	(-0.1 to 0.1)	0	5	2107	0	(-0.1 to 0.1)	0	4	2061
BMI medium-term	-0.01	(-0.15 to 0.12)	43	9	6815	-0.05	(-0.19 to 0.09)	46	6	2434
BMI long-term	-0.17	(-0.48 to 0.13)	8	2	945	-0.26	(-0.58 to 0.06)	n/a	1	434
zBMI short-term	-0.06	(-0.13 to 0.01)	93	8	3695	-0.03	(-0.11 to 0.04)	94	6	2642
zBMI medium-term	-0.04	(-0.1 to 0.02)	80	9	7048	-0.05	(-0.12 to 0.03)	86	6	2358
zBMI long-term	-0.05	(-0.1 to 0.01)	67	7	5285	-0.06	(-0.18 to 0.06)	83	3	1224
Percentile short-term	1.9	(-3.44 to 7.24)	49	3	394	1.9	(-3.44 to 7.24)	49	3	394
Percentile medium-term	-0.94	(-2.65 to 0.78)	24	3	4363	0.3	(-1.97 to 2.57)	n/a	1	596
Percentile long-term	-1.49	(-4.8 to 1.82)	77	2	776	n/a	n/a	n/a	0	0
Comparison: Activity intervention vs control										
	Main analysis					Excluding high risk of bias studies				
Meta-analysis outcome	**MD**	**95% CI**	**I²**	**n studies**	**n participants**	**MD**	**95% CI**	**I²**	**n studies**	**n participants**
BMI short-term	-0.02	(-0.17 to 0.13)	86	14	4069	0.06	(-0.2 to 0.32)	87	8	1327
BMI medium-term	-0.11	(-0.18 to -0.05)	16	16	21,286	-0.13	(-0.2 to -0.07)	0	10	18,166
BMI long-term	-0.07	(-0.24 to 0.1)	64	8	8302	-0.17	(-0.56 to 0.23)	81	4	5703
zBMI short-term	-0.02	(-0.07 to 0.02)	35	6	3580	-0.03	(-0.08 to 0.02)	48	5	2146
zBMI medium-term	-0.05	(-0.09 to -0.02)	48	13	20,600	-0.04	(-0.06 to -0.01)	7	8	17,734

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zBMI long-term	-0.02	(-0.09 to 0.04)	55	6	6940	-0.05	(-0.14 to 0.04)	61	4	5699
Percentile short-term	-0.74	(-4.1 to 2.62)	n/a	1	27	-0.74	(-4.1 to 2.62)	n/a	1	27
Percentile medium-term	-2.26	(-4.42 to -0.1)	n/a	1	621	n/a	n/a	n/a	0	0
Percentile long-term	-0.8	(-2.74 to 1.13)	19	3	860	0.9	(-2.26 to 4.06)	n/a	1	376
Comparison: Dietary and activity intervention vs control										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short-term	-0.11	(-0.21 to -0.01)	72	27	16,066	-0.07	(-0.21 to 0.07)	82	15	8788
BMI medium-term	-0.11	(-0.21 to 0)	74	21	17,547	-0.07	(-0.19 to 0.06)	75	15	14,183
BMI long-term	0.03	(-0.11 to 0.16)	72	16	22,098	0.01	(-0.16 to 0.18)	59	9	6001
zBMI short-term	-0.03	(-0.06 to 0)	58	26	12,784	-0.04	(-0.08 to 0)	51	13	7463
zBMI medium-term	-0.05	(-0.07 to -0.02)	77	24	20,998	-0.04	(-0.07 to 0)	78	18	17,648
zBMI long-term	-0.02	(-0.06 to 0.01)	88	22	23,594	-0.01	(-0.03 to 0.02)	59	10	13,540
Percentile short-term	0.73	(-0.5 to 1.97)	0	5	1036	0.57	(-0.83 to 1.97)	0	4	903
Percentile medium-term	-0.64	(-1.85 to 0.56)	64	8	3823	-0.45	(-1.89 to 1)	62	5	2587
Percentile long-term	-0.67	(-3.05 to 1.72)	82	5	1765	-0.34	(-1.43 to 0.74)	0	2	856
Comparison: Activity intervention vs dietary intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**

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BMI medium-term	-0.25	(-0.55 to 0.06)	0	2	1644	-0.28	(-0.6 to 0.04)	n/a	1	439
zBMI medium-term	-0.11	(-0.22 to 0)	0	2	1644	-0.12	(-0.23 to -0.01)	n/a	1	439
Percentile medium-term	-0.04	(-2.05 to 1.97)	n/a	1	683	n/a	n/a	n/a	0	0
Percentile long-term	2.3	(0.27 to 4.33)	n/a	1	330	n/a	n/a	n/a	0	0
Comparison: Activity and dietary intervention vs dietary intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI medium-term	-0.16	(-0.42 to 0.1)	0	2	456	-0.16	(-0.42 to 0.1)	0	2	456
zBMI medium-term	-0.03	(-0.1 to 0.04)	0	2	456	-0.03	(-0.1 to 0.04)	0	2	456
Percentile medium-term	1.03	(-0.94 to 3)	n/a	1	705	n/a	n/a	n/a	0	0
Percentile long-term	-0.13	(-2.12 to 1.86)	n/a	1	304	n/a	n/a	n/a	0	0
Comparison: Activity and dietary intervention vs activity intervention										
	Main analysis					**Excluding high risk of bias studies**				
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**
BMI short-term	0.34	(-0.25 to 0.93)	0	2	95	0.34	(-0.25 to 0.93)	0	2	95
BMI medium-term	0.19	(-0.12 to 0.49)	0	2	509	0.19	(-0.12 to 0.49)	0	2	509
BMI long-term	-0.08	(-0.43 to 0.27)	n/a	1	261	n/a	n/a	n/a	0	0
zBMI short-term	-0.12	(-0.3 to 0.06)	n/a	1	35	-0.12	(-0.3 to 0.06)	n/a	1	35
zBMI medium-term	-0.07	(-0.42 to 0.28)	90	2	509	-0.07	(-0.42 to 0.28)	90	2	509

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zBMI long-term	-0.04	(-0.13 to 0.05)	n/a	1	261	n/a	n/a	n/a	0	0
Percentile medium-term	1.07	(-0.97 to 3.11)	n/a	1	694	n/a	n/a	n/a	0	0
Percentile long-term	-2.43	(-4.46 to -0.4)	n/a	1	330	n/a	n/a	n/a	0	0

6.2 Different ICCs

The following table shows the results of all meta-analyses in the main analysis (mean difference, 95% confidence interval, I^2, number of studies and number of participants) alongside the equivalent results using imputed ICC values of 0 and 0.04 (compared to 0.02 in the main analysis).

Comparison: Dietary intervention vs control											
	Main analysis (ICC = 0.02)					Analysis with ICC = 0			Analysis with ICC = 0.04		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short-term	0	(-0.1 to 0.1)	0	5	2107	-0.01	(-0.1 to 0.09)	0	0.01	(-0.1 to 0.12)	0
BMI medium-term	-0.01	(-0.15 to 0.12)	43	9	6815	0	(-0.12 to 0.11)	52	-0.02	(-0.16 to 0.12)	38
BMI long-term	-0.17	(-0.48 to 0.13)	8	2	945	-0.11	(-0.46 to 0.24)	44	-0.2	(-0.49 to 0.09)	0
zBMI short-term	-0.06	(-0.13 to 0.01)	93	8	3695	-0.06	(-0.13 to 0.01)	94	-0.05	(-0.12 to 0.02)	93
zBMI medium-term	-0.04	(-0.1 to 0.02)	80	9	7048	-0.04	(-0.09 to 0.02)	86	-0.04	(-0.11 to 0.02)	77
zBMI long-term	-0.05	(-0.1 to 0.01)	67	7	5285	-0.04	(-0.1 to 0.01)	79	-0.05	(-0.11 to 0.01)	62
Percentile short-term	1.9	(-3.44 to 7.24)	49	3	394	1.9	(-3.44 to 7.24)	49	1.9	(-3.44 to 7.24)	49
Percentile medium-term	-0.94	(-2.65 to 0.78)	24	3	4363	-0.65	(-2.06 to 0.77)	45	-1.23	(-2.88 to 0.43)	3
Percentile long-term	-1.49	(-4.8 to 1.82)	77	2	776	-1.39	(-4.7 to 1.92)	83	-1.59	(-4.9 to 1.72)	71
Comparison: Activity intervention vs control											
	Main analysis (ICC = 0.02)					Analysis with ICC = 0			Analysis with ICC = 0.04		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short-term	-0.02	(-0.17 to 0.13)	86	14	4069	-0.02	(-0.17 to 0.13)	87	-0.02	(-0.17 to 0.14)	85
BMI medium-term	-0.11	(-0.18 to -0.05)	16	16	21,286	-0.12	(-0.2 to -0.05)	53	-0.1	(-0.16 to -0.04)	1
BMI long-term	-0.07	(-0.24 to 0.1)	64	8	8302	-0.07	(-0.25 to 0.12)	74	-0.07	(-0.24 to 0.09)	56
zBMI short-term	-0.02	(-0.07 to 0.02)	35	6	3580	-0.02	(-0.06 to 0.02)	36	-0.02	(-0.07 to 0.02)	35
zBMI medium-term	-0.05	(-0.09 to -0.02)	48	13	20,600	-0.05	(-0.09 to -0.02)	66	-0.05	(-0.09 to -0.02)	42

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zBMI long-term	-0.02	(-0.09 to 0.04)	55	6	6940	-0.02	(-0.08 to 0.04)	59	-0.03	(-0.09 to 0.04)	53
Percentile short-term	-0.74	(-4.1 to 2.62)	n/a	1	27	-0.74	(-4.1 to 2.62)	n/a	-0.74	(-4.1 to 2.62)	n/a
Percentile medium-term	-2.26	(-4.42 to -0.1)	n/a	1	621	-2.26	(-4.42 to -0.1)	n/a	-2.26	(-4.42 to -0.1)	n/a
Percentile long-term	-0.8	(-2.74 to 1.13)	19	3	860	-0.87	(-2.86 to 1.12)	25	-0.75	(-2.63 to 1.14)	14
Comparison: Dietary and activity intervention vs control											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short-term	-0.11	(-0.21 to -0.01)	72	27	16,066	-0.1	(-0.19 to 0)	79	-0.11	(-0.21 to -0.01)	68
BMI medium-term	-0.11	(-0.21 to 0)	74	21	17,547	-0.1	(-0.21 to 0)	85	-0.1	(-0.21 to 0.01)	67
BMI long-term	0.03	(-0.11 to 0.16)	72	16	22,098	0.04	(-0.11 to 0.19)	80	0.02	(-0.11 to 0.14)	67
zBMI short-term	-0.03	(-0.06 to 0)	58	26	12,784	-0.03	(-0.07 to 0)	69	-0.03	(-0.06 to 0)	51
zBMI medium-term	-0.05	(-0.07 to -0.02)	77	24	20,998	-0.05	(-0.08 to -0.02)	90	-0.04	(-0.07 to -0.02)	70
zBMI long-term	-0.02	(-0.06 to 0.01)	88	22	23,594	-0.03	(-0.07 to 0.02)	97	-0.02	(-0.05 to 0.01)	82
Percentile short-term	0.73	(-0.5 to 1.97)	0	5	1036	0.73	(-0.5 to 1.97)	0	0.73	(-0.5 to 1.97)	0
Percentile medium-term	-0.64	(-1.85 to 0.56)	64	8	3823	-0.85	(-2.14 to 0.44)	71	-0.5	(-1.65 to 0.65)	57
Percentile long-term	-0.67	(-3.05 to 1.72)	82	5	1765	-0.78	(-3.19 to 1.64)	83	-0.58	(-2.95 to 1.79)	81
Comparison: Activity intervention vs dietary intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**

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BMI medium-term	-0.25	(-0.55 to 0.06)	0	2	1644	-0.19	(-0.46 to 0.08)	38	-0.25	(-0.64 to 0.14)	0
zBMI medium-term	-0.11	(-0.22 to 0)	0	2	1644	-0.08	(-0.2 to 0.04)	50	-0.11	(-0.25 to 0.02)	0
Percentile medium-term	-0.04	(-2.05 to 1.97)	n/a	1	683	-0.04	(-2.05 to 1.97)	n/a	-0.04	(-2.05 to 1.97)	n/a
Percentile long-term	2.3	(0.27 to 4.33)	n/a	1	330	2.3	(0.27 to 4.33)	n/a	2.3	(0.27 to 4.33)	n/a
Comparison: Activity and dietary intervention vs dietary intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI medium-term	-0.16	(-0.42 to 0.1)	0	2	456	-0.13	(-0.32 to 0.06)	0	-0.18	(-0.48 to 0.11)	0
zBMI medium-term	-0.03	(-0.1 to 0.04)	0	2	456	-0.02	(-0.08 to 0.03)	0	-0.03	(-0.1 to 0.05)	0
Percentile medium-term	1.03	(-0.94 to 3)	n/a	1	705	1.03	(-0.94 to 3)	n/a	1.03	(-0.94 to 3)	n/a
Percentile long-term	-0.13	(-2.12 to 1.86)	n/a	1	304	-0.13	(-2.12 to 1.86)	n/a	-0.13	(-2.12 to 1.86)	n/a
Comparison: Activity and dietary intervention vs activity intervention											
	Main analysis (ICC = 0.02)					**Analysis with ICC = 0**			**Analysis with ICC = 0.04**		
Meta-analysis outcome	**MD**	**95% CI**	**I^2**	**n studies**	**n participants**	**MD**	**95% CI**	**I^2**	**MD**	**95% CI**	**I^2**
BMI short-term	0.34	(-0.25 to 0.93)	0	2	95	0.34	(-0.25 to 0.93)	0	0.34	(-0.25 to 0.93)	0
BMI medium-term	0.19	(-0.12 to 0.49)	0	2	509	0.19	(0 to 0.38)	0	0.19	(-0.19 to 0.56)	0
BMI long-term	-0.08	(-0.43 to 0.27)	n/a	1	261	-0.08	(-0.43 to 0.27)	n/a	-0.08	(-0.43 to 0.27)	n/a
zBMI short-term	-0.12	(-0.3 to 0.06)	n/a	1	35	-0.12	(-0.3 to 0.06)	n/a	-0.12	(-0.3 to 0.06)	n/a
zBMI medium-term	-0.07	(-0.42 to 0.28)	90	2	509	-0.07	(-0.42 to 0.28)	92	-0.07	(-0.42 to 0.28)	89

(Continued)

zBMI long-term	-0.04	(-0.13 to 0.05)	n/a	1	261	-0.04	(-0.13 to 0.05)	n/a	-0.04	(-0.13 to 0.05)	n/a
Percentile medium-term	1.07	(-0.97 to 3.11)	n/a	1	694	1.07	(-0.97 to 3.11)	n/a	1.07	(-0.97 to 3.11)	n/a
Percentile long-term	-2.43	(-4.46 to -0.4)	n/a	1	330	-2.43	(-4.46 to -0.4)	n/a	-2.43	(-4.46 to -0.4)	n/a

Abbreviations: CI: confidence interval; ICC: intra-cluster coefficient; MD: mean difference; n: number of; n/a: not applicable

Appendix 7. Funnel plots

We reported nine meta-analyses with at least 10 studies. As planned in the protocol, we produced a funnel plot for these meta-analyses, which did not show notable asymmetry (Figure 6; Figure 7; Figure 8; Figure 9; Figure 10; Figure 11; Figure 12; Figure 13; Figure 14). P values from the Egger test for funnel plot asymmetry are reported in the table below. All tests resulted in P values > 0.05, which does not indicate an important problem.

Figure 6. Funnel plot to investigate small study effects in the meta-analysis of activity intervention vs control for BMI short term. *Abbreviations*
BMI: body mass index
vs: versus

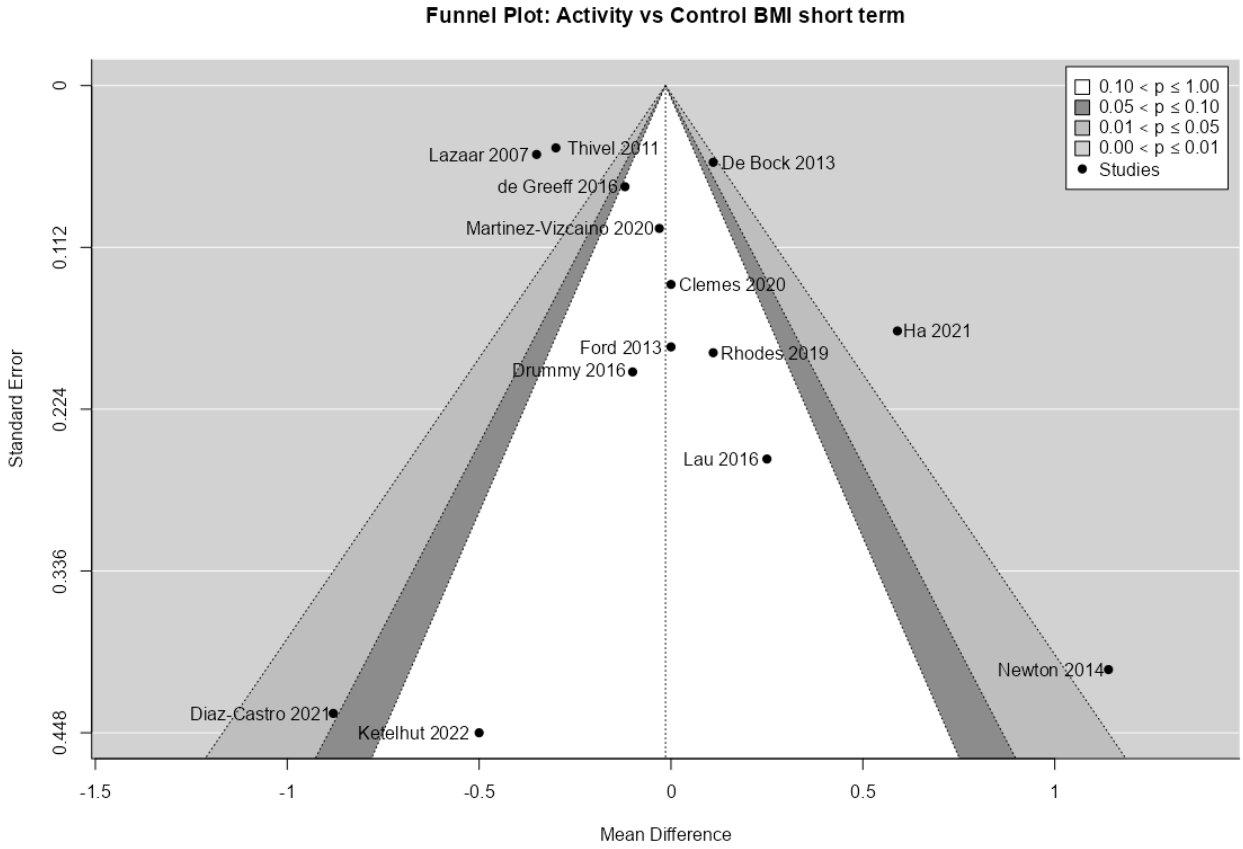


Figure 7. Funnel plot to investigate small study effects in the meta-analysis of activity intervention vs control for BMI medium term. *Abbreviations*
BMI: body mass index
vs: versus

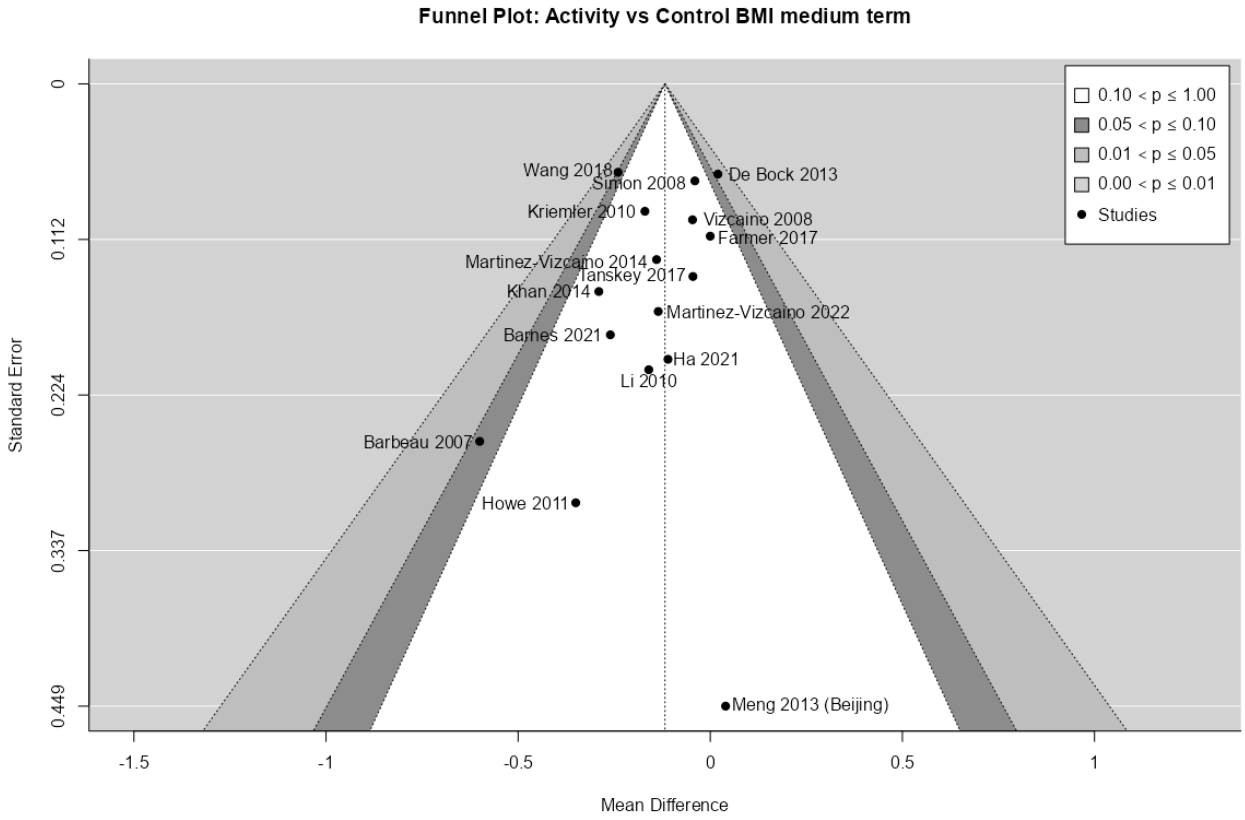


Figure 8. Funnel plot to investigate small study effects in the meta-analysis of activity intervention vs control for zBMI medium term. *Abbreviations*
vs: versus
zBMI: standardised body mass index

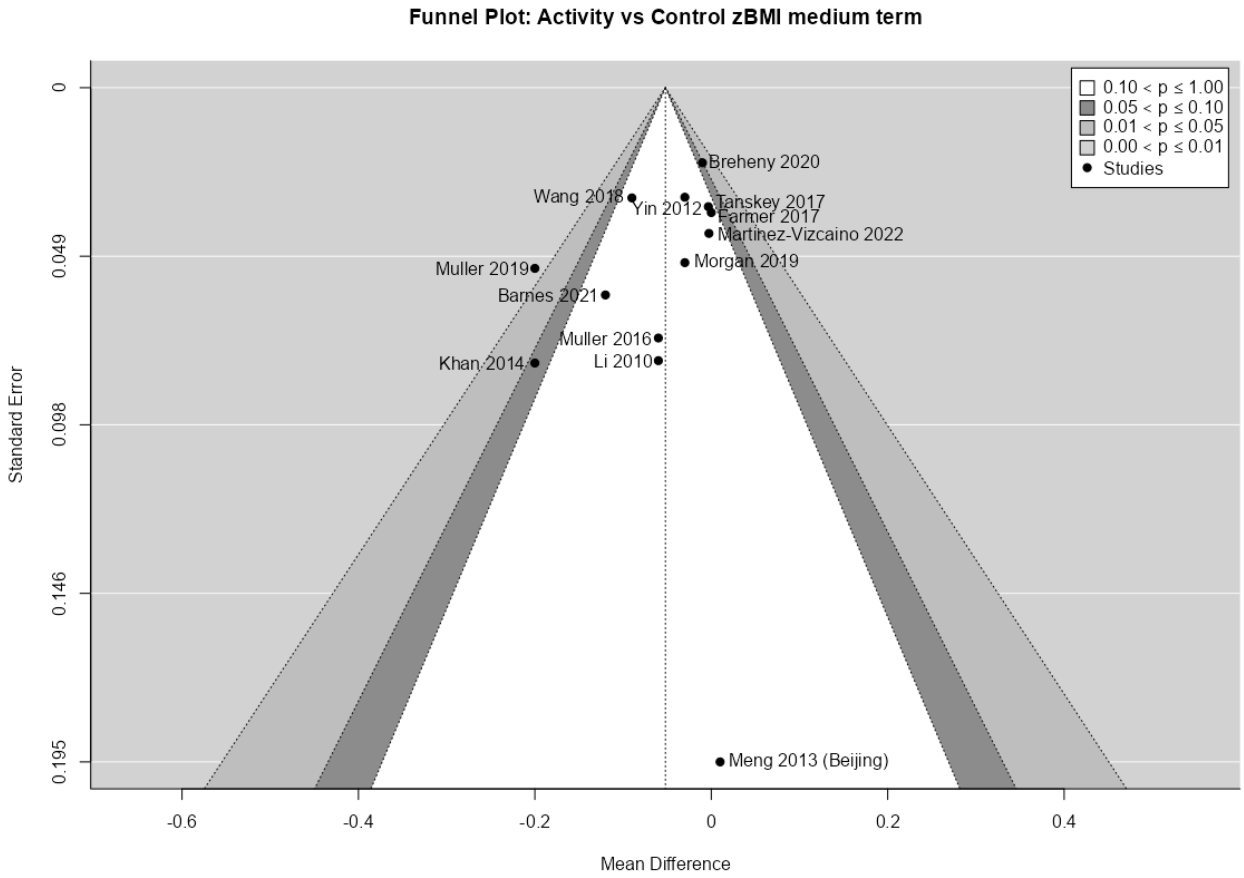


Figure 9. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for BMI short term.
Abbreviations
BMI: body mass index
vs: versus

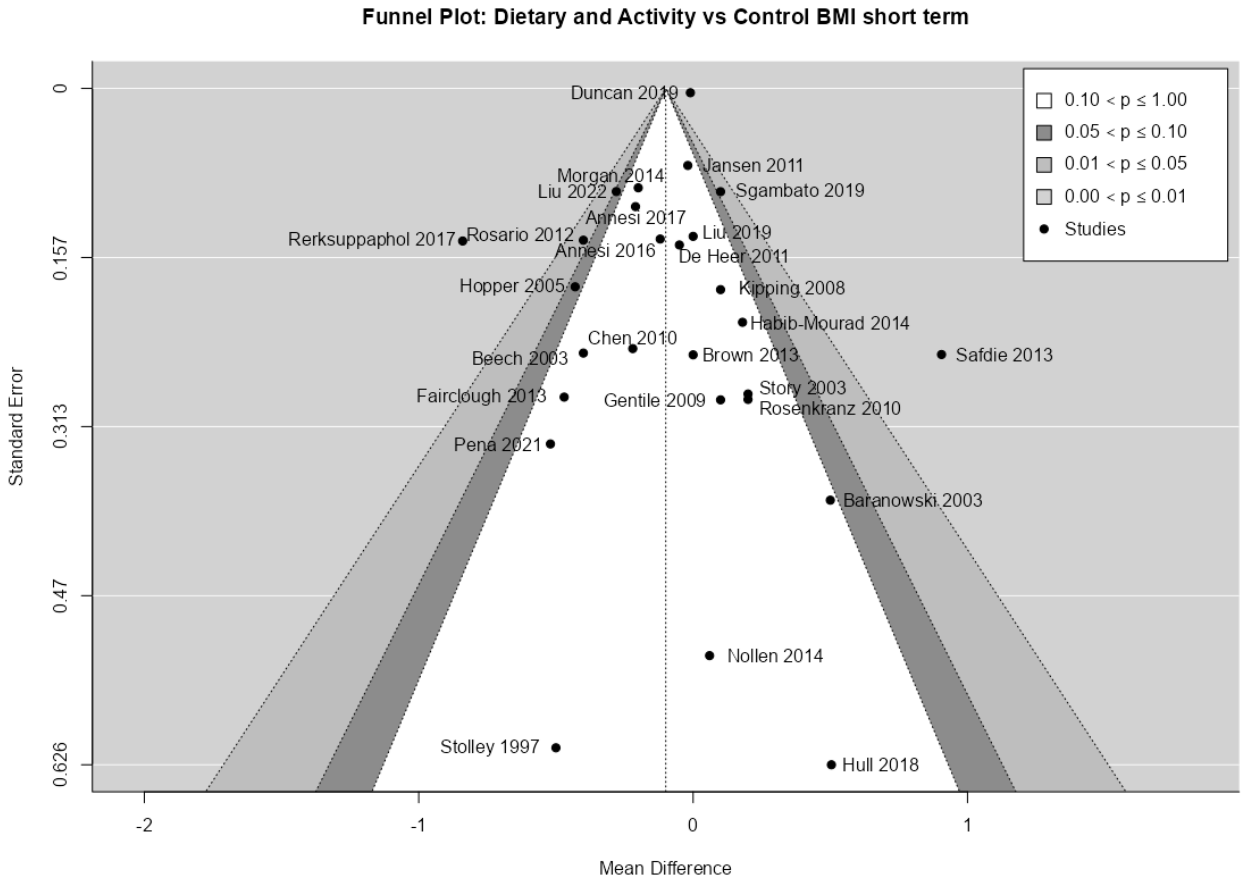


Figure 10. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for BMI medium term.
Abbreviations
BMI: body mass index
vs: versus

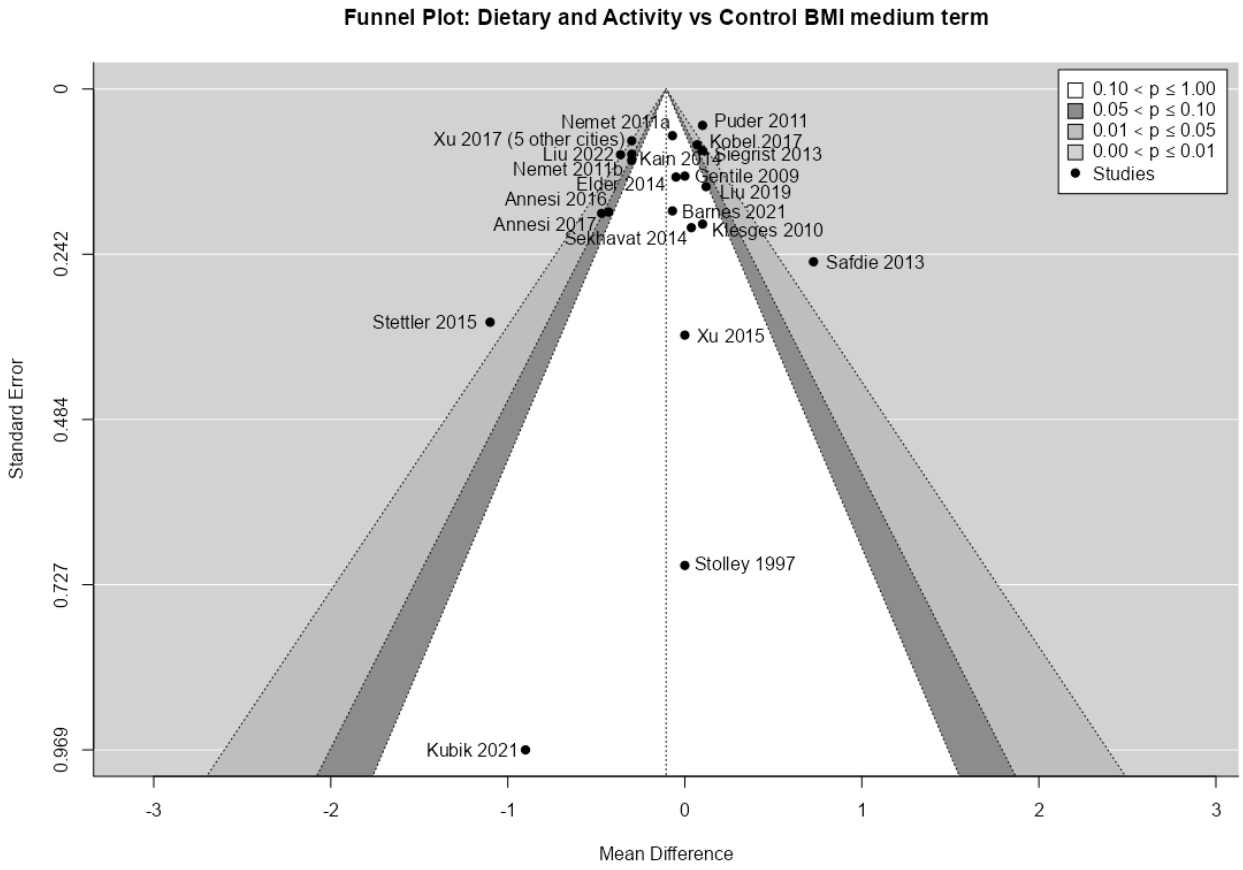


Figure 11. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for BMI long term. ***Abbreviations***
BMI: body mass index
vs: versus

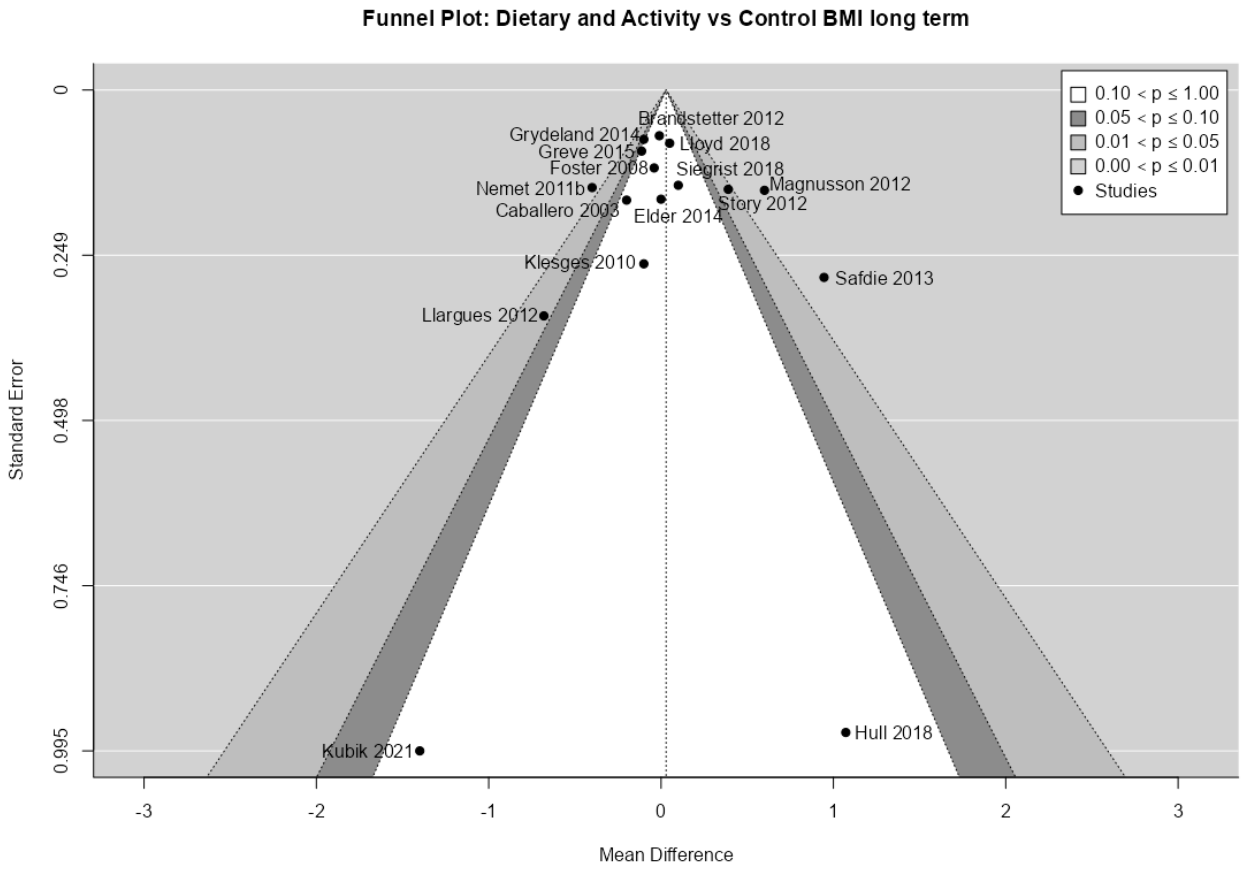


Figure 12. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for zBMI short term. ***Abbreviations***
vs: versus
zBMI: standardised body mass index

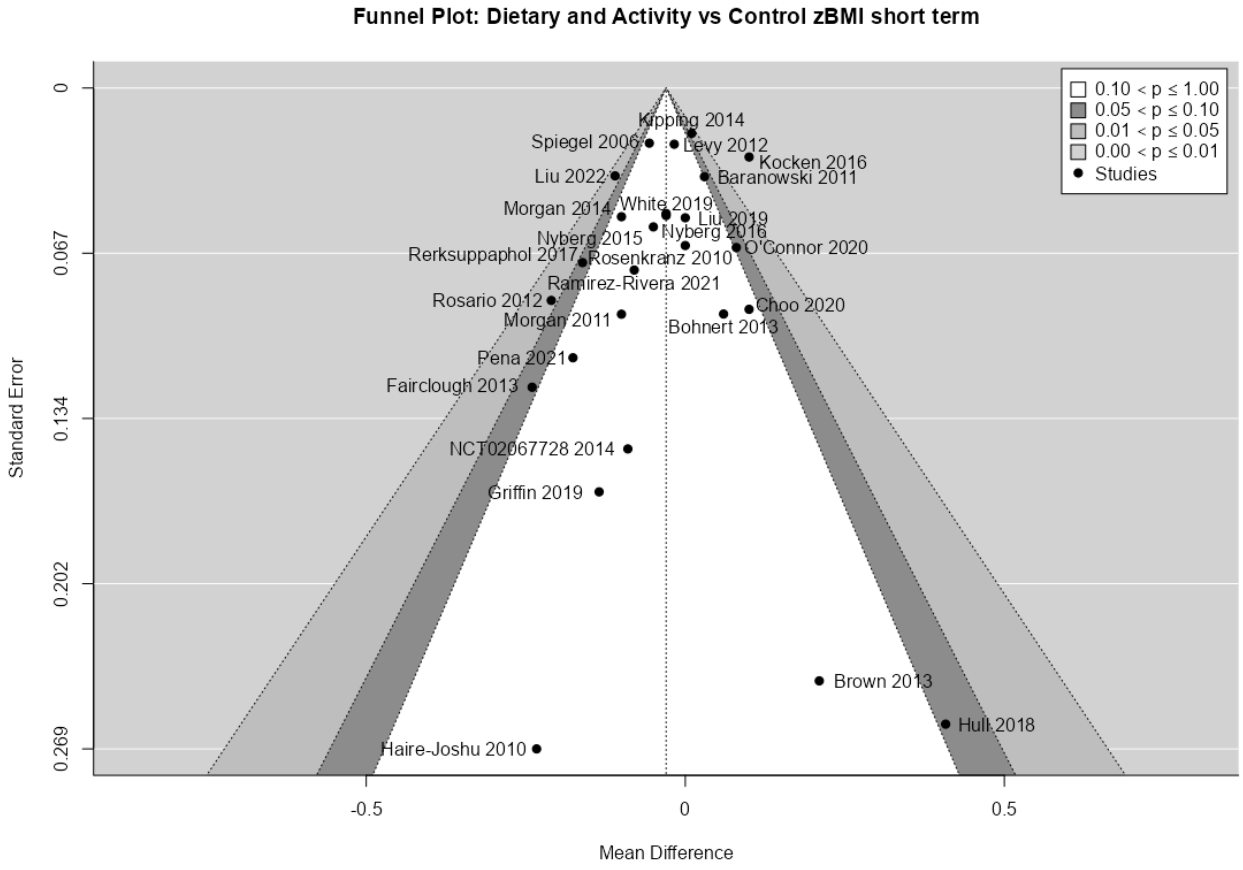


Figure 13. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for zBMI medium term. *Abbreviations*
vs: versus
zBMI: standardised body mass index

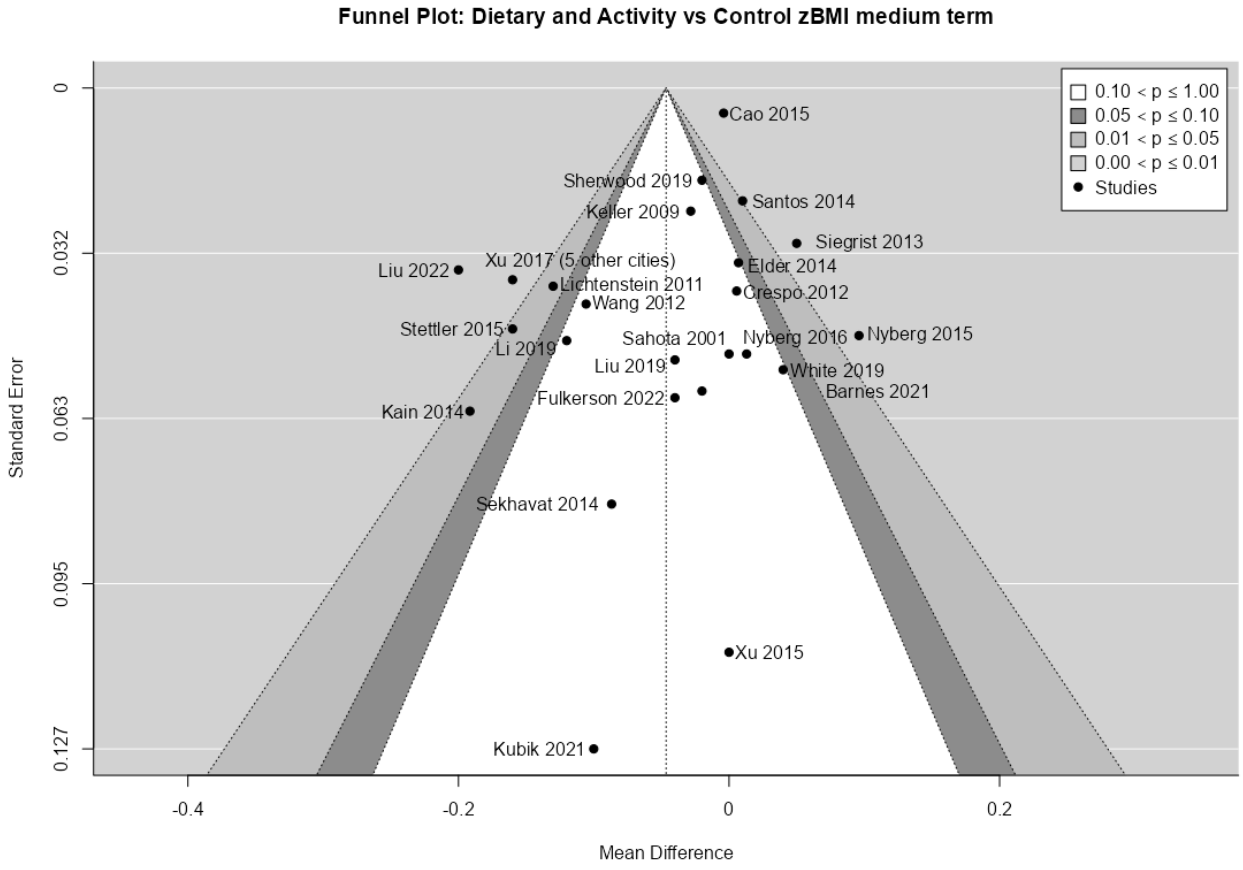
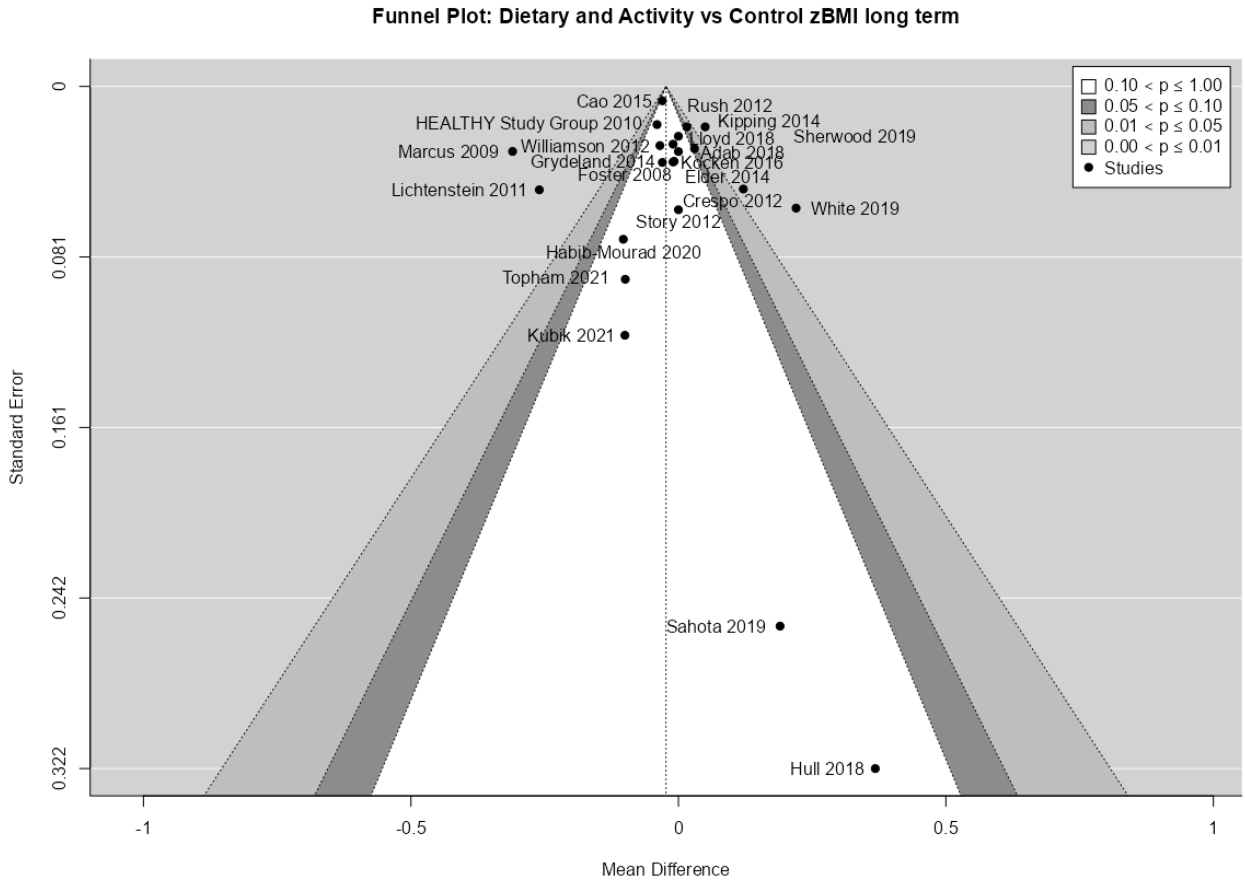


Figure 14. Funnel plot to investigate small study effects in the meta-analysis of dietary and activity intervention vs control for zBMI long term. ***Abbreviations***
vs: versus
zBMI: standardised body mass index



7.1 P values from Egger test for funnel plot asymmetry

Comparison: Activity intervention vs control	
Meta-analysis outcome	**P value**
BMI short-term	0.3992
BMI medium-term	0.1892
zBMI medium-term	0.1236
Comparison: Dietary and activity intervention vs control	
Meta-analysis outcome	**P value**
BMI short-term	0.3672
BMI medium-term	0.5364

(Continued)

BMI long-term	0.9486
zBMI short-term	0.3955
zBMI medium-term	0.4642
zBMI long-term	0.4115

Appendix 8. Subgroup analyses

We conducted subgroup analyses by main setting of the interventions, country income status, participants' socioeconomic status and duration of the interventions. Here we present the results of the tests for subgroup differences and all the meta-analysis results in summary forest plots, and for each analysis we selectively highlight subgroups in which an effect was observed.

8.1 Test for subgroup differences

The following table shows the results of the test for subgroup differences (P value) alongside the total number of studies and the number of studies in each subgroup.

Comparison: Dietary intervention vs control

Meta-analysis outcome	N of studies (total)	Setting		Socioeconomic status		Country income		Duration of intervention	
		N of studies/subgroup (school/home/school + home/other)	P	N of studies/subgroup (low/mixed)	P	N of studies/subgroup (high/non-high)	P	N of studies/subgroup (short/medium/long)	P
BMI short-term	5	1/2/1/1	0.64	1/4	0.26	4/1	0.26	5/0/0	n/a
BMI medium-term	9	6/1/1/1	0.10	5/4	0.71	6/3	0.12	2/6/1	0.87
BMI long-term	2	2/0/0/0	n/a	1/1	0.30	2/0	n/a	0/1/1	0.30
zBMI short-term	8	3/2/1/2	0.84	0/8	n/a	8/0	n/a	7/0/1	0.20
zBMI medium-term	9	6/0/1/2	0.78	4/5	0.31	8/1	0.83	1/5/3	0.71
zBMI long-term	7	6/0/0/1	0.02	2/5	0.54	6/1	0.14	1/2/4	0.69
Percentile short-term	3	0/1/0/2	0.05	0/3	n/a	3/0	n/a	2/0/1	0.05
Percentile medium-term	3	2/0/1/0	0.11	3/0	n/a	3/0	n/a	1/1/1	0.27
Percentile long-term	2	2/0/0/0	n/a	2/0	n/a	2/0	n/a	0/0/2	n/a

Comparison: Activity intervention vs control

Meta-analysis outcome	N of studies (total)	Setting		Socioeconomic status		Country income		Duration of intervention	
		N of studies/subgroup (school/home/school + home/other)	P	N of studies/subgroup (low/mixed)	P	N of studies/subgroup (high/non-high)	P	N of studies/subgroup (short/medium/long)	P
BMI short-term	14	12/1/1/0	0.01	2/12	0.74	12/2	0.002	14/0/0	n/a
BMI medium-term	16	15/0/1/0	0.42	2/14	0.94	12/4	0.05	5/9/2	0.02

(Continued)

BMI long-term	8	8/0/0/0	n/a	0/8	n/a	7/1	0.86	0/3/5	0.03
zBMI short-term	6	3/1/1/1	0.97	1/5	0.14	6/0	n/a	5/1/0	0.14
zBMI medium-term	13	11/0/1/1	0.47	3/10	0.25	9/4	0.02	3/7/3	0.37
zBMI long-term	6	6/0/0/0	n/a	0/6	n/a	4/2	0.90	0/2/4	0.20
Percentile short-term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	1/0/0	n/a
Percentile medium-term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long-term	3	3/0/0/0	n/a	1/2	0.97	3/0	n/a	0/0/3	n/a

Comparison: Dietary and activity intervention vs control

Meta-analysis outcome	**N of studies (total)**	**Setting**		**Socioeconomic status**		**Country income**		**Duration of intervention**	
		N of studies/subgroup (school/home/school + home/other)	**P**	**N of studies/subgroup (low/mixed)**	**P**	**N of studies/subgroup (high/non-high)**	**P**	**N of studies/subgroup (short/medium/long)**	**P**
BMI short-term	27	16/0/2/9	0.07	8/19	0.05	21/6	0.63	21/5/1	0.0001
BMI medium-term	21	13/2/2/4	0.86	6/15	0.92	16/5	0.52	4/14/3	0.11
BMI long-term	16	12/2/0/2	0.80	5/11	0.69	15/1	0.001	0/6/10	0.80
zBMI short-term	26	12/1/2/11	< 0.0001	6/20	0.89	21/5	0.21	21/3/2	0.51
zBMI medium-term	24	13/2/3/6	0.09	5/19	0.34	17/7	0.09	6/15/3	0.003
zBMI long-term	22	12/2/4/4	0.29	6/16	0.12	20/2	0.65	3/7/12	0.18
Percentile short-term	5	2/1/0/2	0.87	2/3	0.14	5/0	n/a	5/0/0	n/a
Percentile medium-term	8	4/1/2/1	0.51	3/5	0.18	8/0	n/a	2/5/1	0.35
Percentile long-term	5	2/1/1/1	< 0.0001	2/3	0.004	5/0	n/a	1/2/2	0.01

(Continued)

Comparison: Activity intervention vs dietary intervention

Meta-analysis outcome	N of studies (total)	Setting		Socioeconomic status		Country income		Duration of intervention	
		N of studies/subgroup (school/home/school + home/other)	P	N of studies/subgroup (low/mixed)	P	N of studies/subgroup (high/non-high)	P	N of studies/subgroup (short/medium/long)	P
BMI short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
BMI medium-term	2	1/0/1/0	0.55	1/1	0.55	1/1	0.55	1/1/0	0.55
BMI long-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI medium-term	2	1/0/1/0	0.52	1/1	0.52	1/1	0.52	1/1/0	0.52
zBMI long-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium-term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long-term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a

Comparison: Dietary and activity intervention vs dietary intervention

Meta-analysis outcome	N of studies (total)	Setting		Socioeconomic status		Country income		Duration of intervention	
		N of studies/subgroup (school/home/school + home/other)	P	N of studies/subgroup (low/mixed)	P	N of studies/subgroup (high/non-high)	P	N of studies/subgroup (short/medium/long)	P
BMI short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
BMI medium-term	2	0/0/1/1	0.45	1/1	0.45	2/0	n/a	1/1/0	0.45

(Continued)

BMI long-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
zBMI medium-term	2	0/0/1/1	0.89	1/1	0.89	2/0	n/a	1/1/0	0.89
zBMI long-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium-term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long-term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a

Comparison: Dietary and activity intervention vs activity intervention

Meta-analysis outcome	N of studies (total)	Setting		Socioeconomic status		Country income		Duration of intervention	
		N of studies/subgroup (school/home/school + home/other)	P	N of studies/subgroup (low/mixed)	P	N of studies/subgroup (high/non-high)	P	N of studies/subgroup (short/medium/long)	P
BMI short-term	2	1/1/0/0	0.70	0/2	n/a	2/0	n/a	2/0/0	n/a
BMI medium-term	2	1/0/1/0	0.96	1/1	0.96	2/0	n/a	2/0/0	n/a
BMI long-term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	0/0/1	n/a
zBMI short-term	1	1/0/0/0	n/a	0/1	n/a	1/0	n/a	1/0/0	n/a
zBMI medium-term	2	1/0/1/0	0.001	1/1	0.001	2/0	n/a	2/0/0	n/a
zBMI long-term	1	0/1/0/0	n/a	0/1	n/a	1/0	n/a	0/0/1	n/a
Percentile short-term	0	0/0/0/0	n/a	0/0	n/a	0/0	n/a	0/0/0	n/a
Percentile medium-term	1	0/0/1/0	n/a	1/0	n/a	1/0	n/a	1/0/0	n/a
Percentile long-term	1	1/0/0/0	n/a	1/0	n/a	1/0	n/a	0/0/1	n/a

Abbreviations

(Continued)
BMI: body mass index; N: number; n/a: not applicable; vs: versus; zBMI: standardised body mass index.

8.2 Subgroup analysis by setting

Summary forest plots for subgroup analyses by setting (school, home, school and home, other) are provided in Figure 15; Figure 16; Figure 17; Figure 18; Figure 19; Figure 20 for BMI; Figure 21; Figure 22; Figure 23; Figure 24; Figure 25; Figure 26 for zBMI; Figure 27; Figure 28; Figure 29; Figure 30; Figure 31; Figure 32 for BMI percentile. The results of the test for subgroup differences by setting are reported in the table above.

Figure 15. Summary of meta-analysis results for dietary intervention vs control on BMI subgrouped by setting.
Abbreviations
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

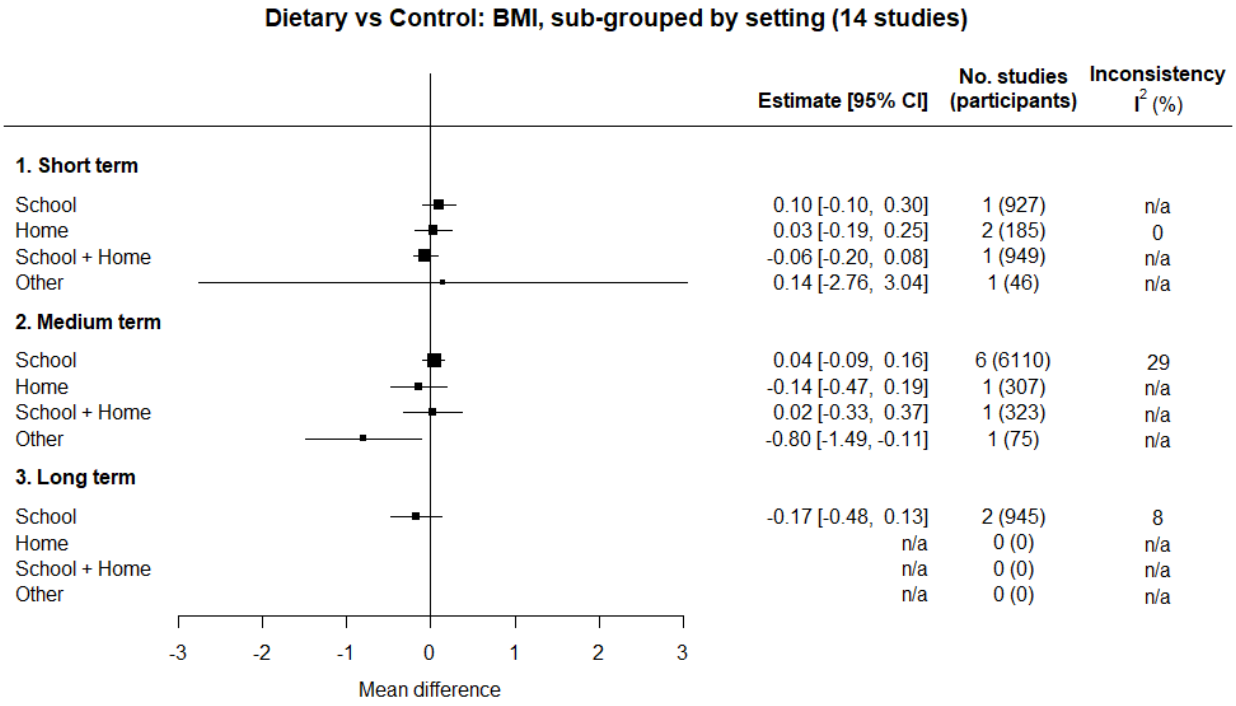


Figure 16. Summary of meta-analysis results for activity interventions vs control on BMI subgrouped by setting.
Abbreviations
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

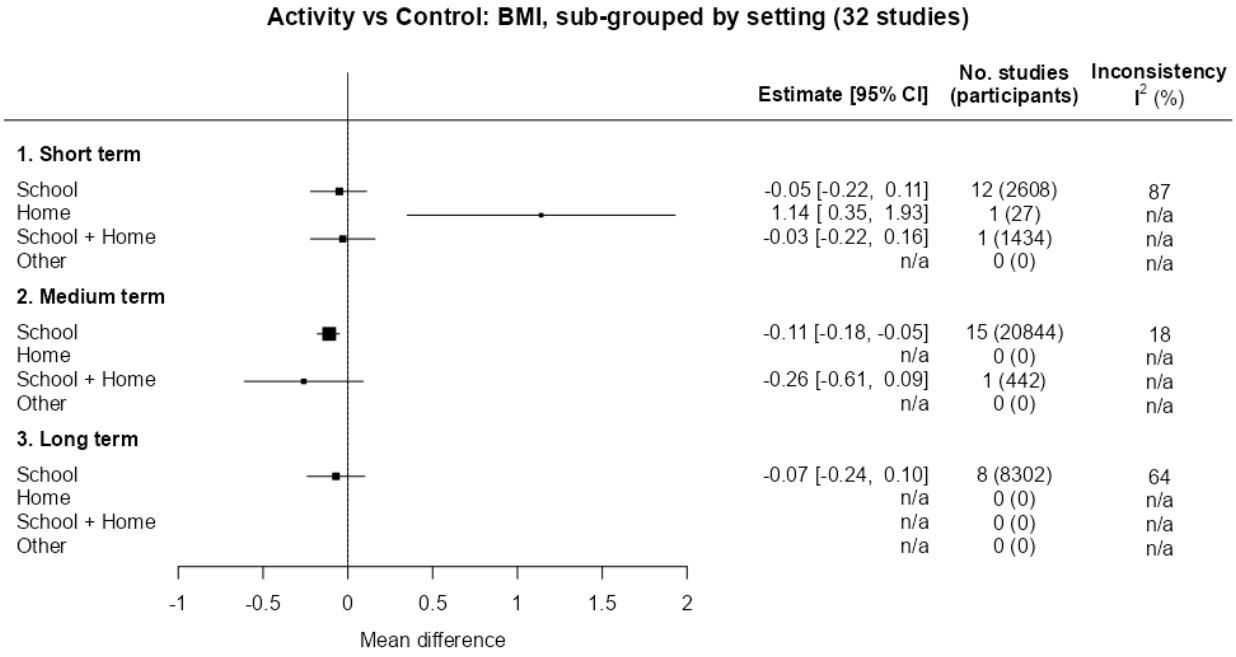


Figure 17. Summary of meta-analysis results for dietary and activity interventions vs control on BMI subgrouped by setting. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

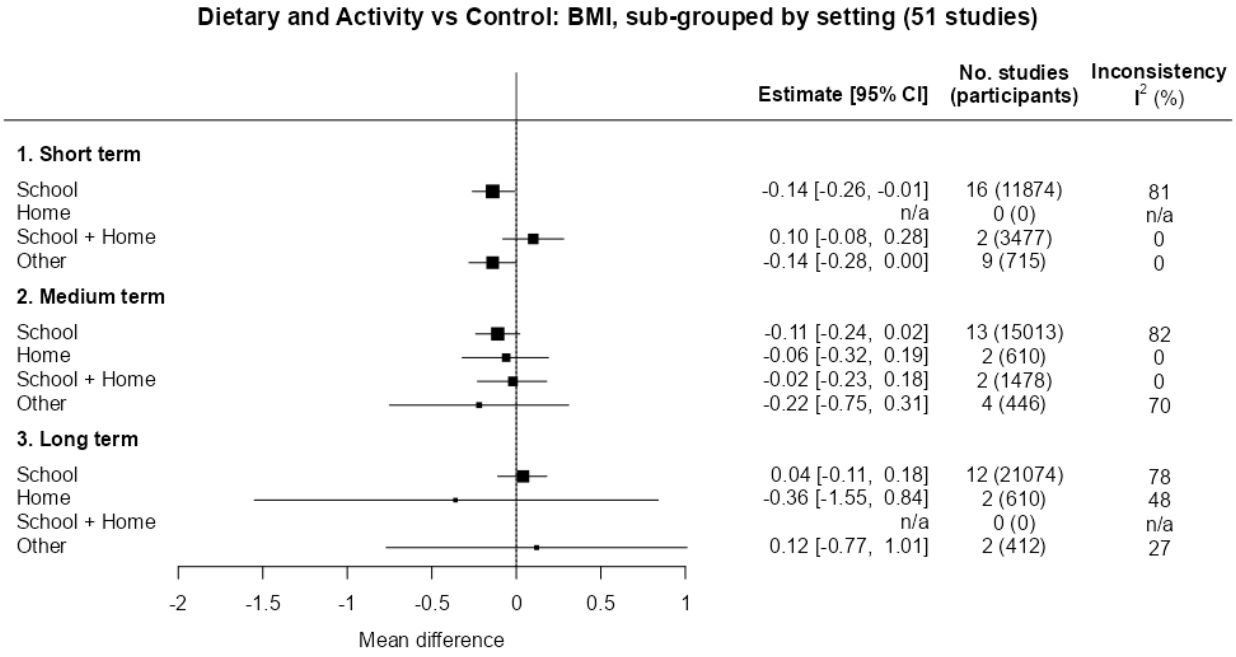


Figure 18. Summary of meta-analysis results for activity interventions vs dietary interventions on BMI subgrouped by setting. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

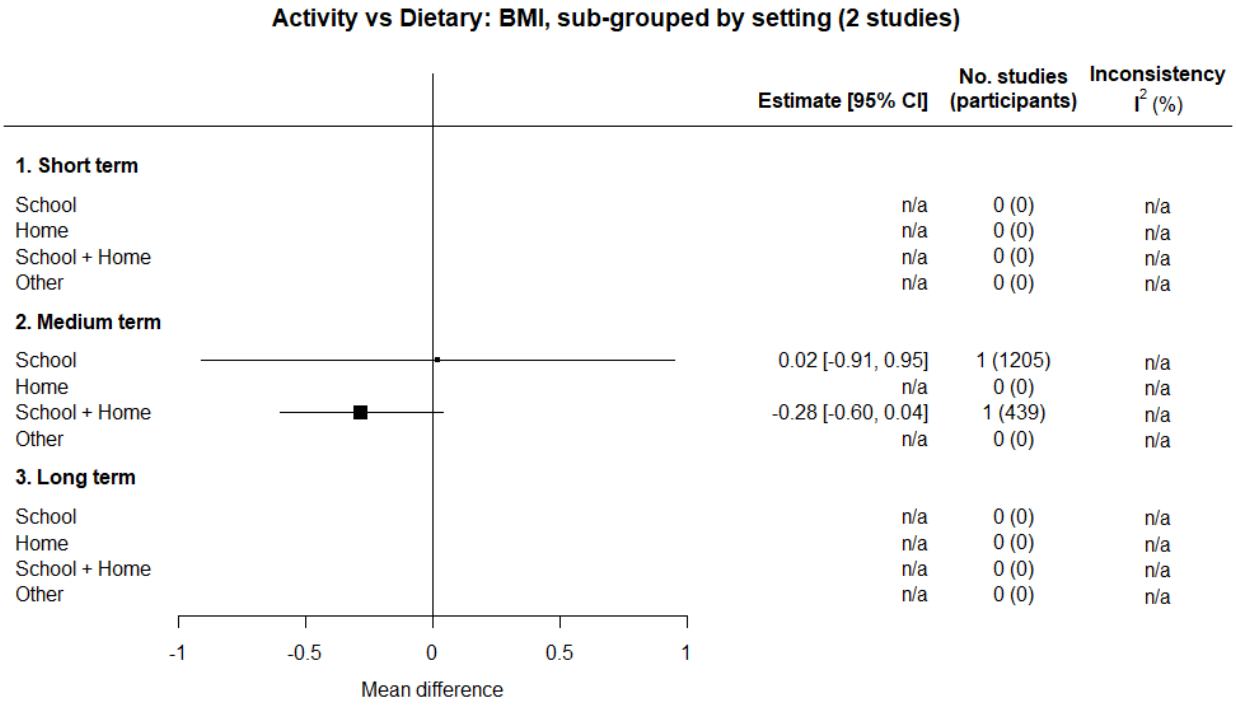


Figure 19. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI subgrouped by setting. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

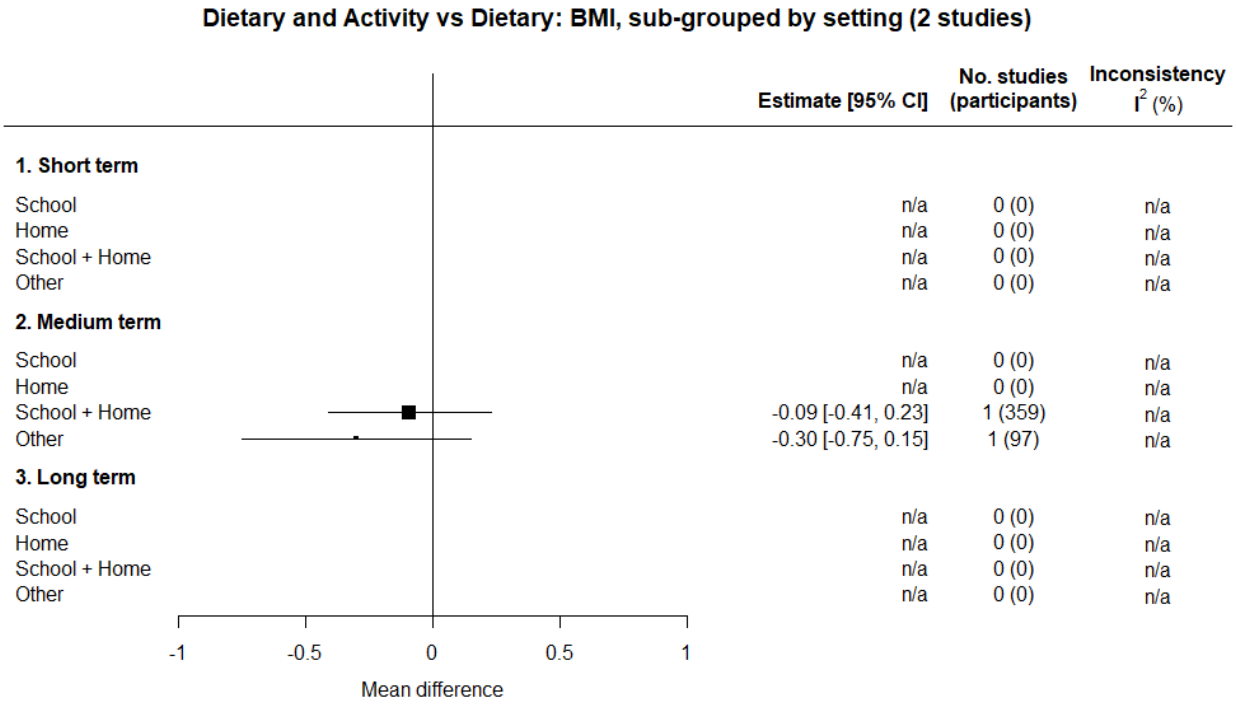


Figure 20. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI subgrouped by setting. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

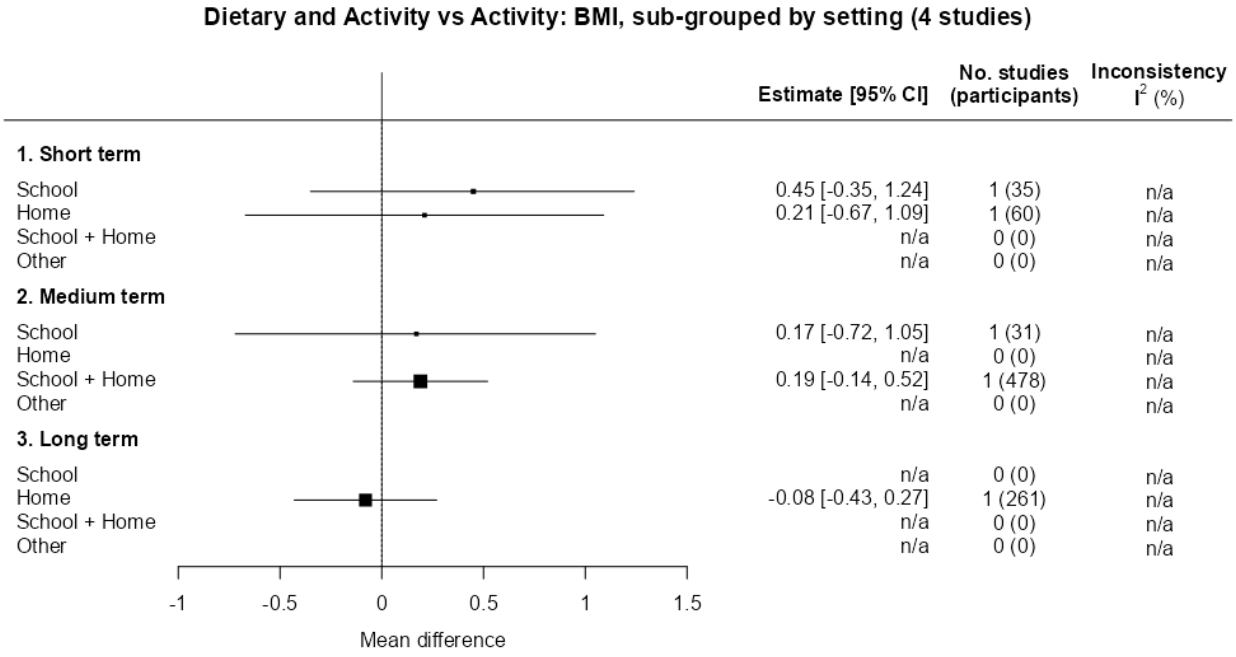


Figure 21. Summary of meta-analysis results for dietary interventions vs control on zBMI subgrouped by setting.
Abbreviations
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

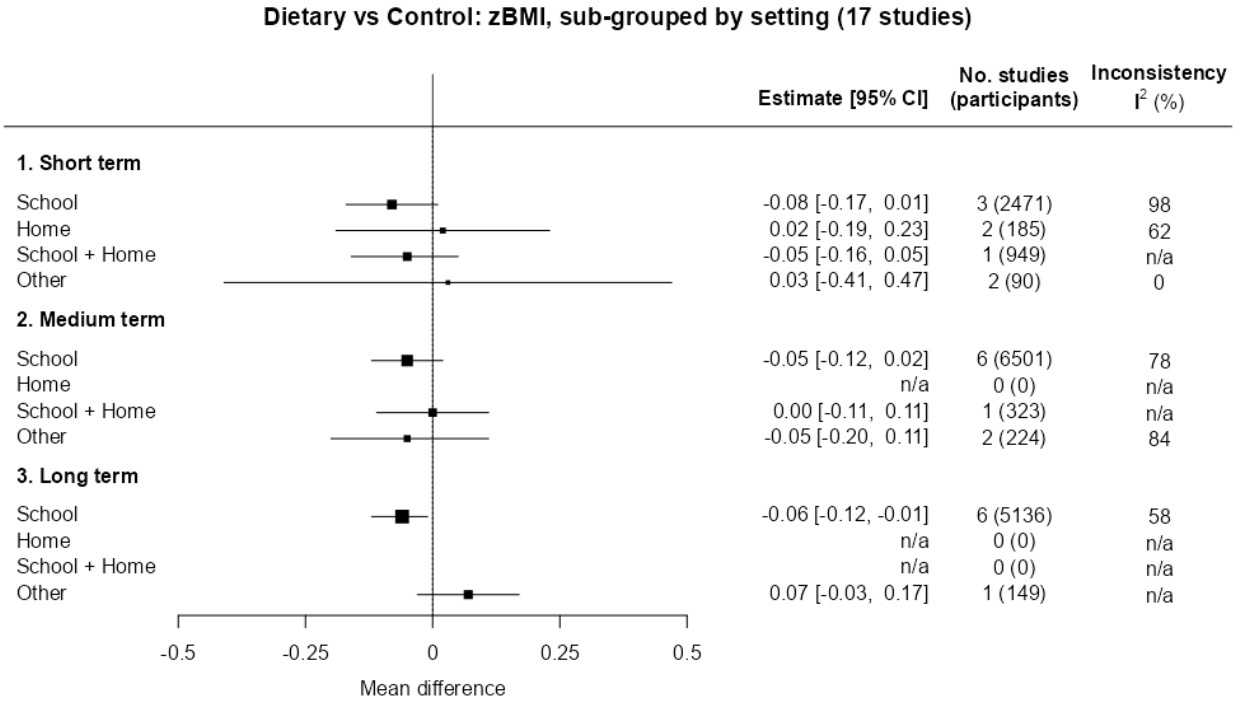


Figure 22. Summary of meta-analysis results for activity interventions vs control on zBMI subgrouped by setting.
Abbreviations
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

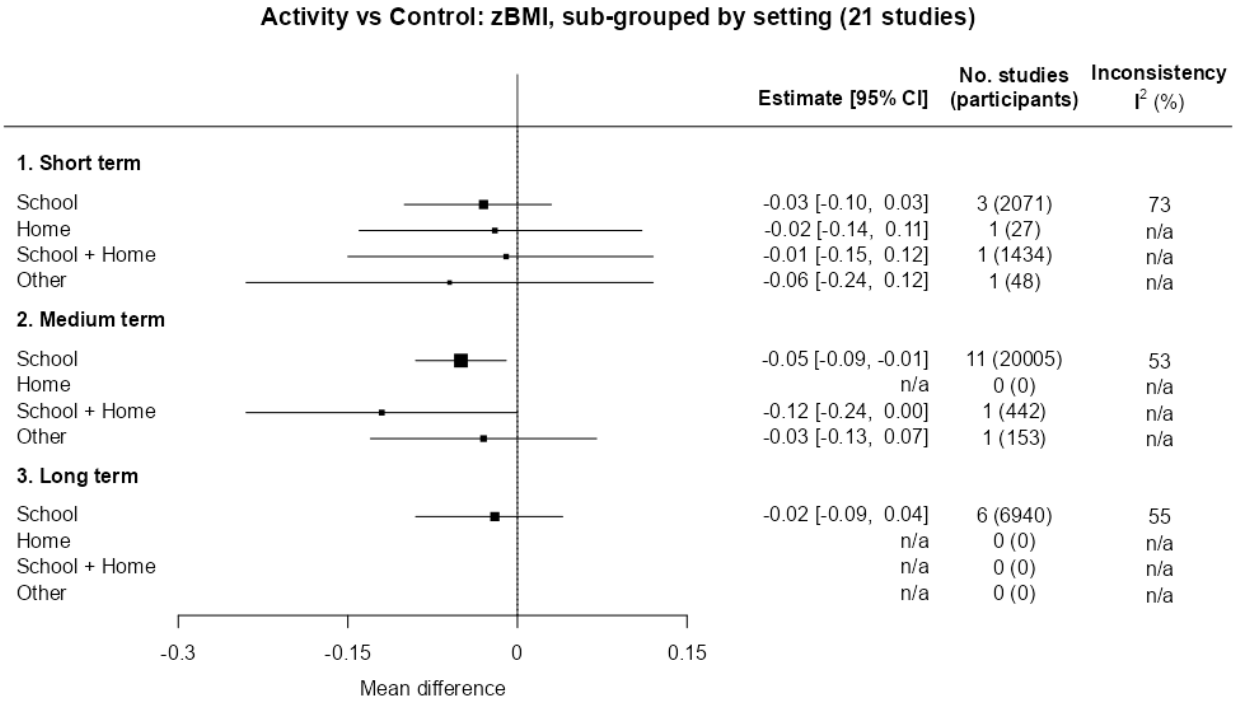


Figure 23. Summary of meta-analysis results for dietary and activity interventions vs control on zBMI subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

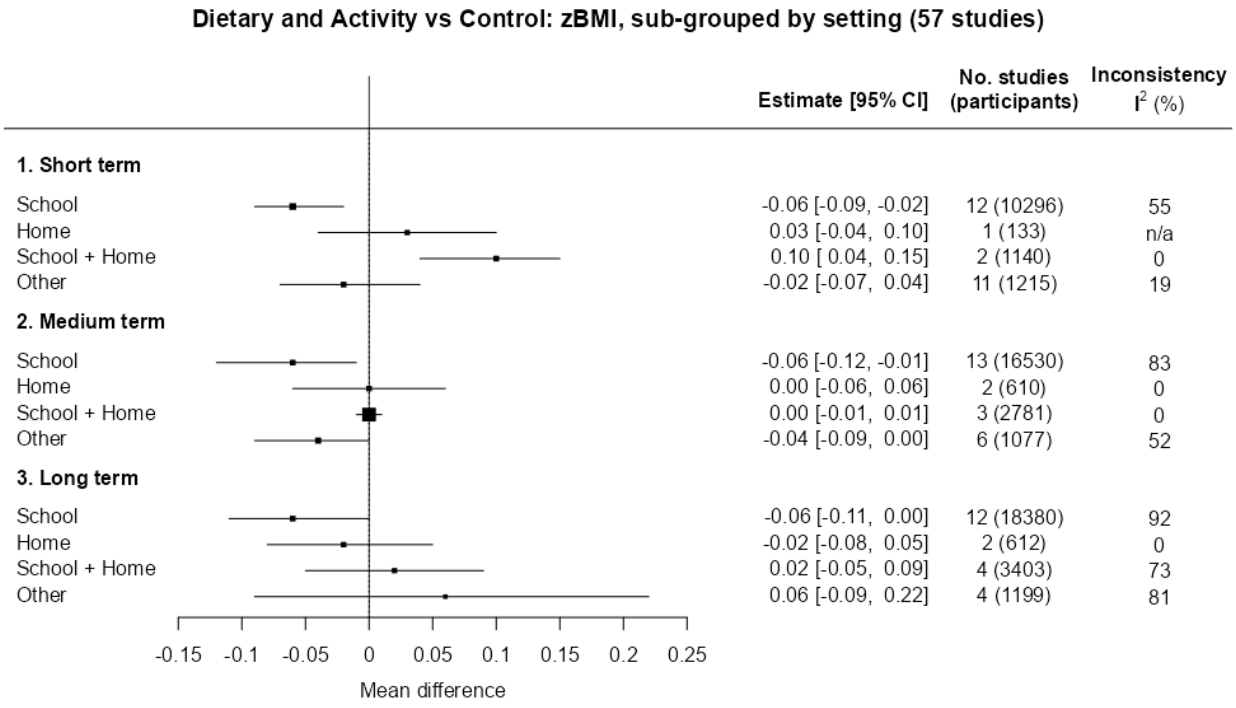


Figure 24. Summary of meta-analysis results for activity interventions vs dietary interventions on zBMI subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

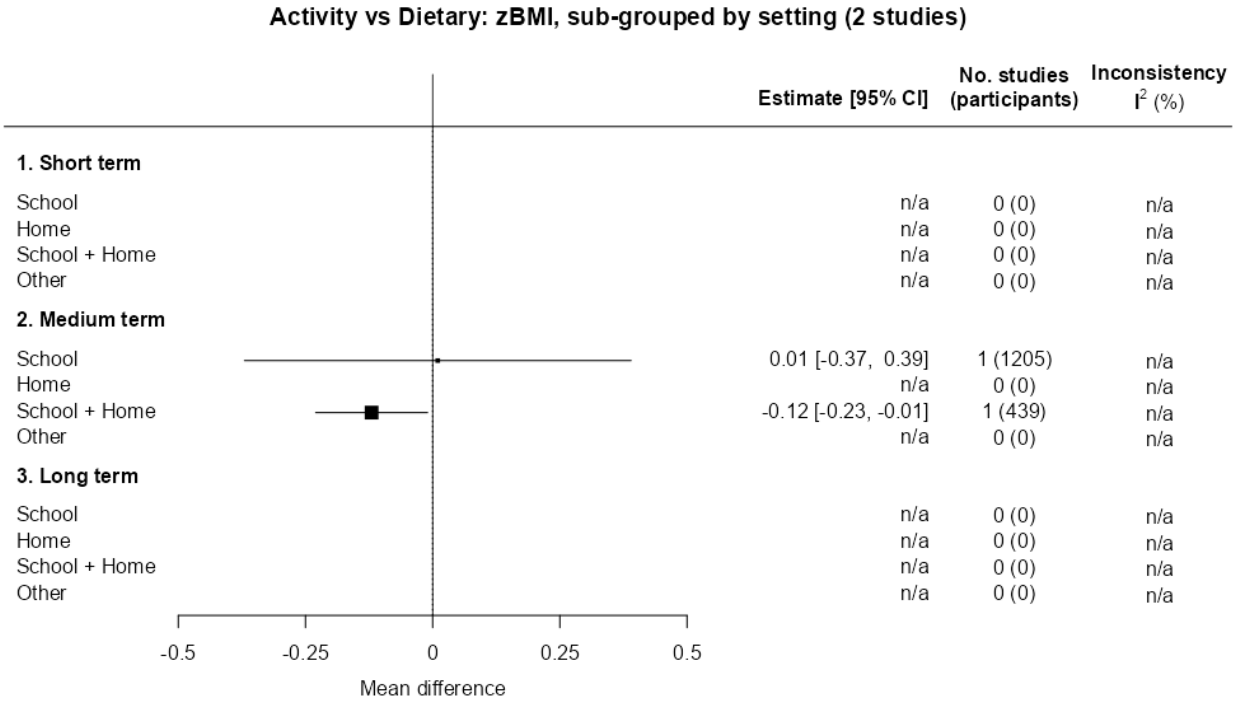


Figure 25. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on zBMI subgrouped by setting *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

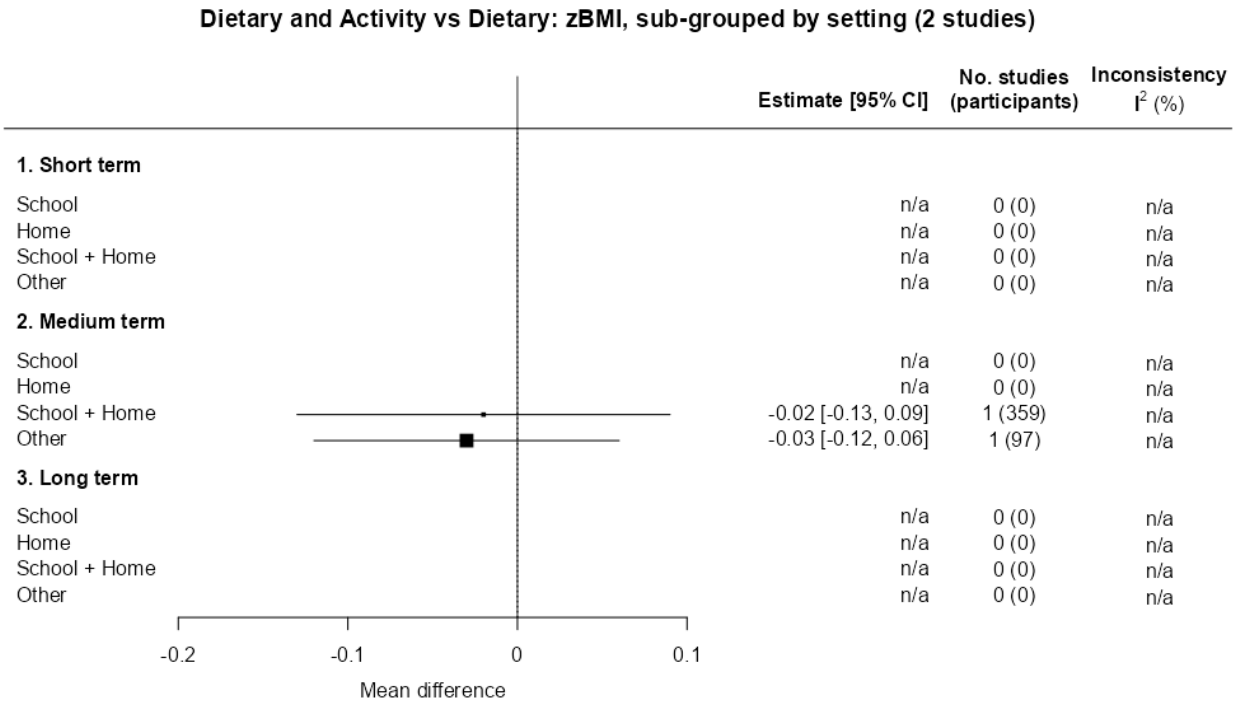


Figure 26. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on zBMI subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

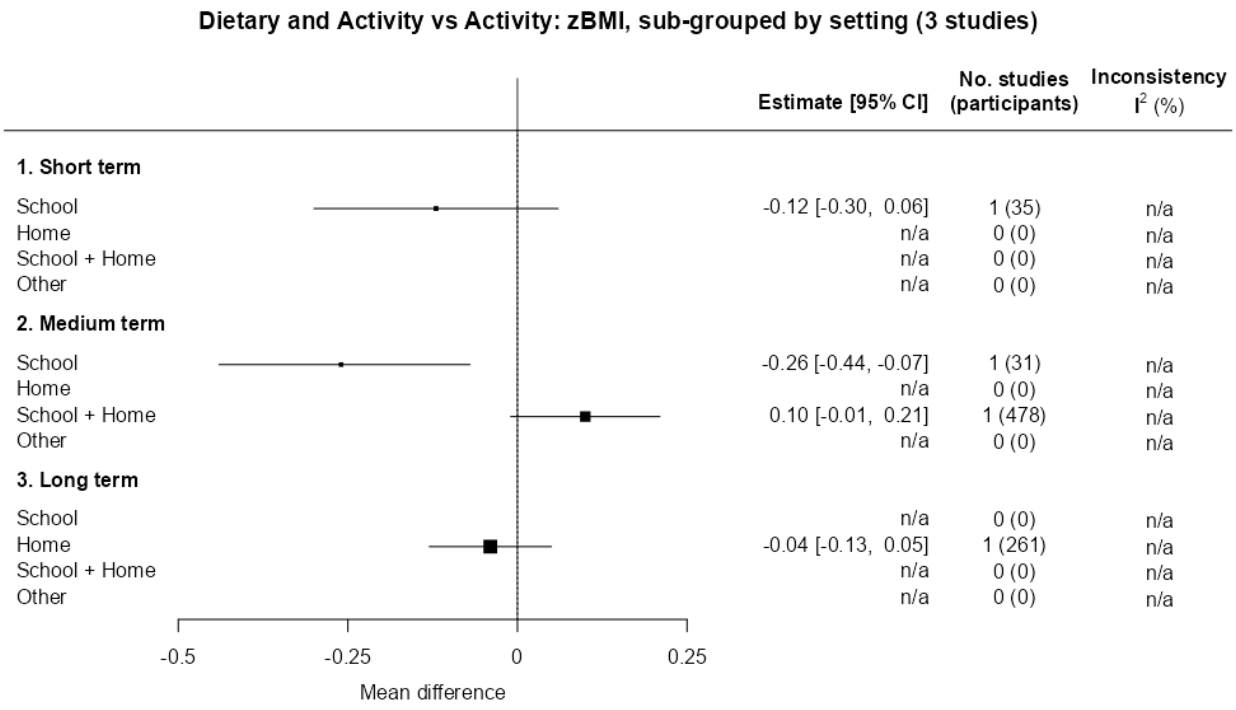


Figure 27. Summary of meta-analysis results for dietary interventions vs control on BMI percentile subgrouped by setting. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

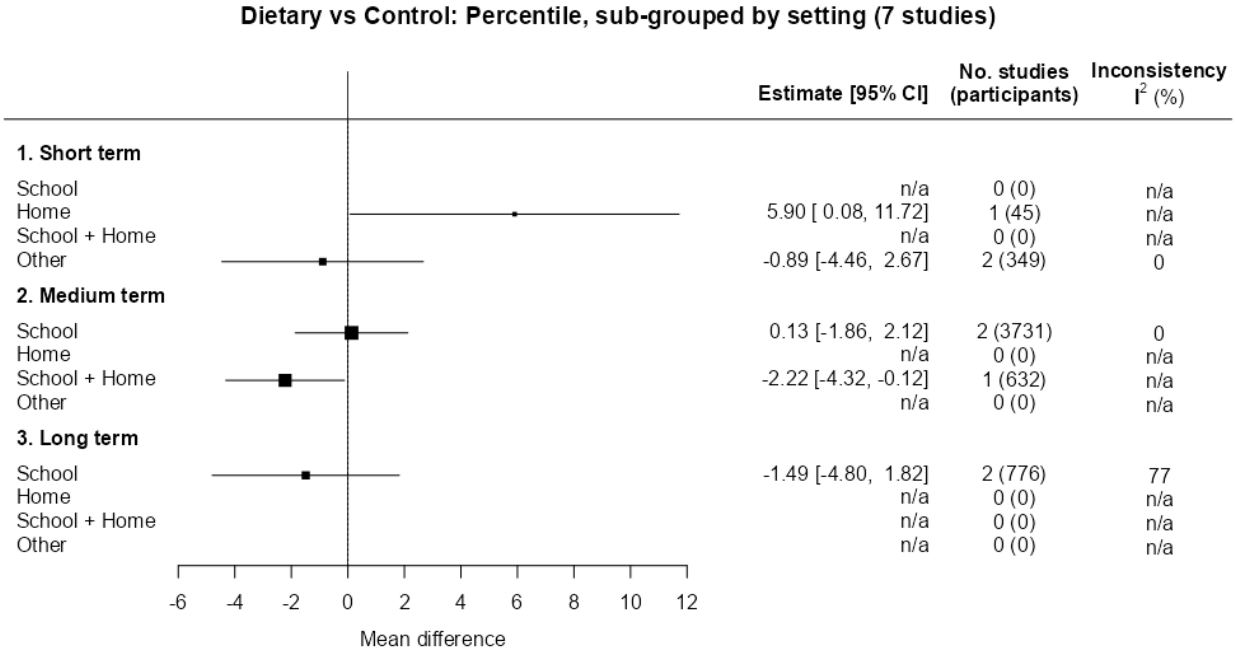


Figure 28. Summary of meta-analysis results for activity interventions vs control on BMI percentile subgrouped by setting. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

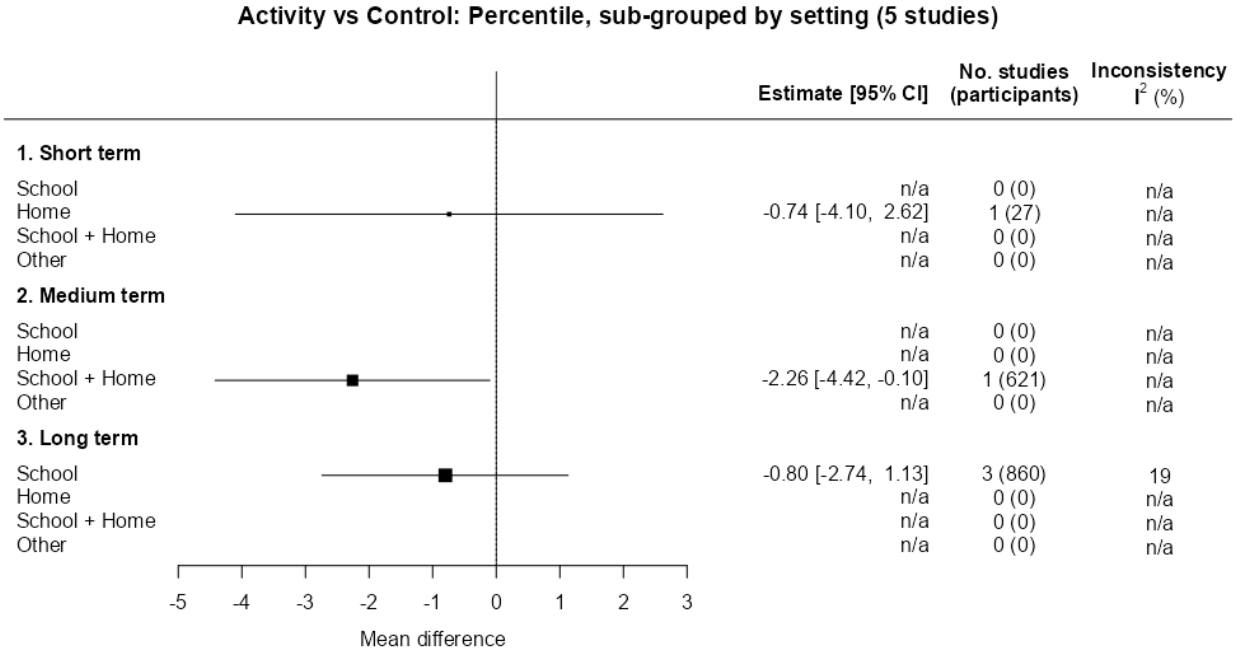


Figure 29. Summary of meta-analysis results for dietary and activity interventions vs control on BMI percentile subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

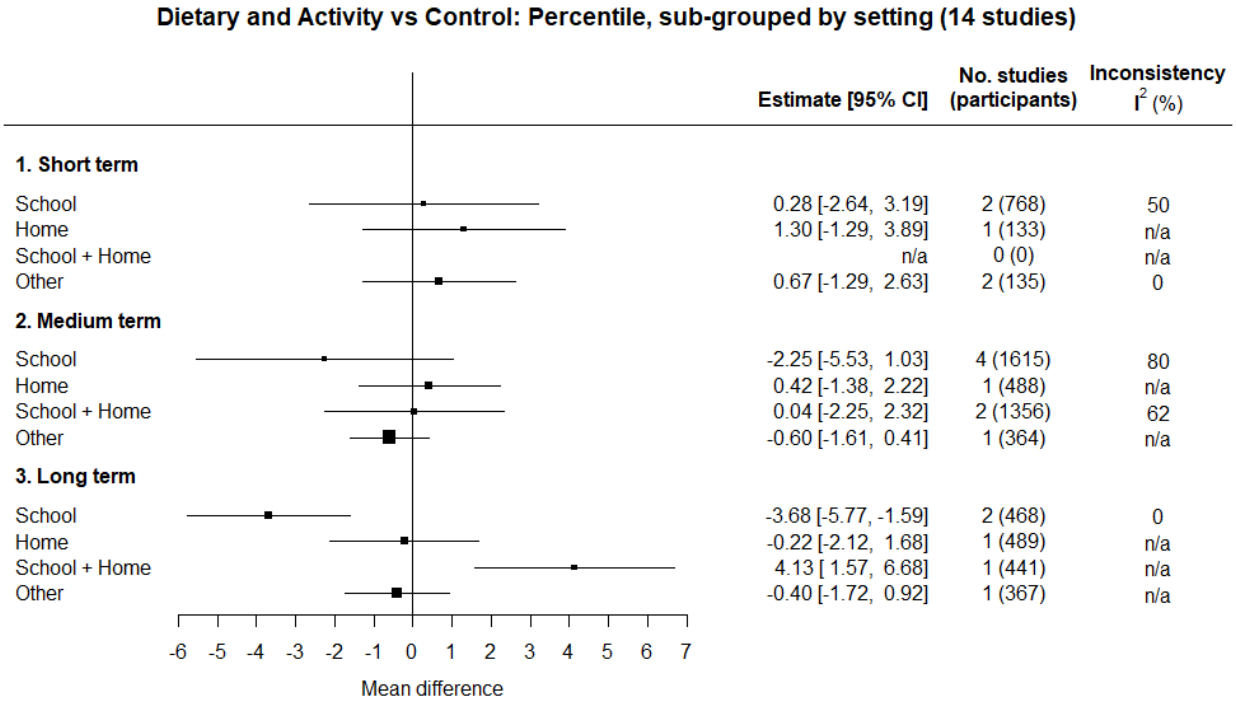


Figure 30. Summary of meta-analysis results for activity interventions vs dietary interventions on BMI percentile subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

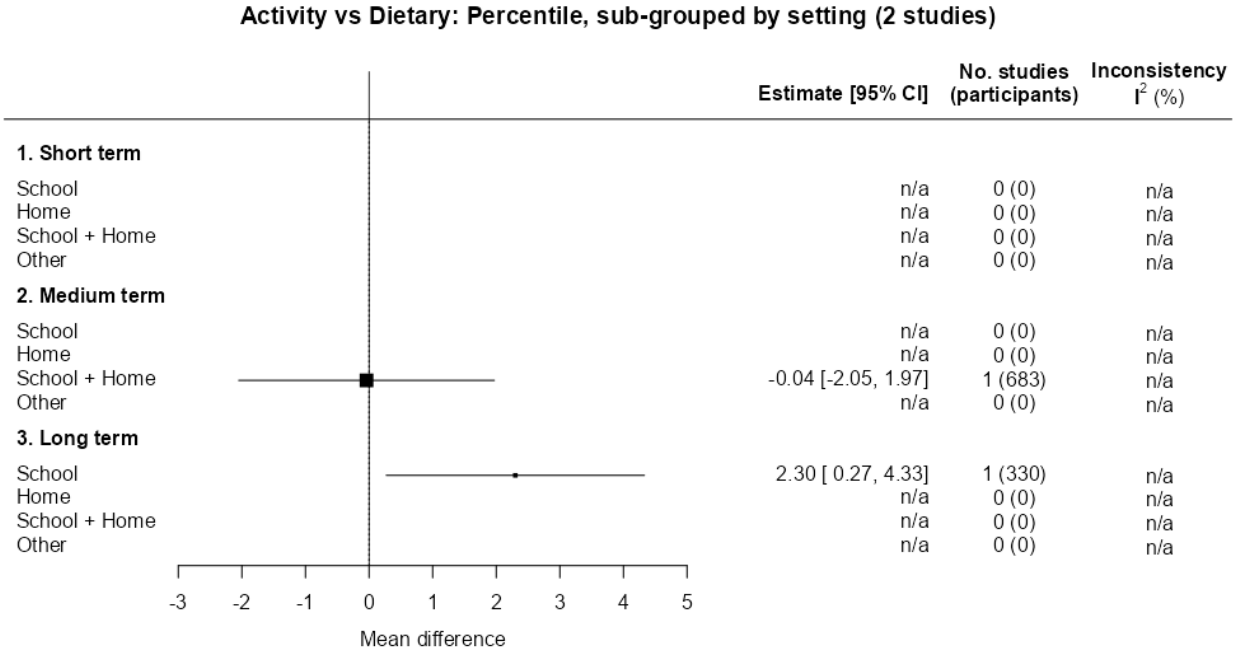


Figure 31. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI percentile subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

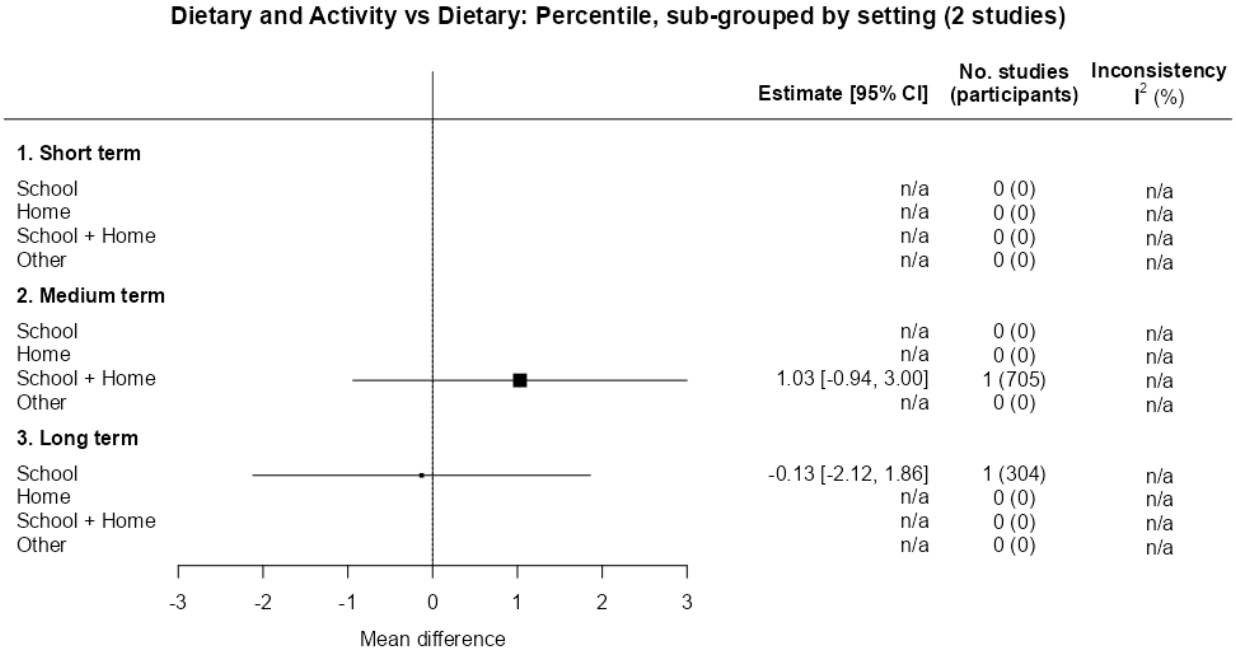
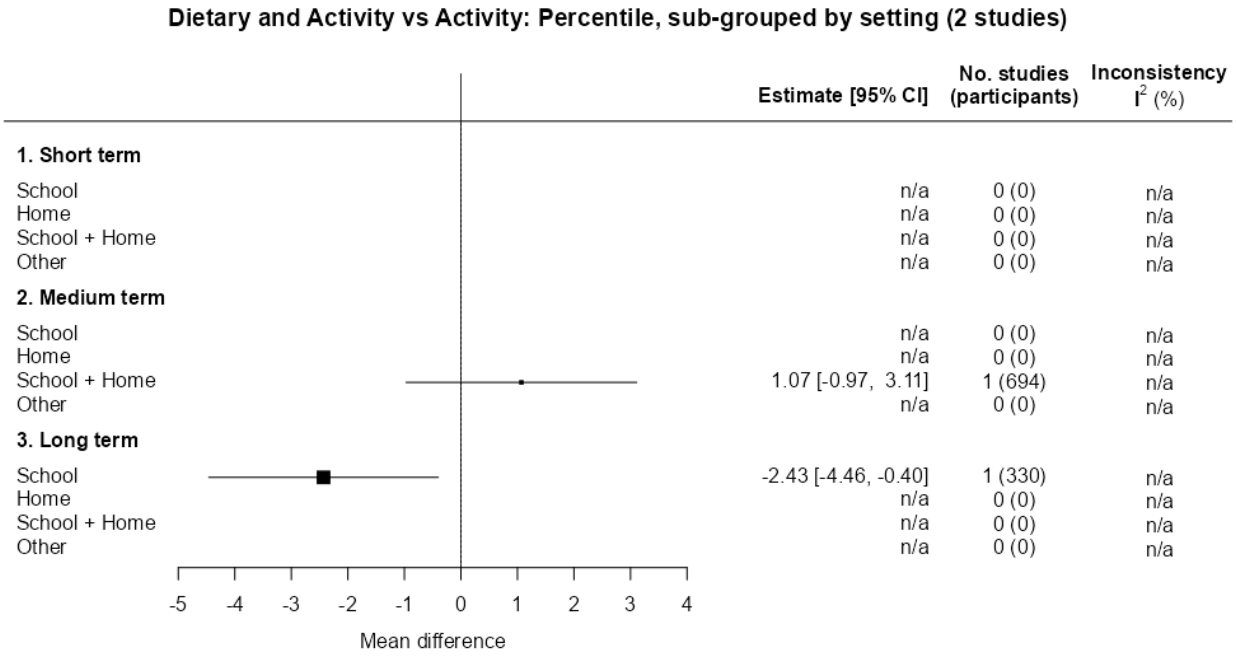


Figure 32. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI percentile subgrouped by setting. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus



For dietary intervention versus control there was evidence of differences in effect between subgroups in zBMI at long-term follow-up (P = 0.02) and in BMI percentile at short-term follow-up (P = 0.05), but not in BMI at short-term (P = 0.64) and long-term follow-up (P = 0.1), zBMI at short-term (P = 0.84) and medium-term follow-up (P = 0.78) or in BMI percentile at medium-term follow-up (P = 0.11).

For activity intervention versus control there was evidence of differences in effect between subgroups in BMI at short-term follow-up (P = 0.01), but not in BMI at medium-term follow-up (P = 0.42), or zBMI at short-term (P = 0.97) and medium-term follow-up (P = 0.47).

For dietary and activity intervention versus control there was evidence of differences in effect between subgroups in zBMI at short-term follow-up (P < 0.0001) and in BMI percentile at long-term follow-up (P < 0.0001), but not in BMI at short-term (P = 0.07), medium-term (P = 0.86) and long-term follow-up (P = 0.80), in zBMI at medium-term (P = 0.09) and long-term follow-up (P = 0.29), or in BMI percentile at short-term (P = 0.87) and medium-term follow-up (P = 0.51).

For activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.55) and in zBMI at medium-term follow-up (P = 0.52).

For dietary and activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.45) and in zBMI at medium-term follow-up (P = 0.89).

For dietary and activity interventions versus activity interventions there was evidence of differences in effect between subgroups in zBMI at medium-term follow-up (P < 0.001), but not in BMI at short-term (P = 0.7) and medium-term follow-up (P = 0.96).

8.2.1 School

In studies in which the interventions were conducted at school, we found that dietary interventions, compared with control, may reduce zBMI at long-term follow-up (MD -0.06, 95% CI -0.12 to -0.01; 6 studies, 5136 participants), but may have little to no effect on BMI and zBMI at short-term (BMI: MD 0.1, 95% CI -0.1 to 0.3; 1 study, 927 participants; zBMI: MD -0.08, 95% CI -0.17 to 0.01; 3 studies, 2471 participants) and medium-term follow-up (BMI: MD 0.04, 95% CI -0.09 to 0.16; 6 studies, 6110 participants; zBMI: MD -0.05, 95% CI -0.12 to 0.02; 6 studies,

6501 participants), on BMI at long-term follow-up (MD -0.17, 95% CI -0.48 to 0.13; 2 studies, 945 participants), and on BMI percentile at medium-term (MD 0.13, 95% CI -1.86 to 2.12; 2 studies, 3731 participants) and long-term follow-up (MD -1.49, 95% CI -4.8 to 1.82; 2 studies, 776 participants).

We found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.11, 95% CI -0.18 to -0.04; 15 studies, 20,844 participants; zBMI: MD -0.05, 95% CI -0.09 to -0.01; 11 studies, 20,005 participants), but may have little to no effect on BMI and zBMI at short-term (BMI: MD -0.05, 95% CI -0.22 to 0.11; 12 studies, 2608 participants; MD -0.03, 95% CI -0.1 to 0.03; 3 studies, 2071 participants) and long-term follow-up (BMI: MD -0.07, 95% CI -0.24 to 0.1; 8 studies, 8302 participants; zBMI: MD -0.02, 95% CI -0.09 to 0.04; 6 studies, 6940 participants), and on BMI percentile at long-term follow-up (MD -0.8, 95% CI -2.74 to 1.13; 3 studies, 860 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI and zBMI at short-term follow-up (BMI: MD -0.14, 95% CI -0.26 to -0.01; 16 studies, 11,874 participants; zBMI: MD -0.06, 95% CI -0.09 to -0.02; 12 studies, 10,296 participants), zBMI at medium-term (MD -0.06, 95% CI -0.12 to -0.01; 13 studies, 16,530 participants) and long-term follow-up (MD -0.06, 95% CI -0.11 to 0; 12 studies, 18,380 participants), and BMI percentile at long-term follow-up (MD -3.68, 95% CI -5.77 to -1.59; 2 studies, 468 participants). Dietary and activity interventions, compared with control, may have little to no effect on BMI at medium-term (MD -0.11, 95% CI -0.24 to 0.02; 13 studies, 15,013 participants) and long-term follow-up (MD 0.04, 95% CI -0.11 to 0.18; 12 studies, 21,074 participants), and on BMI percentile at short-term (MD 0.28, 95% CI -2.64 to 3.19; 2 studies, 768 participants) and medium-term follow-up (MD -2.25, 95% CI -5.53 to 1.03; 4 studies, 1615 participants).

We found that dietary interventions compared with activity interventions may increase BMI percentile at long-term follow-up (MD 2.3, 95% CI 0.27 to 4.33; 1 study, 330 participants), but may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD 0.02, 95% CI -0.91 to 0.95; 1 study, 1205 participants; zBMI: MD 0.01, 95% CI -0.37 to 0.39; 1 study, 1205 participants).

We found that a dietary and activity intervention, compared with a dietary intervention may have little to no effect on BMI percentile at long-term follow-up (MD -0.13, 95% CI -2.12 to 1.86; 1 study, 304 participants).

We also found that a dietary and activity intervention, compared with an activity intervention, may reduce zBMI at medium-term follow-up (MD -0.26, 95% CI -0.44 to -0.07; 1 study, 31 participants) and BMI percentile at long-term follow-up (MD -2.43, 95% CI -4.46 to -0.4; 1 study, 330 participants), but may have little to no effect on BMI and zBMI at short-term follow-up (BMI: MD 0.45, 95% CI -0.35 to 1.24; 1 study, 35 participants; zBMI: MD -0.12, 95% CI -0.3 to 0.06; 1 study, 35 participants), and on BMI at medium-term follow-up (MD 0.17, 95% CI -0.72 to 1.05; 1 study, 31 participants).

8.2.2 Home

In studies conducted at home we found that dietary interventions, compared with control, may increase BMI percentile at short-term follow-up (MD 5.9, 95% CI 0.08 to 11.72; 1 study, 45 participants), but may have little to no effect on BMI and zBMI at short-term follow-up (BMI: MD 0.03, 95% CI -0.19 to 0.25; 2 studies, 185 participants; zBMI: MD 0.02, 95% CI -0.19 to 0.23; 2 studies, 185 participants) and BMI at medium-term follow-up (MD -0.14, 95% CI -0.47 to 0.19; 1 study, 307 participants).

We found that activity interventions, compared with control, may increase BMI at short-term follow-up (MD 1.14, 95% CI 0.35 to 1.93; 1 study, 27 participants), but may have little to no effect on zBMI and BMI percentile at short-term follow-up (zBMI: MD -0.02, 95% CI -0.14 to 0.11; 1 study, 27 participants; BMI percentile: MD -0.74, 95% CI -4.1 to 2.62; 1 study, 27 participants).

We found that dietary and activity interventions, compared with control, may have little to no effect on zBMI and BMI percentile at short-term follow-up (zBMI: MD 0.03, 95% CI -0.04 to 0.1; 1 study, 133 participants; BMI percentile: MD 1.3, 95% CI -1.29 to 3.89; 1 study, 133 participants); BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.06, 95% CI -0.32 to 0.19; 2 studies, 610 participants; zBMI: MD 0, 95% CI -0.06 to 0.06; 2 studies, 610 participants; BMI percentile: MD 0.42, 95% CI -1.38 to 2.22; 1 study, 488 participants) and on BMI, zBMI and BMI percentile at long-term follow-up (MD -0.36, 95% CI -1.55 to 0.84; 2 studies, 610 participants; zBMI: MD -0.02, 95% CI -0.08 to 0.05; 2 studies, 612 participants; BMI percentile: MD -0.22, 95% CI -2.12 to 1.68; 1 study, 489 participants).

We also found that a dietary and activity intervention, compared with an activity intervention, may have little to no effect on BMI at short-term follow-up (MD 0.21, 95% CI -0.67 to 1.09; 1 study, 60 participants) and on zBMI and BMI percentile at long-term follow-up (zBMI: MD -0.08, 95% CI -0.43 to 0.27; 1 study, 261 participants; BMI percentile: MD -0.04, 95% CI -0.13 to 0.05; 1 study, 261 participants).

8.2.3 School and home

In studies in which the interventions were conducted at school and home, we found that dietary interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.22, 95% CI -4.32 to -0.12; 1 study, 632 participants), but may have little to no effect on BMI and zBMI at short-term (BMI: MD -0.06, 95% CI -0.2 to 0.08; 1 study, 949 participants; zBMI: MD -0.05, 95% CI -0.16 to 0.05; 1 study, 949 participants) and at medium-term follow-up (BMI: MD 0.02, 95% CI -0.33 to 0.37; 1 study, 323 participants; zBMI: MD 0, 95% CI -0.11 to 0.11; 1 study, 323 participants).

We found that activity interventions, compared with control, may reduce zBMI and BMI percentile at medium-term follow-up (zBMI: MD -0.12, 95% CI -0.24 to 0; 1 study, 442 participants; BMI percentile: MD -2.26, 95% CI -4.42 to -0.1; 1 study, 621 participants), but may have little

to no effect on BMI and zBMI at short-term follow-up (BMI: MD -0.03, 95% CI -0.22 to 0.16; 1 study, 1434 participants; zBMI: MD -0.01, 95% CI -0.15 to 0.12; 1 study, 1434 participants) and BMI at medium-term follow-up (MD -0.26, 95% CI -0.61 to 0.09; 1 study, 442 participants).

We found that dietary and activity interventions, compared with control, may increase zBMI at short-term follow-up (MD 0.1, 95% CI 0.04 to 0.15; 2 studies, 1140 participants) and BMI percentile at long-term follow-up (MD 4.13, 95% CI 1.57 to 6.68; 1 study, 441 participants), but may have little to no effect on BMI at short-term follow-up (MD 0.1, 95% CI -0.08 to 0.28; 2 studies, 3477 participants), on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.02, 95% CI -0.23 to 0.18; 2 studies, 1478 participants; zBMI: MD 0, 95% CI -0.01 to 0.01; 3 studies, 2781 participants; BMI percentile: MD 0.04, 95% CI -2.25 to 2.32; 2 studies, 1356 participants), and on zBMI at long-term follow-up (MD 0.02, 95% CI -0.05 to 0.09; 4 studies, 3403 participants).

We found that activity interventions, compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI -0.23 to -0.01; 1 study, 439 participants), but may have little to no effect on BMI and BMI percentile at medium-term follow-up (BMI: MD -0.28, 95% CI -0.6 to 0.04; 1 study, 439 participants; BMI percentile: MD -0.04, 95% CI -2.05 to 1.97; 1 study, 683 participants).

We also found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.09, 95% CI -0.41 to 0.23; 1 study, 359 participants; zBMI: MD -0.02, 95% CI -0.13 to 0.09; 1 study, 359 participants; BMI percentile: MD 1.03, 95% CI -0.94 to 3; 1 study, 705 participants).

We also found that dietary and activity interventions, compared with activity interventions, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0.19, 95% CI -0.14 to 0.52; 1 study, 478 participants; zBMI: MD 0.1, 95% CI -0.01 to 0.21; 1 study, 478 participants; BMI percentile: MD 1.07, 95% CI -0.97 to 3.11; 1 study, 694 participants).

8.2.4 Other

In studies in which the interventions were conducted in setting other than school and/or home, we found that dietary interventions, compared with control, may reduce BMI at medium-term follow-up (MD -0.8, 95% CI -1.49 to -0.11; 1 study, 75 participants), may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD 0.14, 95% CI -2.76 to 3.04; 1 study, 46 participants; zBMI: MD 0.03, 95% CI -0.41 to 0.47; 2 studies, 90 participants; BMI percentile: MD -0.89, 95% CI -4.46 to 2.67; 2 studies, 349 participants), and on zBMI at medium-term (MD -0.05, 95% CI -0.2 to 0.11; 2 studies, 224 participants) and long-term follow-up (MD 0.07, 95% CI -0.03 to 0.17; 1 study, 149 participants).

We found that activity interventions, compared with control, may have little to no effect on zBMI at short-term (MD -0.06, 95% CI -0.24 to 0.12; 1 study, 48 participants) and medium-term follow-up (MD -0.03, 95% CI -0.13 to 0.07; 1 study, 153 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI at short-term follow-up (MD -0.14, 95% CI -0.28 to 0; 9 studies, 715 participants) and zBMI at medium-term follow-up (MD -0.04, 95% CI -0.09 to 0; 6 studies, 1077 participants), but may have little to no effect on zBMI and BMI percentile at short-term follow-up (zBMI: MD -0.02, 95% CI -0.07 to 0.04; 11 studies, 1215 participants; MD 0.67, 95% CI -1.29 to 2.63; 2 studies, 135 participants), on BMI and BMI percentile at medium-term follow-up (BMI: MD -0.22, 95% CI -0.75 to 0.31; 4 studies, 446 participants; MD -0.6, 95% CI -1.61 to 0.41; 1 study, 364 participants) and on BMI, zBMI and BMI percentile at long-term follow-up (BMI: MD 0.12, 95% CI -0.77 to 1.01; 2 studies, 412 participants; zBMI: MD 0.06, 95% CI -0.09 to 0.22; 4 studies, 1199 participants; BMI percentile: MD -0.4, 95% CI -1.72 to 0.92; 1 study, 367 participants).

We also found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI or zBMI at medium-term follow-up (BMI: MD -0.3, 95% CI -0.75 to 0.15; 1 study, 97 participants; zBMI: MD -0.03, 95% CI -0.12 to 0.06; 1 study, 97 participants).

8.3 Subgroup analysis by country income status

Summary forest plots for subgroup analyses by country income status (high income and non-high income) are provided in Figure 33; Figure 34; Figure 35; Figure 36; Figure 37; Figure 38 for BMI; Figure 39; Figure 40; Figure 41; Figure 42; Figure 43; Figure 44 for zBMI; Figure 45; Figure 46; Figure 47; Figure 48; Figure 49; Figure 50 for BMI percentile. The results of the test for subgroup differences by setting are reported in the table above.

Figure 33. Summary of meta-analysis results for dietary intervention vs control on BMI subgrouped by income status of country and socio-economic status (SES). *Abbreviations*
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

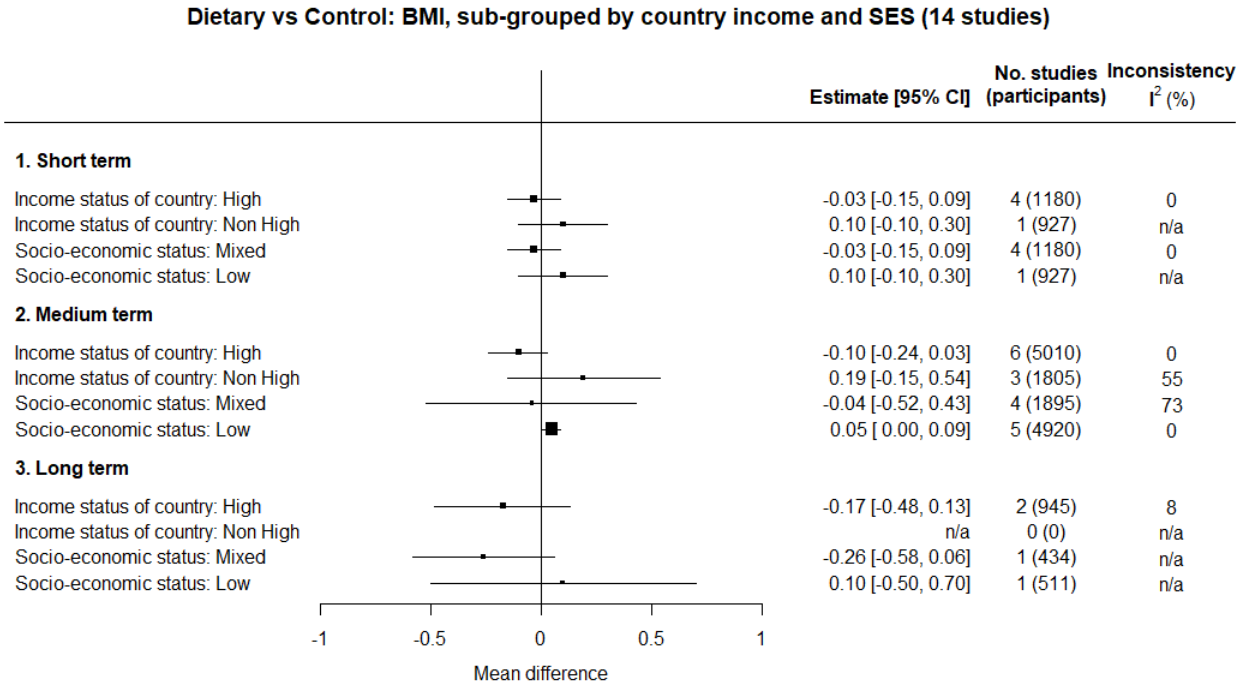


Figure 34. Summary of meta-analysis results for activity intervention vs control on BMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

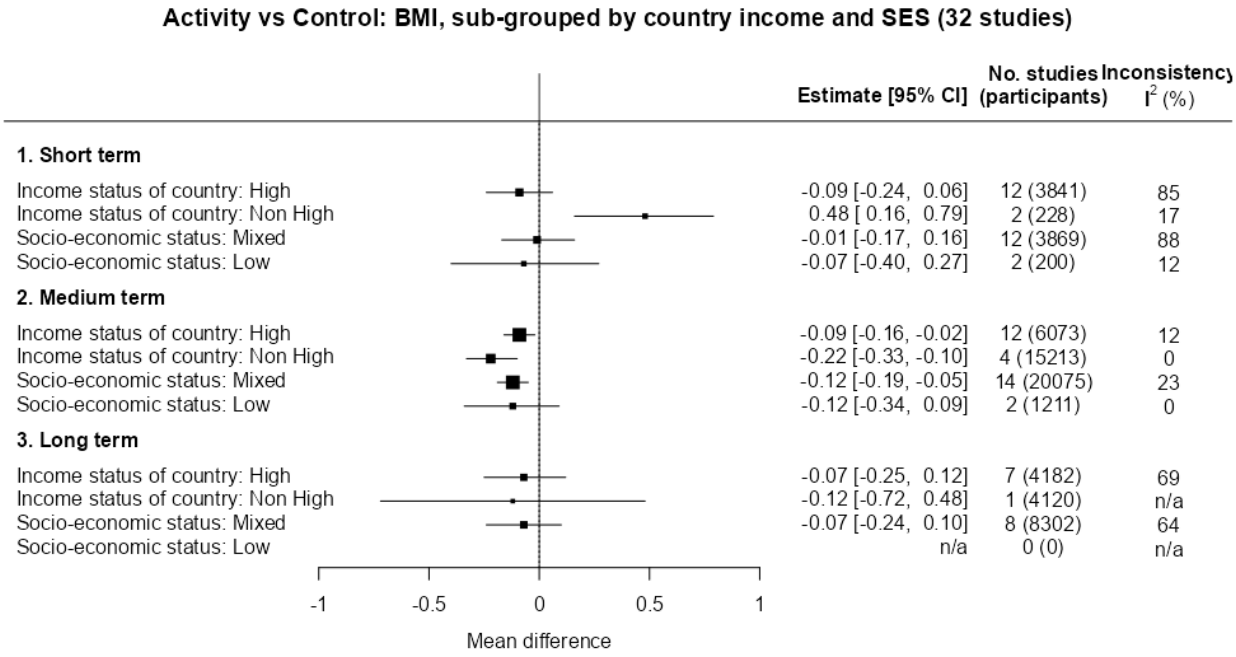


Figure 35. Summary of meta-analysis results for dietary and activity intervention vs control on BMI subgrouped by income status of country and socio-economic status. *Abbreviations*
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

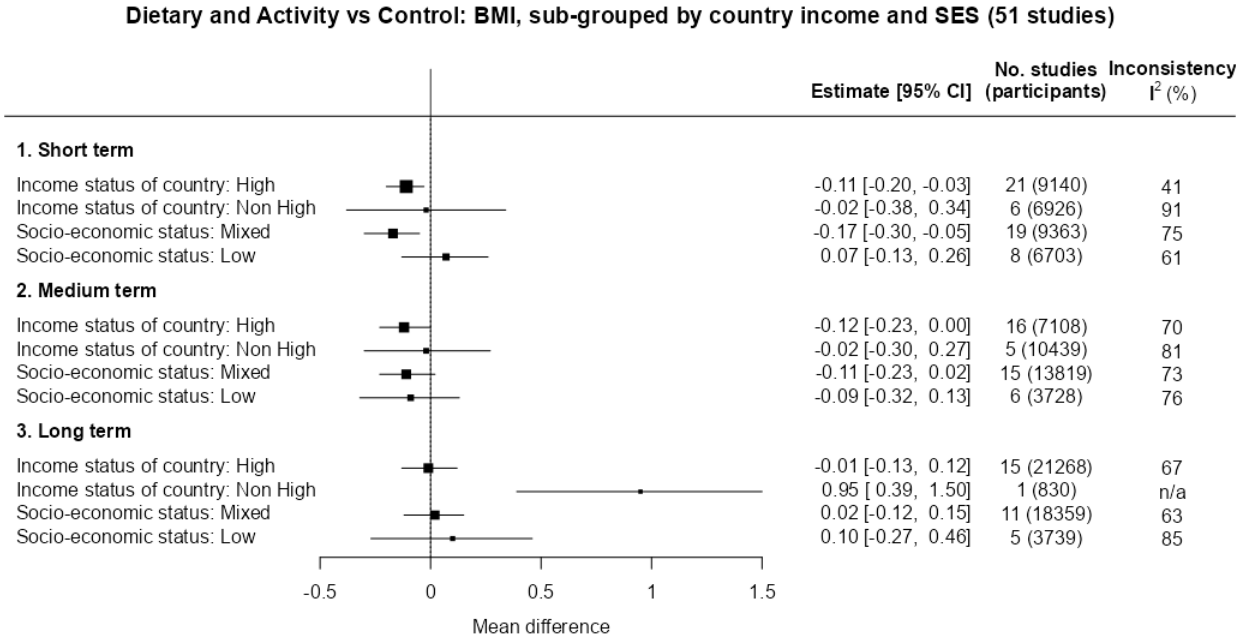


Figure 36. Summary of meta-analysis results for dietary intervention vs activity interventions on BMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

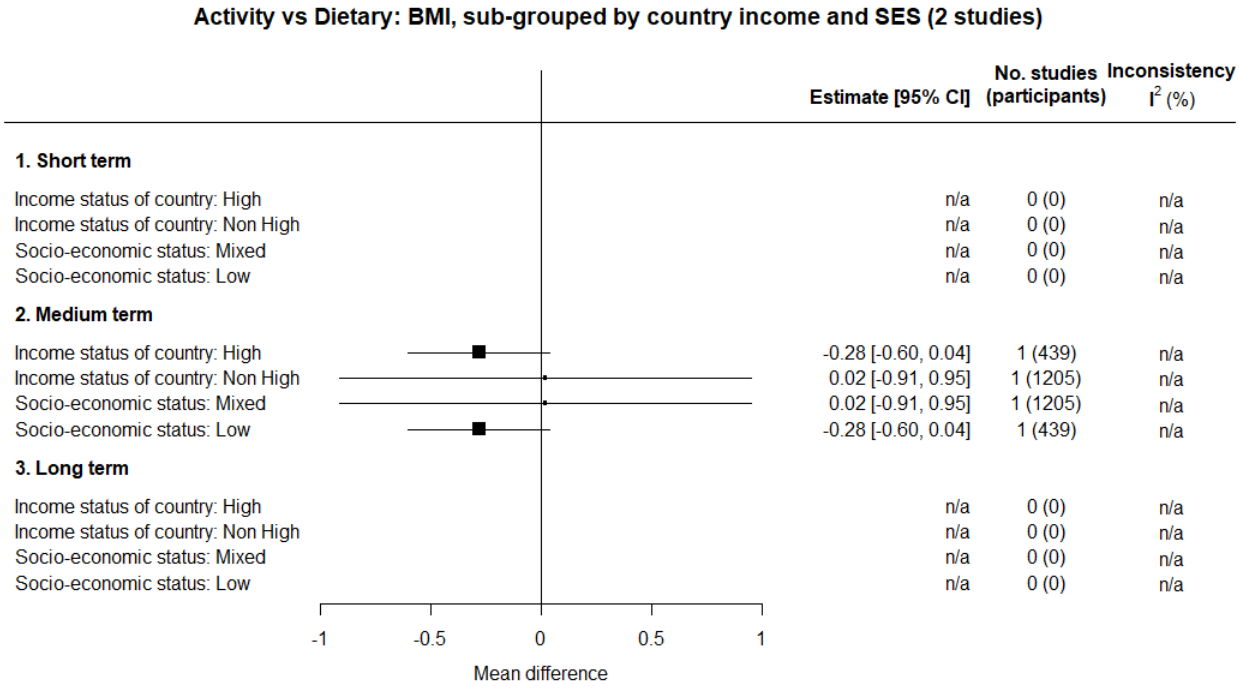


Figure 37. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

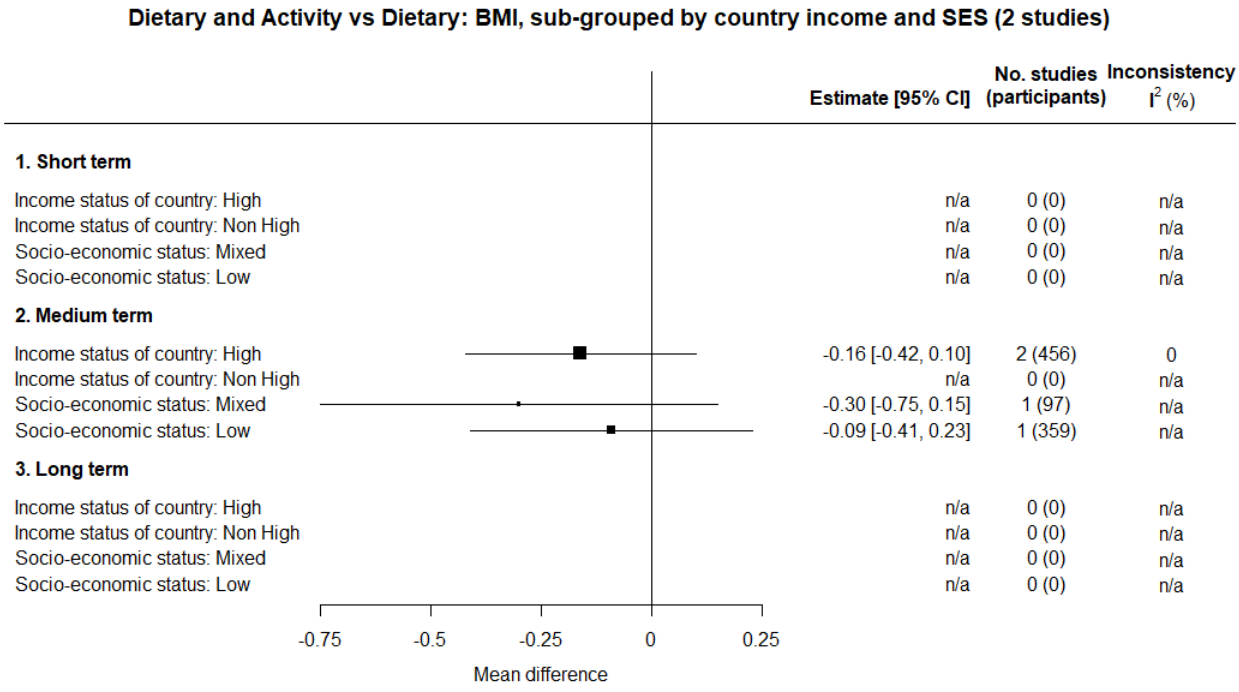


Figure 38. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

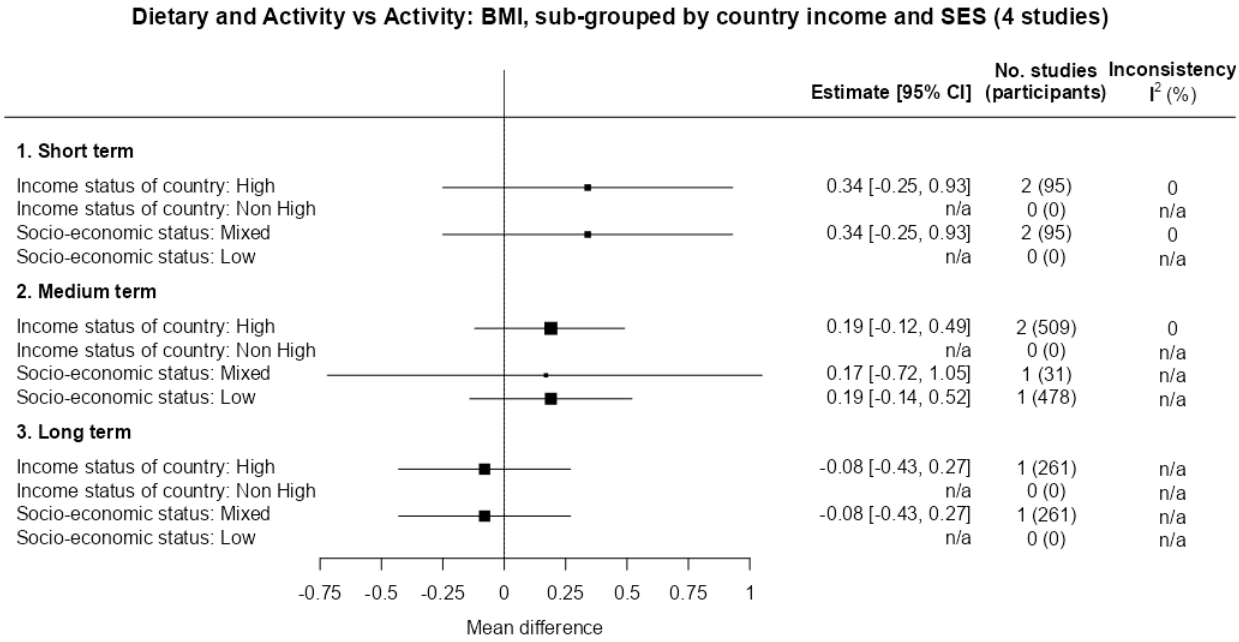


Figure 39. Summary of meta-analysis results for dietary interventions vs control on zBMI subgrouped by income status of country and socio-economic status. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

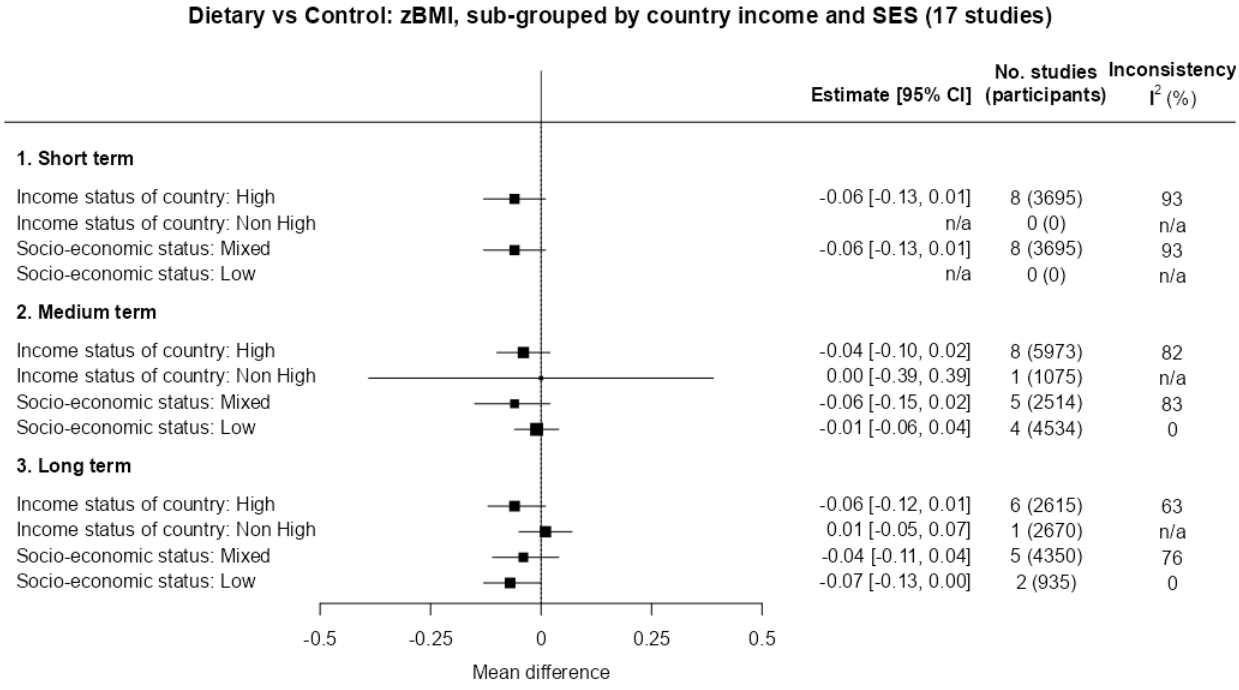


Figure 40. Summary of meta-analysis results for activity interventions vs control on zBMI subgrouped by income status of country and socio-economic status. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

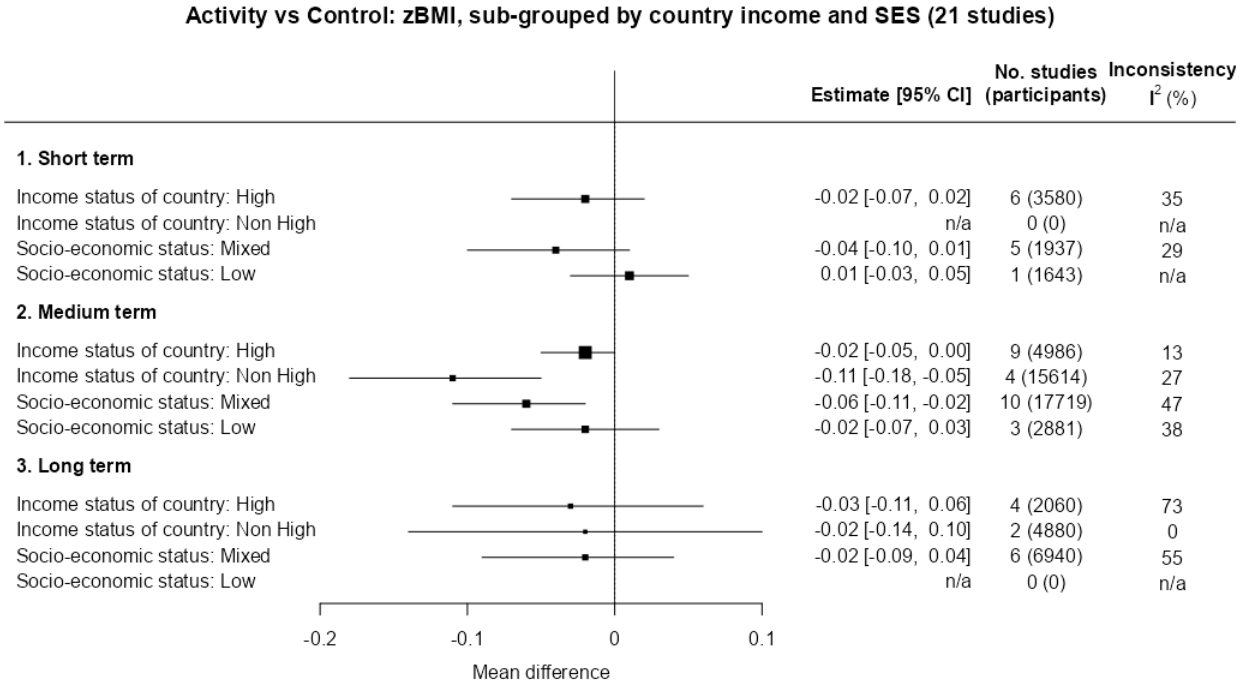


Figure 41. Summary of meta-analysis results for dietary and activity interventions vs control on zBMI subgrouped by income status of country and socio-economic status. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

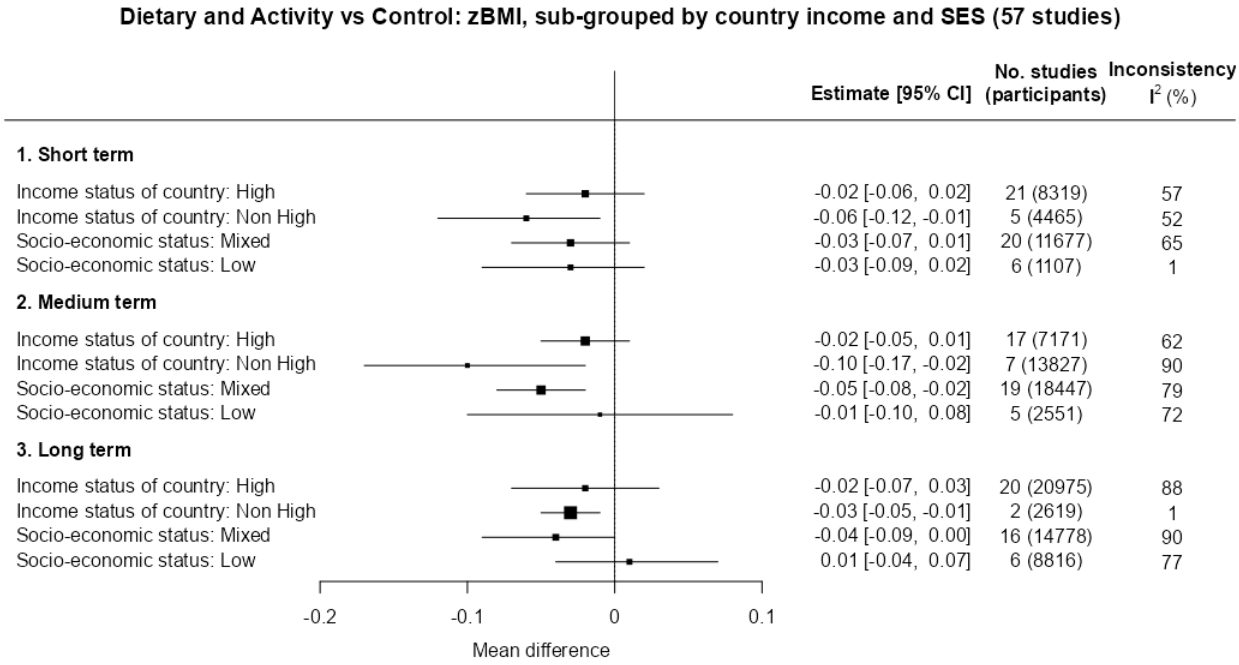


Figure 42. Summary of meta-analysis results for activity interventions vs dietary interventions on zBMI subgrouped by income status of country and socio-economic status. *Abbreviations*
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

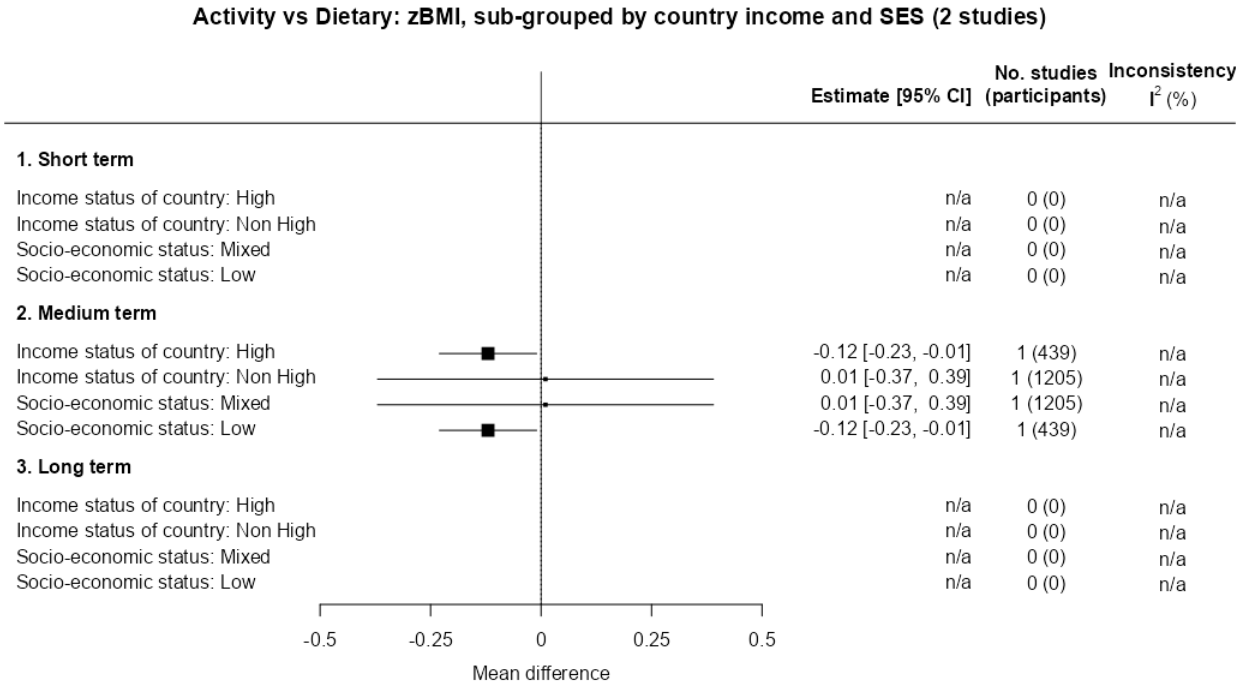


Figure 43. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on zBMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

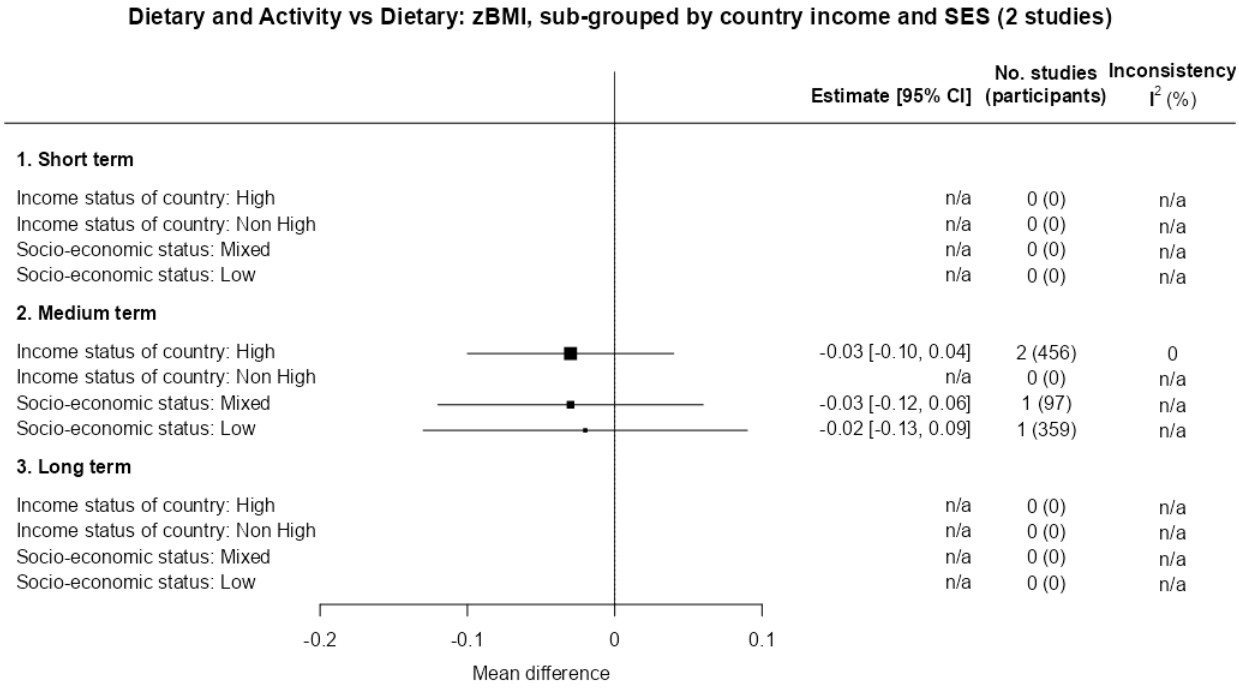


Figure 44. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on zBMI subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus
zBMI: standardised body mass index

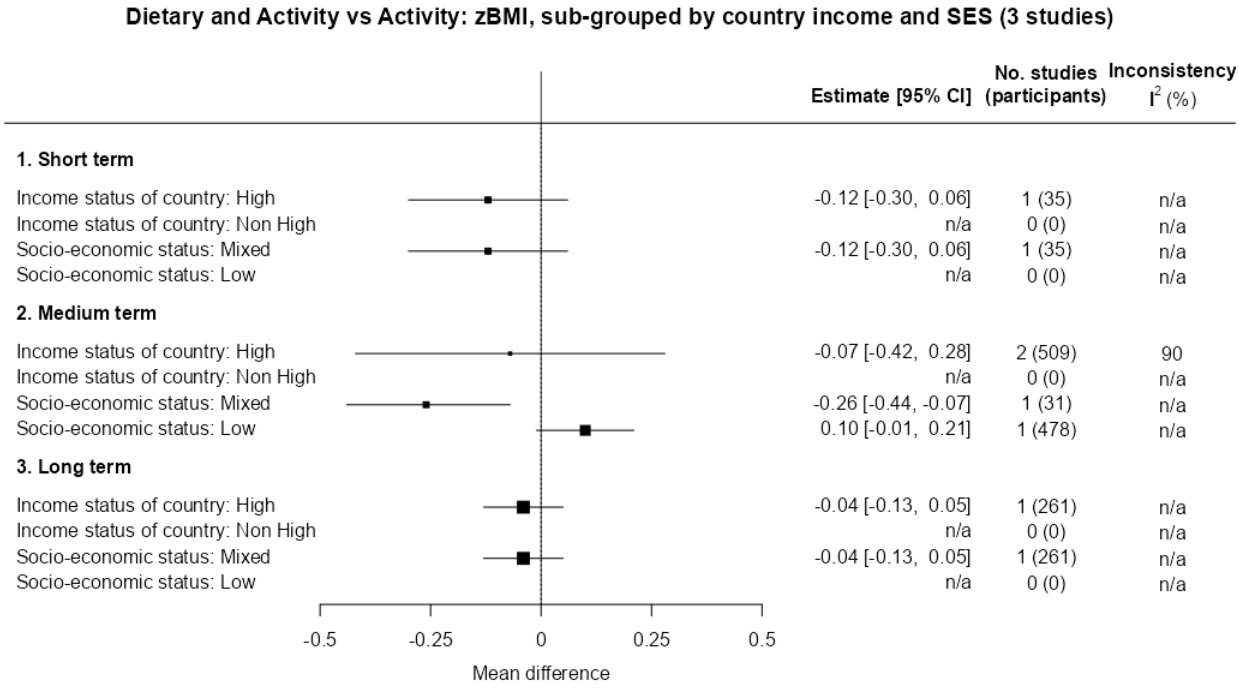


Figure 45. Summary of meta-analysis results for dietary interventions vs control on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

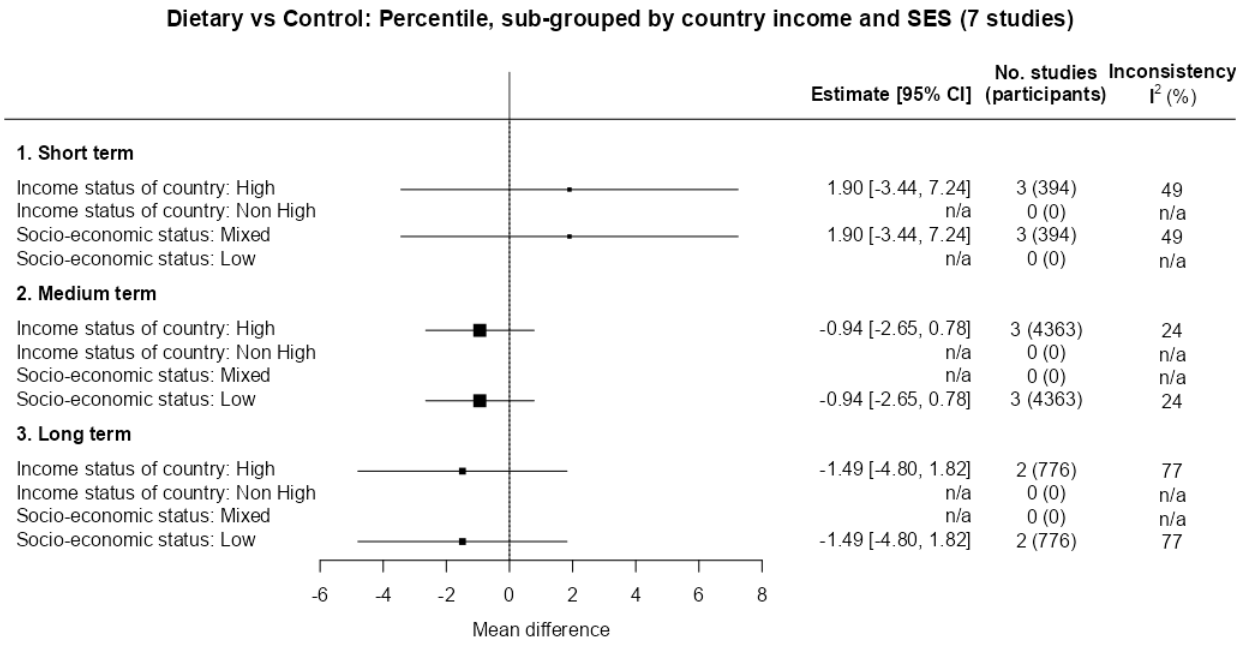


Figure 46. Summary of meta-analysis results for activity interventions vs control on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

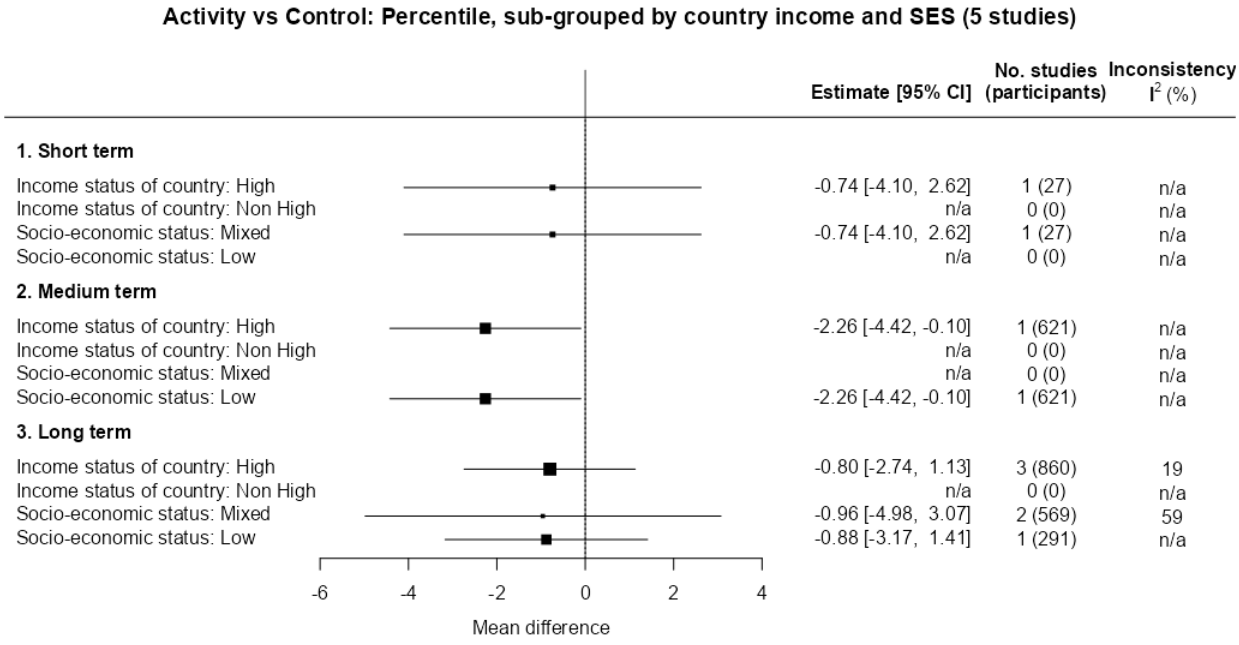


Figure 47. Summary of meta-analysis results for dietary and activity interventions vs control on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

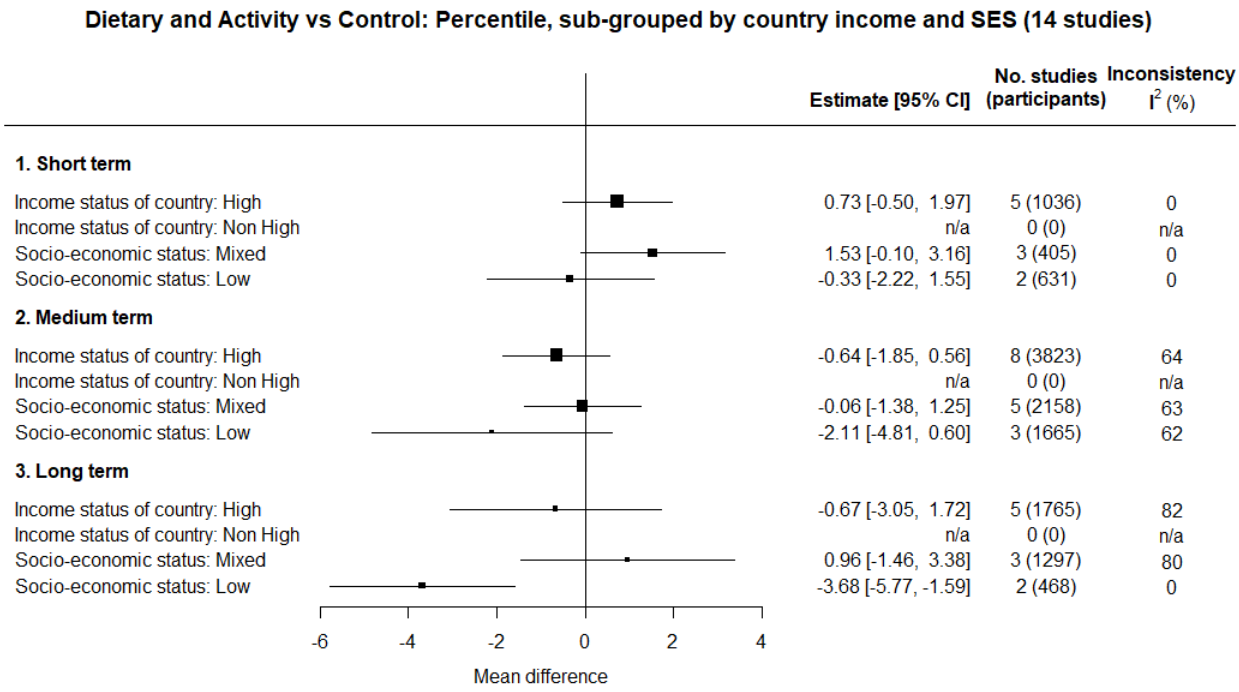


Figure 48. Summary of meta-analysis results for activity interventions vs dietary interventions on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

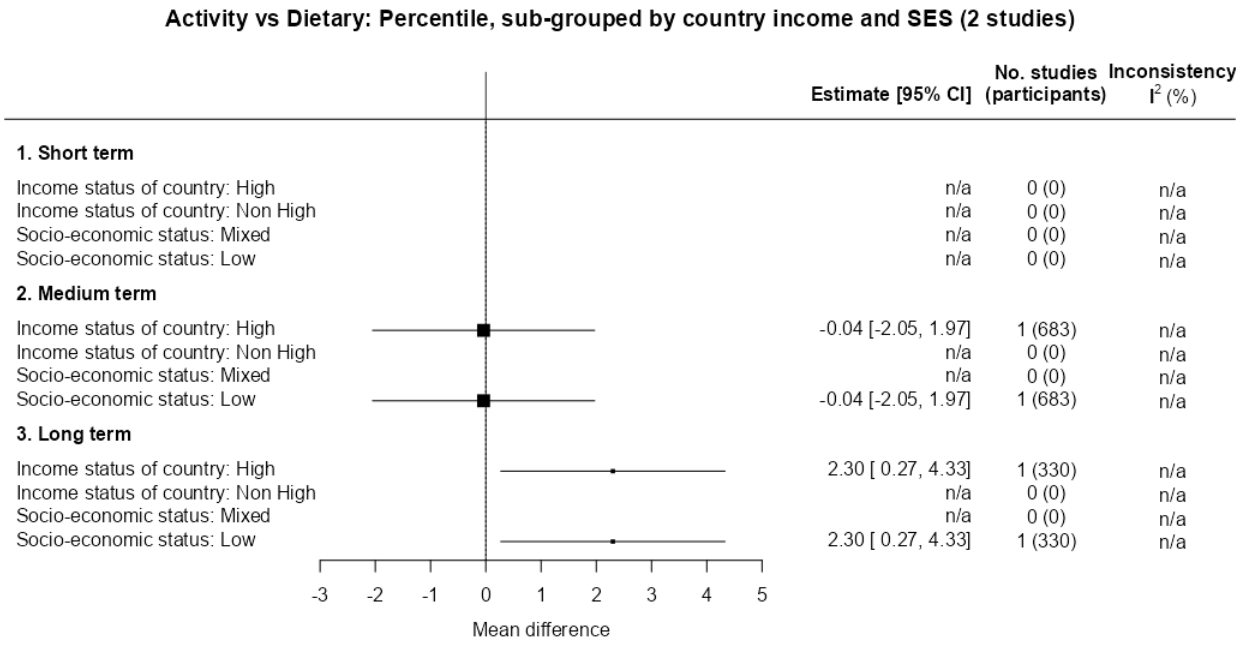


Figure 49. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

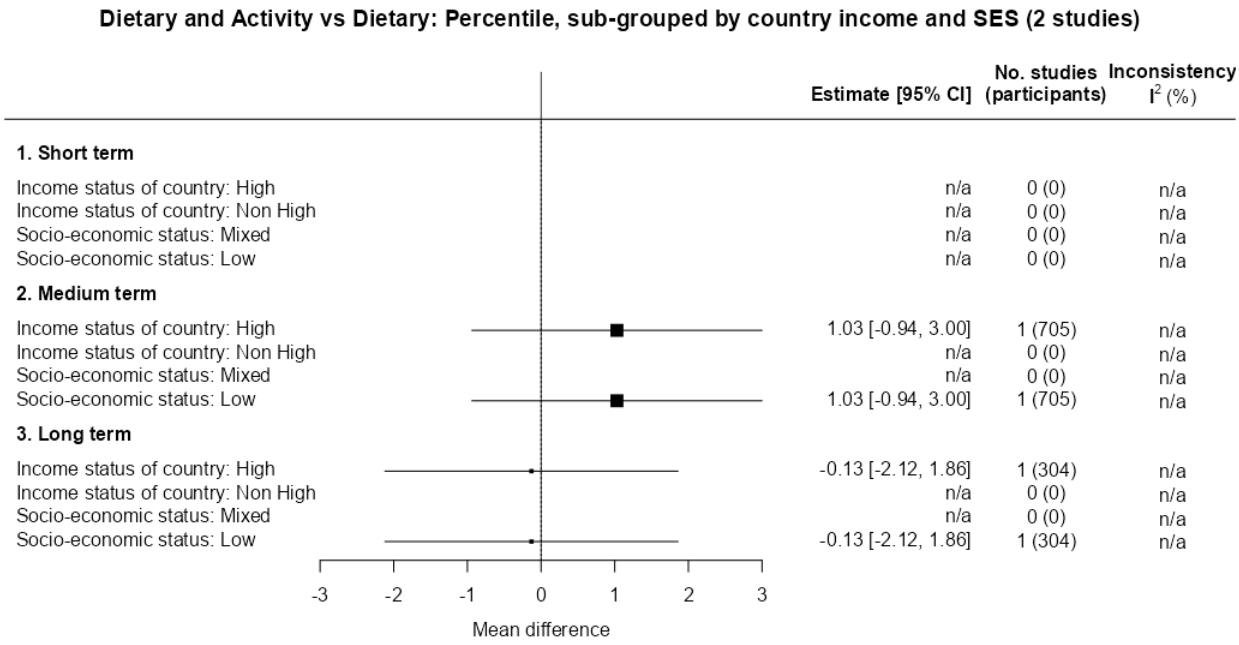
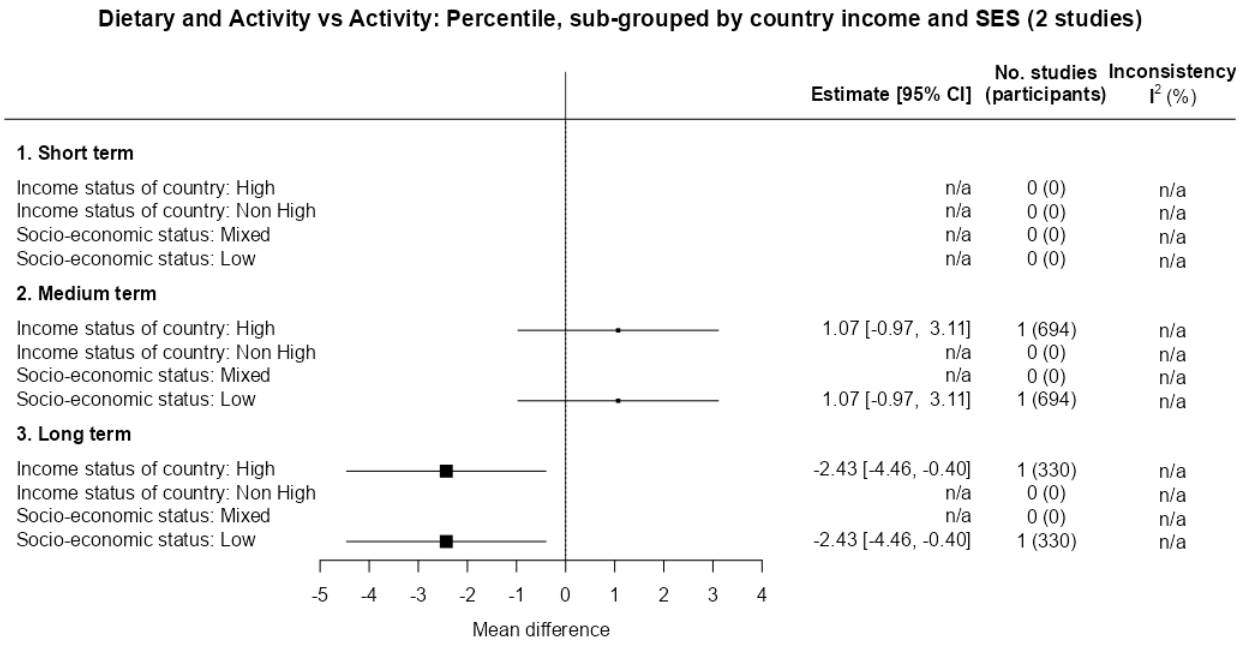


Figure 50. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI percentile subgrouped by income status of country and socio-economic status. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus



For dietary intervention versus control there was little evidence of differences in effect between subgroups in BMI at short-term (P = 0.26) and medium-term follow-up (P = 0.12) and in zBMI at medium-term (P = 0.83) and long-term follow-up (P = 0.14).

For activity intervention versus control there was some evidence of differences in effect between subgroups in BMI at short-term (P = 0.002) and medium-term follow-up (P = 0.05) and in zBMI at medium-term follow-up (P = 0.02), but not in zBMI at long-term follow-up (P = 0.9).

For dietary and activity intervention versus control there was some evidence of differences in effect between subgroups in BMI at long-term follow-up (P = 0.001) but not in BMI at short-term (P = 0.63) and medium-term follow-up (P = 0.52) and in zBMI at short-term (P = 0.21), medium-term (P = 0.09) and long-term follow-up (P = 0.65).

For activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.55) and in zBMI at medium-term follow-up (P = 0.52).

8.3.1 High-income countries

In studies in which the interventions were conducted in high-income countries, we found that dietary interventions, compared with control, may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD -0.03, 95% CI -0.15 to 0.09; 4 studies, 1180 participants; zBMI: MD -0.06, 95% CI -0.13 to 0.01; 8 studies, 3695 participants; BMI percentile: MD 1.9, 95% CI -3.44 to 7.24; 3 studies, 394 participants), medium-term follow-up (BMI: MD -0.1, 95% CI -0.24 to 0.03; 6 studies, 5010 participants; zBMI: MD -0.04, 95% CI -0.1 to 0.02; 8 studies, 5973 participants; BMI percentile: MD -0.94, 95% CI -2.65 to 0.78; 3 studies, 4363 participants) and long-term follow-up (BMI: MD -0.17, 95% CI -0.48 to 0.13; 2 studies, 945 participants; zBMI: MD -0.06, 95% CI -0.12 to 0.01; 6 studies, 2615 participants; BMI percentile: MD -1.49, 95% CI -4.8 to 1.82; 2 studies, 776 participants).

We found that activity interventions, compared with control, may reduce BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.09, 95% CI -0.17 to -0.01; 12 studies, 6073 participants; zBMI: MD -0.02, 95% CI -0.05 to 0; 9 studies, 4986 participants; BMI percentile: MD -2.26, 95% CI -4.42 to -0.1; 1 study, 621 participants), but may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD -0.09, 95% CI -0.24 to 0.06; 12 studies, 3841 participants; zBMI: MD -0.02, 95% CI -0.07 to 0.02; 6 studies, 3580 participants; BMI

percentile: MD -0.74, 95% CI -4.1 to 2.62; 1 study, 27 participants) and long-term follow-up (BMI: MD -0.07, 95% CI -0.25 to 0.12; 7 studies, 4182 participants; zBMI: MD -0.03, 95% CI -0.11 to 0.06; 4 studies, 2060 participants; BMI percentile: MD -0.8, 95% CI -2.74 to 1.13; 3 studies, 860 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI at short-term (MD -0.11, 95% CI -0.2 to -0.03; 21 studies, 9140 participants) and medium-term follow-up (MD -0.12, 95% CI -0.23 to 0; 16 studies, 7108 participants), but may have little to no effect on zBMI and BMI percentile at short-term (zBMI: MD -0.02, 95% CI -0.06 to 0.02; 21 studies, 8319 participants; BMI percentile: MD 0.73, 95% CI -0.5 to 1.97; 5 studies, 1036 participants) and medium-term follow-up (zBMI: MD -0.02, 95% CI -0.05 to 0.01; 17 studies, 7171 participants; BMI percentile: MD -0.64, 95% CI -1.85 to 0.56; 8 studies, 3823 participants) and on BMI, zBMI and BMI percentile at long-term follow-up (BMI: MD -0.01, 95% CI -0.13 to 0.12; 15 studies, 21,268 participants; zBMI: MD -0.02, 95% CI -0.07 to 0.03; 20 studies, 20,975 participants; BMI percentile: MD -0.67, 95% CI -3.05 to 1.72; 5 studies, 1765 participants).

We found that activity interventions, compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI -0.23 to -0.01; 1 study, 439 participants) and increase BMI percentile at long-term follow-up (MD 2.3, 95% CI 0.27 to 4.33; 1 study, 330 participants), but may have little to no effect on BMI and BMI percentile at medium-term follow-up (BMI: MD -0.28, 95% CI -0.6 to 0.04; 1 study, 439 participants; BMI percentile: MD -0.04, 95% CI -2.05 to 1.97; 1 study, 683 participants).

We found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.16, 95% CI -0.42 to 0.1; 2 studies, 456 participants; zBMI: MD -0.03, 95% CI -0.1 to 0.04; 2 studies, 456 participants; BMI percentile: MD 1.03, 95% CI -0.94 to 3; 1 study, 705 participants) and on BMI percentile at long-term follow-up (MD -0.13, 95% CI -2.12 to 1.86; 1 study, 304 participants).

We also found that dietary and activity interventions, compared with activity interventions may reduce BMI percentile at long-term follow-up (MD -2.43, 95% CI -4.46 to -0.4; 1 study, 330 participants), but may have little to no effect on BMI and zBMI at short-term follow-up (BMI: MD 0.34, 95% CI -0.25 to 0.93; 2 studies, 95 participants; zBMI: MD -0.12, 95% CI -0.3 to 0.06; 1 study, 35 participants), on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0.19, 95% CI -0.12 to 0.49; 2 studies, 509 participants; zBMI: MD -0.07, 95% CI -0.42 to 0.28; 2 studies, 509 participants; BMI percentile: MD 1.07, 95% CI -0.97 to 3.11; 1 study, 694 participants), and on BMI and zBMI at long-term follow-up (BMI: MD -0.08, 95% CI -0.43 to 0.27; 1 study, 261 participants; zBMI: MD -0.04, 95% CI -0.13 to 0.05; 1 study, 261 participants).

8.3.2 Non-high-income countries

In studies in which the interventions were conducted in non-high-income countries, we found that dietary interventions, compared with control, may have little to no effect on BMI and zBMI at short-term (BMI: MD 0.1, 95% CI -0.1 to 0.3; 1 study, 927 participants; zBMI: MD 0, 95% CI -0.39 to 0.39; 1 study, 1075 participants) and medium-term follow-up (BMI: MD 0.19, 95% CI -0.15 to 0.54; 3 studies, 1805 participants; zBMI: MD 0.01, 95% CI -0.05 to 0.07; 1 study, 2670 participants).

We found that activity interventions, compared with control, may increase BMI at short-term follow-up (MD 0.48, 95% CI 0.16 to 0.79; 2 studies, 228 participants) and may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.22, 95% CI -0.33 to -0.1; 4 studies, 15,213 participants; zBMI: MD -0.11, 95% CI -0.18 to -0.05; 4 studies, 15,614 participants), but may have little to no effect on BMI and zBMI at long-term follow-up (BMI: MD -0.12, 95% CI -0.72 to 0.48; 1 study, 4120 participants; zBMI: MD -0.02, 95% CI -0.14 to 0.1; 2 studies, 4880 participants).

We found that dietary and activity interventions, compared with control, may increase BMI at long-term follow-up (MD 0.95, 95% CI 0.39 to 1.5; 1 study, 830 participants) and may reduce zBMI at short-term (MD -0.06, 95% CI -0.12 to -0.01; 5 studies, 4465 participants), medium-term (MD -0.1, 95% CI -0.17 to -0.02; 7 studies, 13,827 participants) and long-term follow-up (MD -0.03, 95% CI -0.05 to -0.01; 2 studies, 2619 participants), but may have little to no effect on BMI at short-term (MD -0.02, 95% CI -0.38 to 0.34; 6 studies, 6926 participants) and medium-term follow-up (MD -0.02, 95% CI -0.3 to 0.27; 5 studies, 10,439 participants).

We found that activity interventions, compared with dietary interventions, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD 0.02, 95% CI -0.91 to 0.95; 1 study, 1205 participants; zBMI: MD 0.01, 95% CI -0.37 to 0.39; 1 study, 1205 participants).

8.4 Subgroup analysis by participants' socioeconomic status

Summary forest plots for subgroup analyses by participants' socioeconomic status (mixed versus low) are provided in Figure 33; Figure 34; Figure 35; Figure 36; Figure 37; Figure 38 for BMI; Figure 39; Figure 40; Figure 41; Figure 42; Figure 43; Figure 44 for zBMI; Figure 45; Figure 46; Figure 47; Figure 48; Figure 49; Figure 50 for BMI percentile. The results of the test for subgroup differences by setting are reported in the table above.

For dietary intervention versus control there was little evidence of differences in effect between subgroups in BMI at short-term (P = 0.26), medium-term (P = 0.71) and long-term follow-up (P = 0.3) and in zBMI at medium-term (P = 0.31) and long-term follow-up (P = 0.54).

For activity intervention versus control there was little evidence of differences in effect between subgroups in BMI at short-term (P = 0.74) and medium-term follow-up (P = 0.94), in zBMI at short-term (P = 0.14) and medium-term follow-up (P = 0.25), and in BMI percentile at long-term follow-up (P = 0.97).

For dietary and activity intervention versus control there was some evidence of differences in effect between subgroups in BMI at short-term follow-up (P = 0.05) and BMI percentile at long-term follow-up (P = 0.004), but not in BMI at medium-term (P = 0.92) and long-term follow-up (P = 0.69), in zBMI at short-term (P = 0.89), medium-term (P = 0.34) and long-term follow-up (P = 0.12), and in BMI percentile at short-term (P = 0.14) and long-term follow-up (P = 0.18).

For activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.55) and in zBMI at medium-term follow-up (P = 0.52).

For dietary and activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.45) and in zBMI at medium-term follow-up (P = 0.89).

For dietary and activity interventions versus activity interventions there was some evidence of differences in effect between subgroups in zBMI at medium-term follow-up (P = 0.001), but not in BMI at medium-term follow-up (P = 0.96).

8.4.1 Mixed socioeconomic status

In studies in which participants were in a mixed socioeconomic status, we found that dietary interventions compared with control, may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD -0.03, 95% CI -0.15 to 0.09; 4 studies, 1180 participants; zBMI: MD -0.06, 95% CI -0.13 to 0.01; 8 studies, 3695 participants; BMI percentile: MD 1.9, 95% CI -3.44 to 7.24; 3 studies, 394 participants), and on BMI and zBMI at medium-term (BMI: MD -0.04, 95% CI -0.52 to 0.43; 4 studies, 1895 participants; zBMI: MD -0.06, 95% CI -0.15 to 0.02; 5 studies, 2514 participants), and long-term follow-up (BMI: MD -0.26, 95% CI -0.58 to 0.06; 1 study, 434 participants; zBMI: MD -0.04, 95% CI -0.11 to 0.04; 5 studies, 4350 participants).

We found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.12, 95% CI -0.19 to -0.05; 14 studies, 20,075 participants; zBMI: MD -0.06, 95% CI -0.11 to -0.02; 10 studies, 17,719 participants), but may have little to no effect on BMI, zBMI and BMI percentile at short-term (BMI: MD -0.01, 95% CI -0.17 to 0.16; 12 studies, 3869 participants; zBMI: MD -0.04, 95% CI -0.1 to 0.01; 5 studies, 1937 participants; BMI percentile: MD -0.74, 95% CI -4.1 to 2.62; 1 study, 27 participants) and long-term follow-up (BMI: MD -0.07, 95% CI -0.24 to 0.1; 8 studies, 8302 participants; zBMI: MD -0.02, 95% CI -0.09 to 0.04; 6 studies, 6940 participants; BMI percentile: MD -0.96, 95% CI -4.98 to 3.07; 2 studies, 569 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI at short-term follow-up (MD -0.17, 95% CI -0.3 to -0.05; 19 studies, 9363 participants) and zBMI at medium-term (MD -0.05, 95% CI -0.08 to -0.02; 19 studies, 18,447 participants) and long-term follow-up (MD -0.04, 95% CI -0.09 to 0; 16 studies, 14,778 participants), but may have little to no effect on zBMI and BMI percentile at short-term follow-up (zBMI: MD -0.03, 95% CI -0.07 to 0.01; 20 studies, 11,677 participants; BMI percentile: MD 1.53, 95% CI -0.1 to 3.16; 3 studies, 405 participants), and on BMI and BMI percentile at medium-term (BMI: MD -0.11, 95% CI -0.23 to 0.02; 15 studies, 13,819 participants; BMI percentile: MD -0.06, 95% CI -1.38 to 1.25; 5 studies, 2158 participants) and long-term follow-up (BMI: MD 0.02, 95% CI -0.12 to 0.15; 11 studies, 18,359 participants; BMI percentile: MD 0.96, 95% CI -1.46 to 3.38; 3 studies, 1297 participants).

We found that activity interventions, compared with dietary interventions, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD 0.02, 95% CI -0.91 to 0.95; 1 study, 1205 participants; zBMI: MD 0.01, 95% CI -0.37 to 0.39; 1 study, 1205 participants).

We found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD -0.3, 95% CI -0.75 to 0.15; 1 study, 97 participants; zBMI: MD -0.03, 95% CI -0.12 to 0.06; 1 study, 97 participants).

We also found that dietary and activity interventions, compared with activity interventions, may reduce zBMI at medium-term follow-up (MD -0.26, 95% CI -0.44 to -0.07; 1 study, 31 participants), but may have little to no effect on BMI and zBMI at short-term follow-up (BMI: MD 0.34, 95% CI -0.25 to 0.93; 2 studies, 95 participants; zBMI: MD -0.12, 95% CI -0.3 to 0.06; 1 study, 35 participants), BMI at medium-term follow-up (MD 0.17, 95% CI -0.72 to 1.05; 1 study, 31 participants) and on BMI and zBMI at long-term follow-up (BMI: MD -0.08, 95% CI -0.43 to 0.27; 1 study, 261 participants; zBMI: MD -0.04, 95% CI -0.13 to 0.05; 1 study, 261 participants).

8.4.2 Low socioeconomic status

In studies in which participants were in a low socioeconomic status, we found that dietary interventions, compared with control, may reduce zBMI at long-term follow-up (MD -0.07, 95% CI -0.13 to 0; 2 studies, 935 participants) and may increase BMI at medium-term follow-up (MD 0.05, 95% CI 0 to 0.09; 5 studies, 4920 participants), but may have little to no effect on BMI at short-term follow-up (MD 0.1, 95% CI -0.1 to 0.3; 1 study, 927 participants), on zBMI and BMI percentile at medium-term follow-up (zBMI: MD -0.01, 95% CI -0.06 to 0.04; 4 studies, 4534 participants; BMI percentile: MD -0.94, 95% CI -2.65 to 0.78; 3 studies, 4363 participants), and on BMI and BMI percentile at long-term follow-up (BMI: MD 0.1, 95% CI -0.5 to 0.7; 1 study, 511 participants; BMI percentile: MD -1.49, 95% CI -4.8 to 1.82; 2 studies, 776 participants).

We found that activity interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.26, 95% CI -4.42 to -0.1; 1 study, 621 participants), but may have little to no effect on BMI and zBMI at short-term (BMI: MD -0.07, 95% CI -0.4 to 0.27; 2 studies, 200 participants; zBMI: MD 0.01, 95% CI -0.03 to 0.05; 1 study, 1643 participants) and medium-term follow-up (BMI: MD -0.12, 95% CI -0.34 to 0.09; 2 studies, 1211 participants; zBMI: MD -0.02, 95% CI -0.07 to 0.03; 3 studies, 2881 participants), and on BMI percentile at long-term follow-up (MD -0.88, 95% CI -3.17 to 1.41; 1 study, 291 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI percentile at long-term follow-up (MD -3.68, 95% CI -5.77 to -1.59; 2 studies, 468 participants), but may have little to no effect on BMI, zBMI and BMI percentile at short-term (BMI: MD 0.07, 95% CI -0.13 to 0.26; 8 studies, 6703 participants; zBMI: MD -0.03, 95% CI -0.09 to 0.02; 6 studies, 1107 participants; BMI percentile: MD -0.33, 95% CI -2.22 to 1.55; 2 studies, 631 participants) and medium-term follow-up (BMI: MD -0.09, 95% CI -0.32 to 0.13; 6 studies, 3728 participants; zBMI: MD -0.01, 95% CI -0.1 to 0.08; 5 studies, 2551 participants; BMI percentile: MD -2.11, 95% CI -4.81 to 0.6; 3 studies, 1665 participants), and on BMI and zBMI at long-term follow-up (BMI: MD 0.1, 95% CI -0.27 to 0.46; 5 studies, 3739 participants; zBMI: MD 0.01, 95% CI -0.04 to 0.07; 6 studies, 8816 participants).

We found that activity interventions, compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI -0.23 to -0.01; 1 study, 439 participants) and increase BMI percentile at long-term follow-up (MD 2.3, 95% CI 0.27 to 4.33; 1 study, 330 participants), but may have little to no effect on BMI and BMI percentile at medium-term follow-up (BMI: MD -0.28, 95% CI -0.6 to 0.04; 1 study, 439 participants; BMI percentile: MD -0.04, 95% CI -2.05 to 1.97; 1 study, 683 participants).

We found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.09, 95% CI -0.41 to 0.23; 1 study, 359 participants; zBMI: MD -0.02, 95% CI -0.13 to 0.09; 1 study, 359 participants; BMI percentile: MD 1.03, 95% CI -0.94 to 3; 1 study, 705 participants) and on BMI percentile at long-term follow-up (MD -0.13, 95% CI -2.12 to 1.86; 1 study, 304 participants).

We also found that dietary and activity interventions, compared with activity interventions, may reduce BMI percentile at long-term follow-up (MD -2.43, 95% CI -4.46 to -0.4; 1 study, 330 participants), but may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0.19, 95% CI -0.14 to 0.52; 1 study, 478 participants; zBMI: MD 0.1, 95% CI -0.01 to 0.21; 1 study, 478 participants; BMI percentile: MD 1.07, 95% CI -0.97 to 3.11; 1 study, 694 participants).

8.5 Subgroup analysis by duration of intervention

Summary forest plots for subgroup analyses by intervention duration (short, medium and long) are provided in Figure 51; Figure 52; Figure 53; Figure 54; Figure 55; Figure 56 for BMI; Figure 57; Figure 58; Figure 59; Figure 60; Figure 61; Figure 62 for zBMI; Figure 63; Figure 64; Figure 65; Figure 66; Figure 67; Figure 68 for BMI percentile. The results of the test for subgroup differences by setting are reported in the table above.

Figure 51. Summary of meta-analysis results for dietary interventions vs control on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

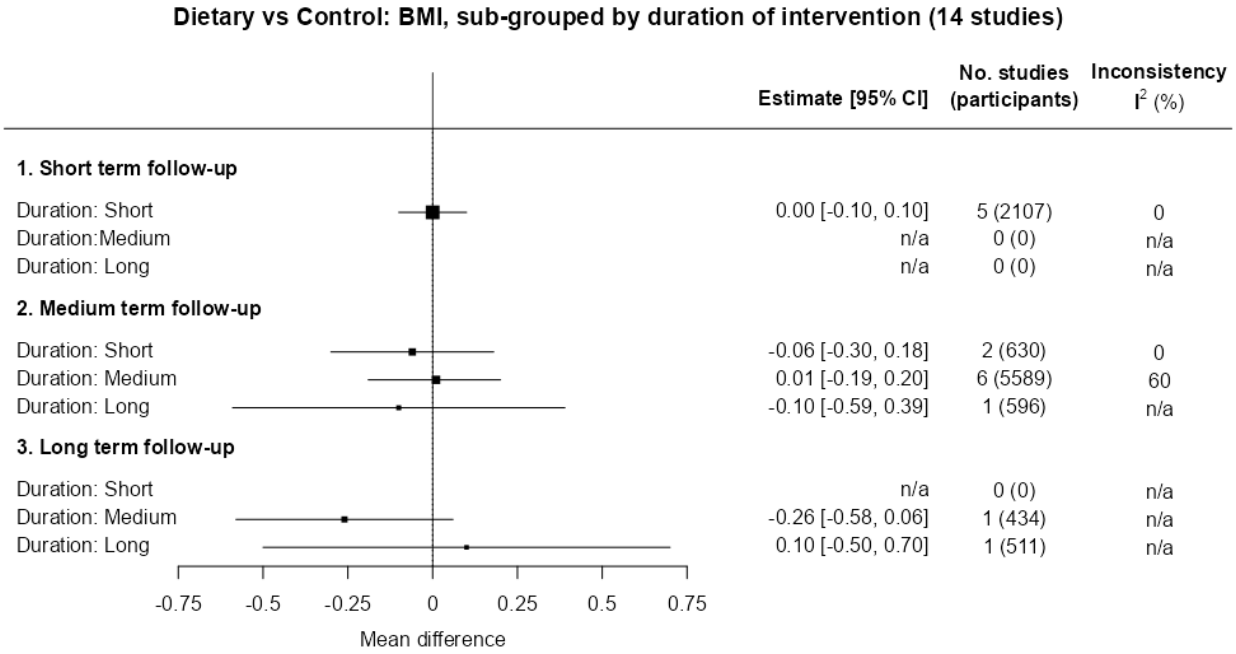


Figure 52. Summary of meta-analysis results for activity interventions vs control on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

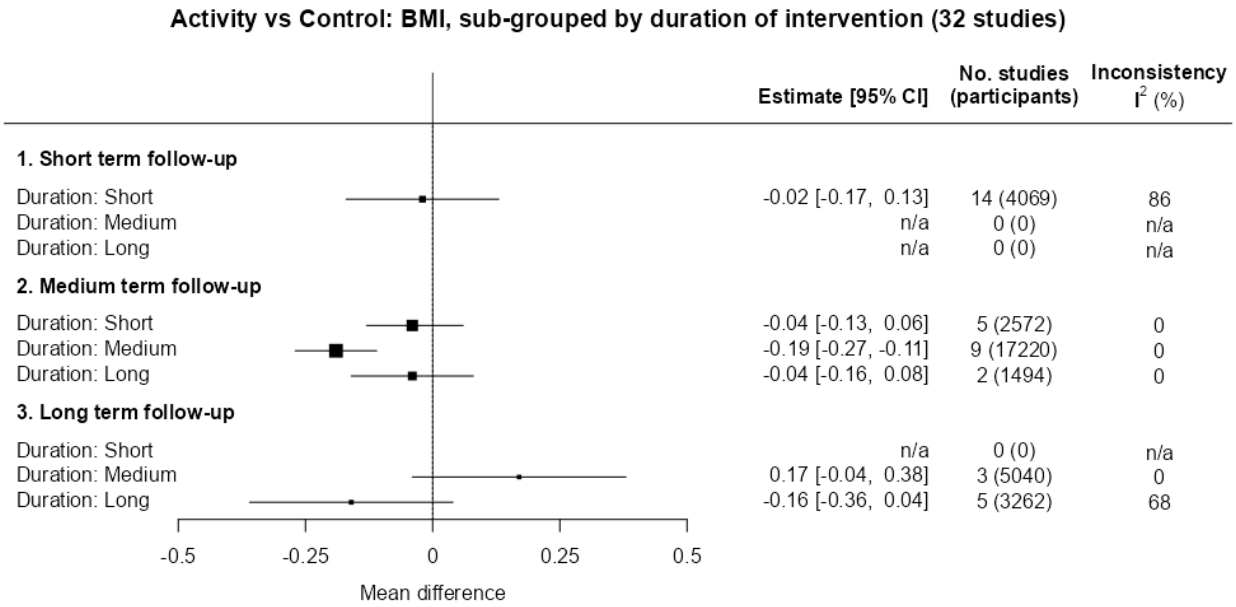


Figure 53. Summary of meta-analysis results for dietary and activity interventions vs control on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

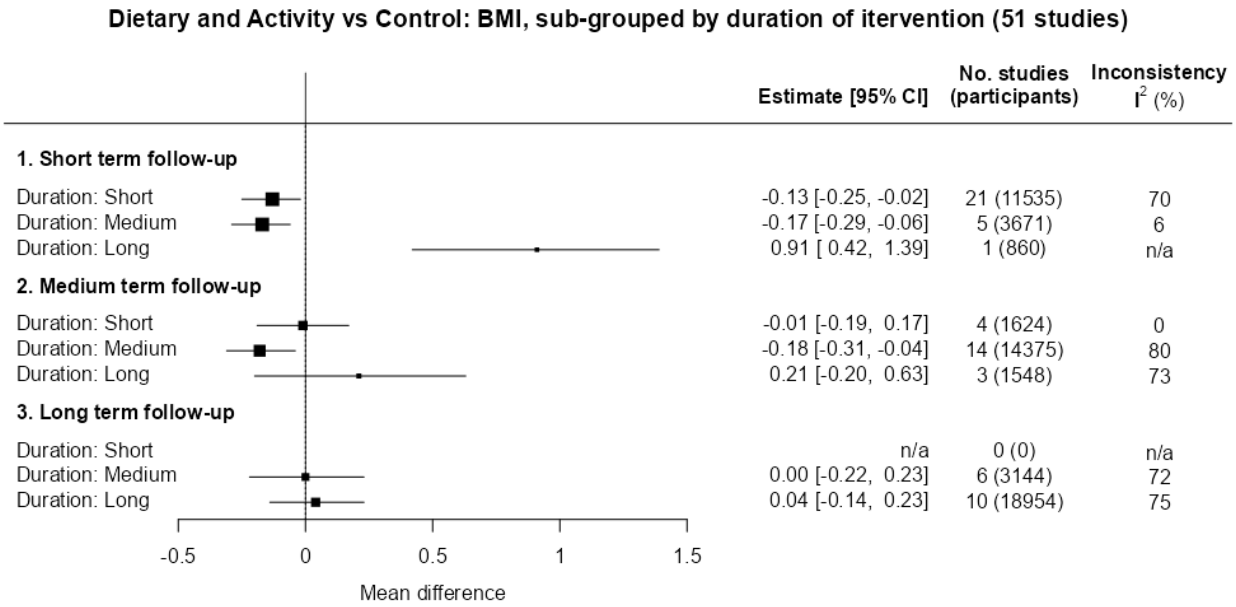


Figure 54. Summary of meta-analysis results for activity interventions vs dietary interventions on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

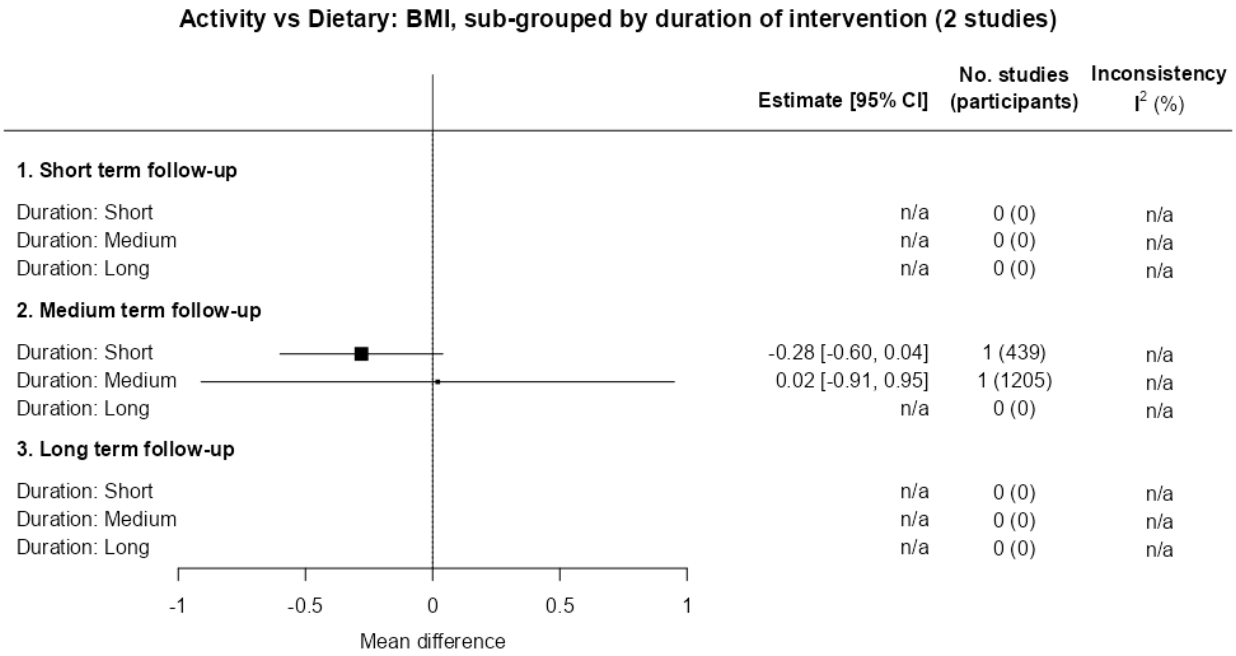


Figure 55. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

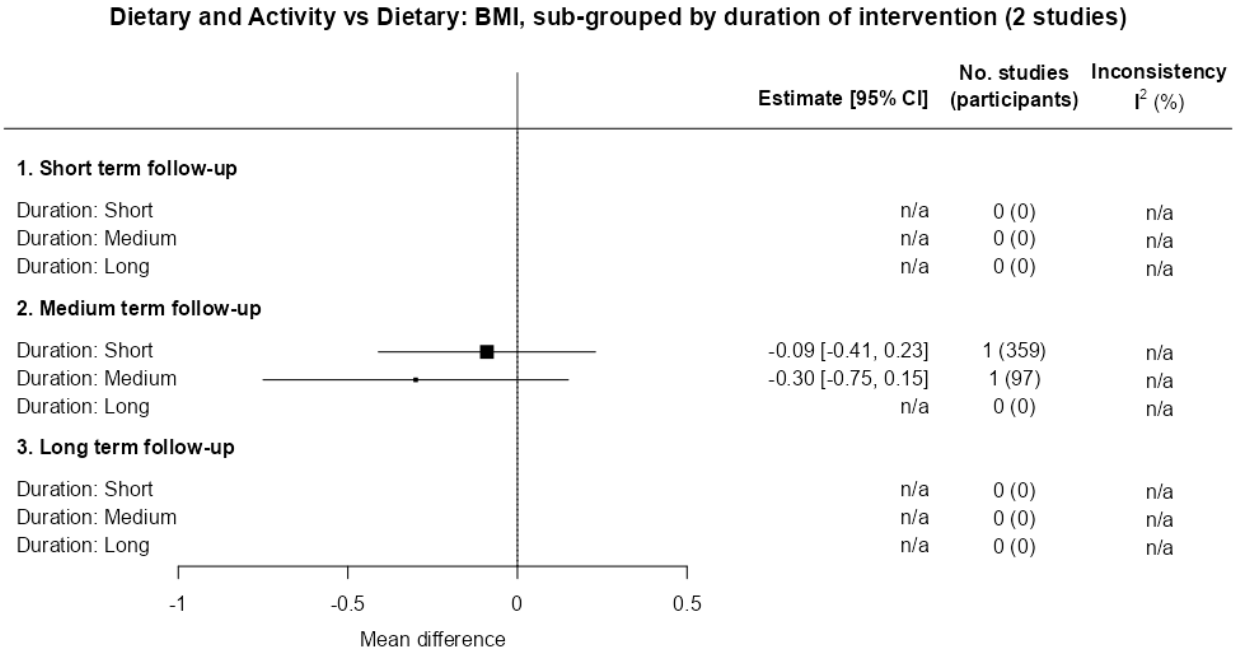


Figure 56. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI subgrouped by duration of intervention. ***Abbreviations***
BMI: body mass index
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus

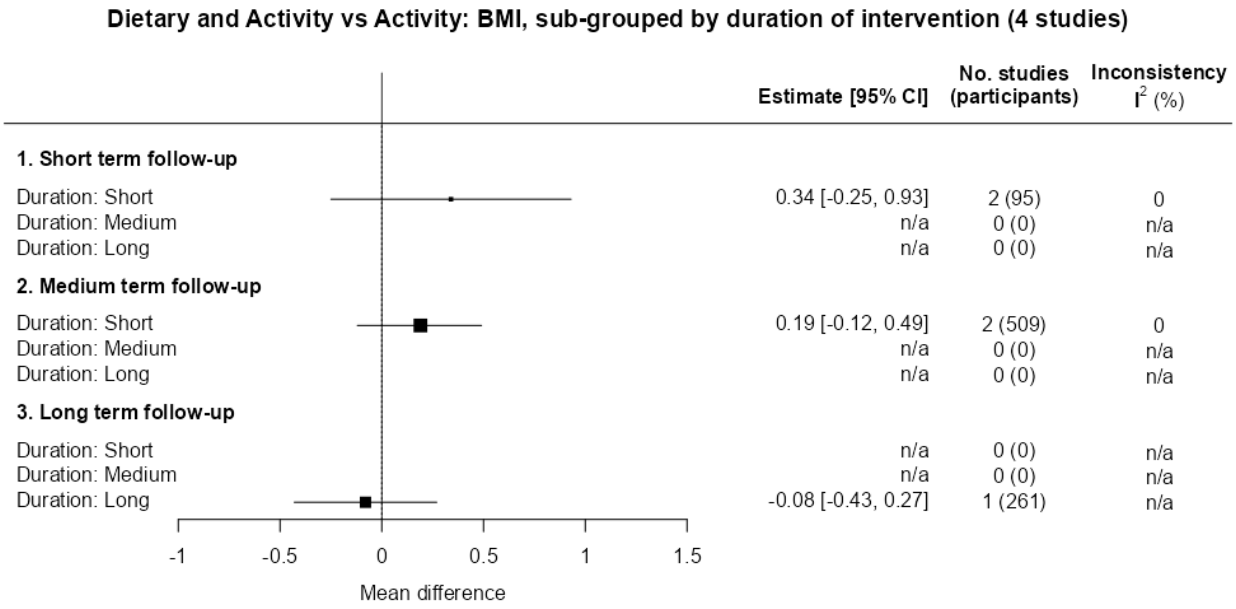


Figure 57. Summary of meta-analysis results for dietary interventions vs control on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index.

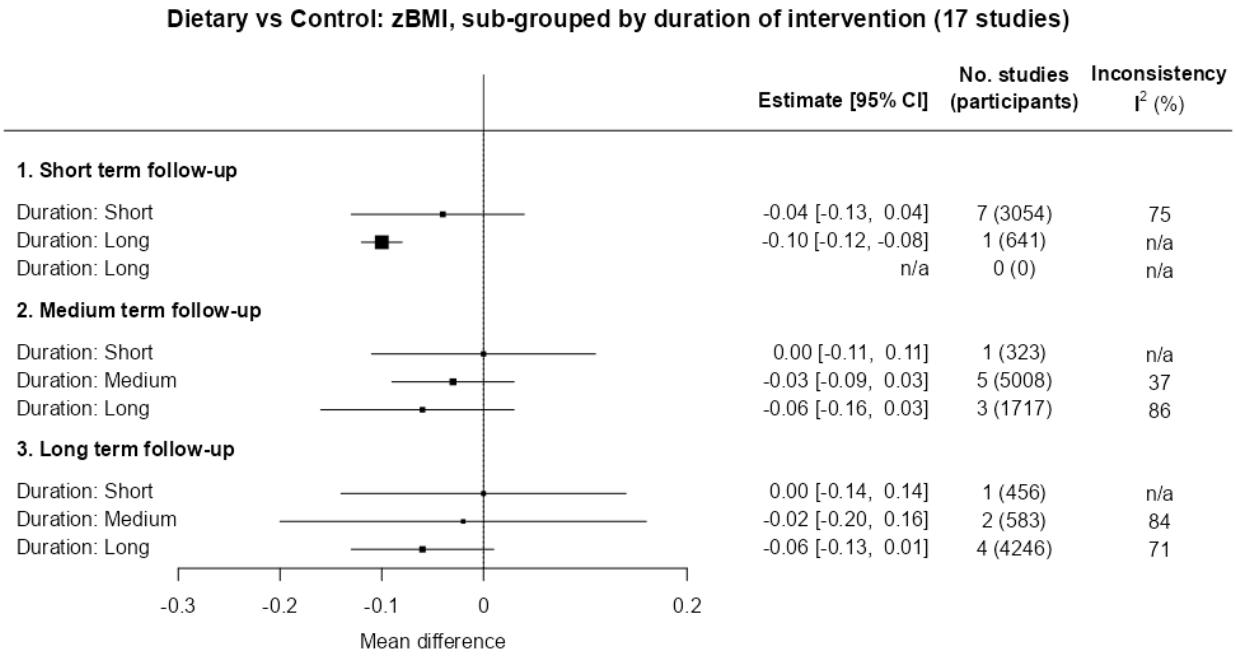


Figure 58. Summary of meta-analysis results for activity interventions vs control on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

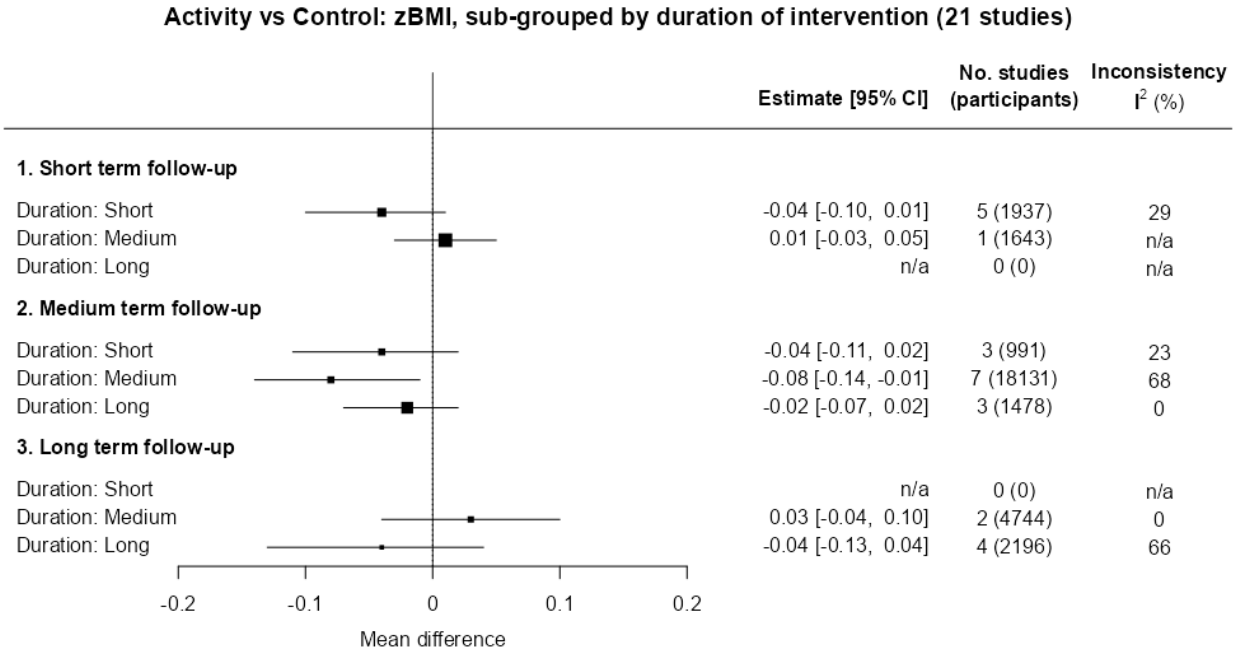


Figure 59. Summary of meta-analysis results for dietary and activity interventions vs control on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

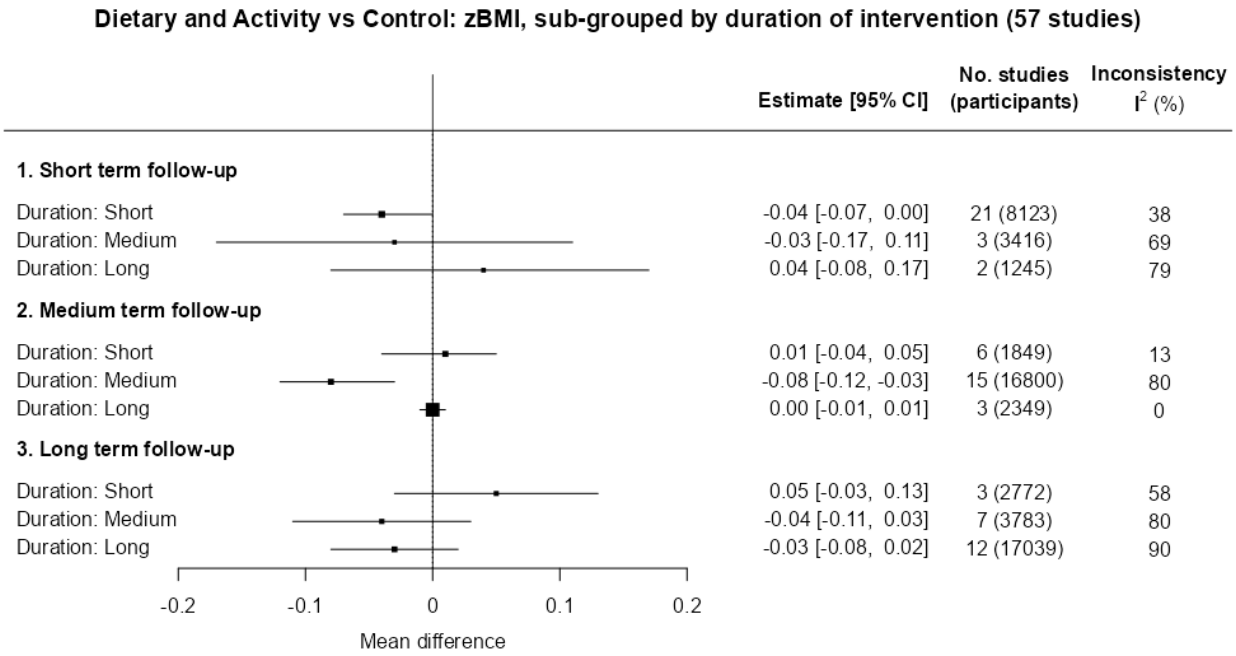


Figure 60. Summary of meta-analysis results for activity interventions vs dietary interventions on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

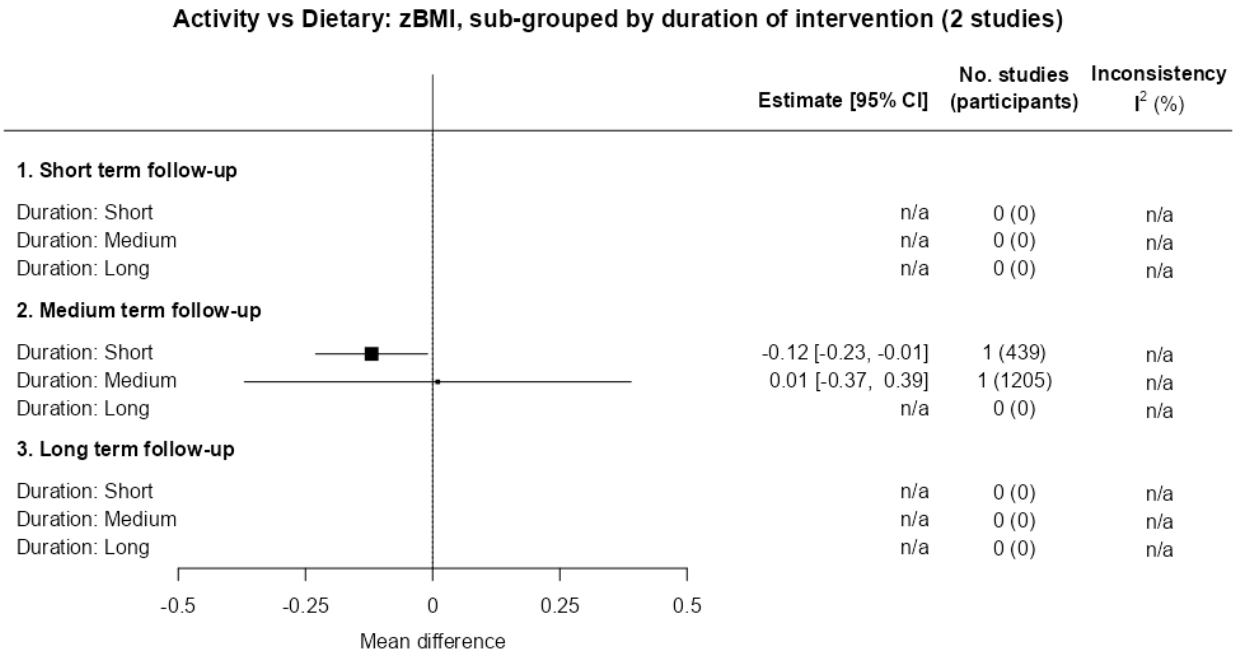


Figure 61. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

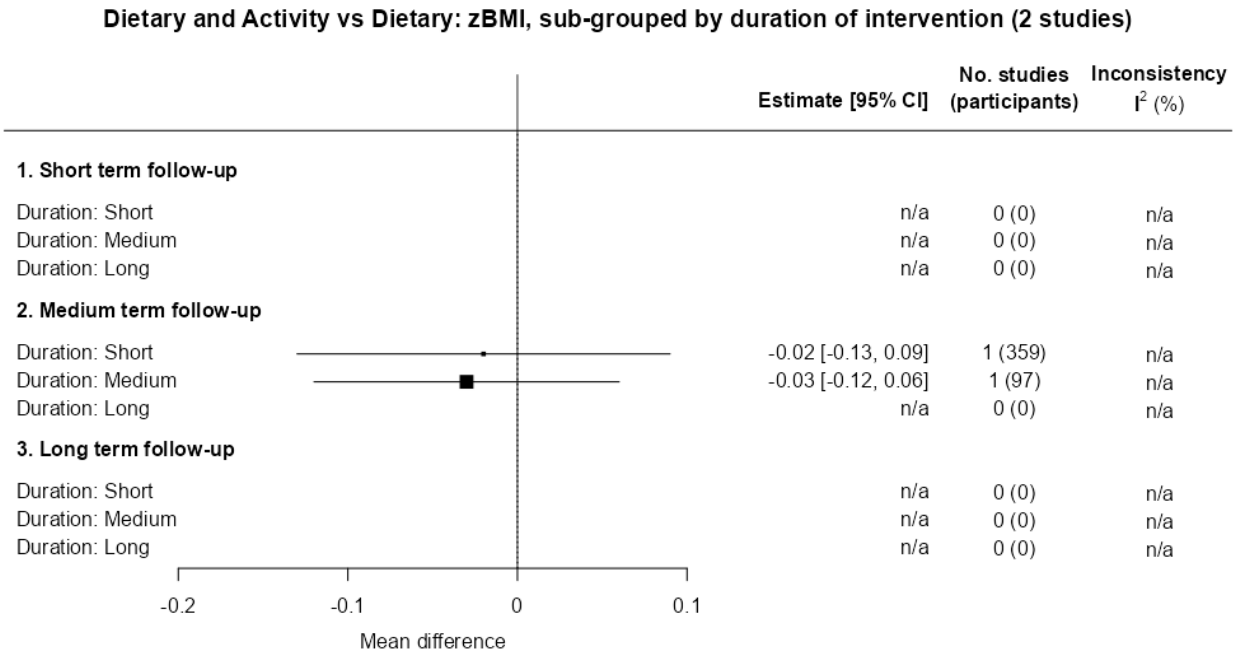


Figure 62. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on zBMI subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
vs: versus
zBMI: standardised body mass index

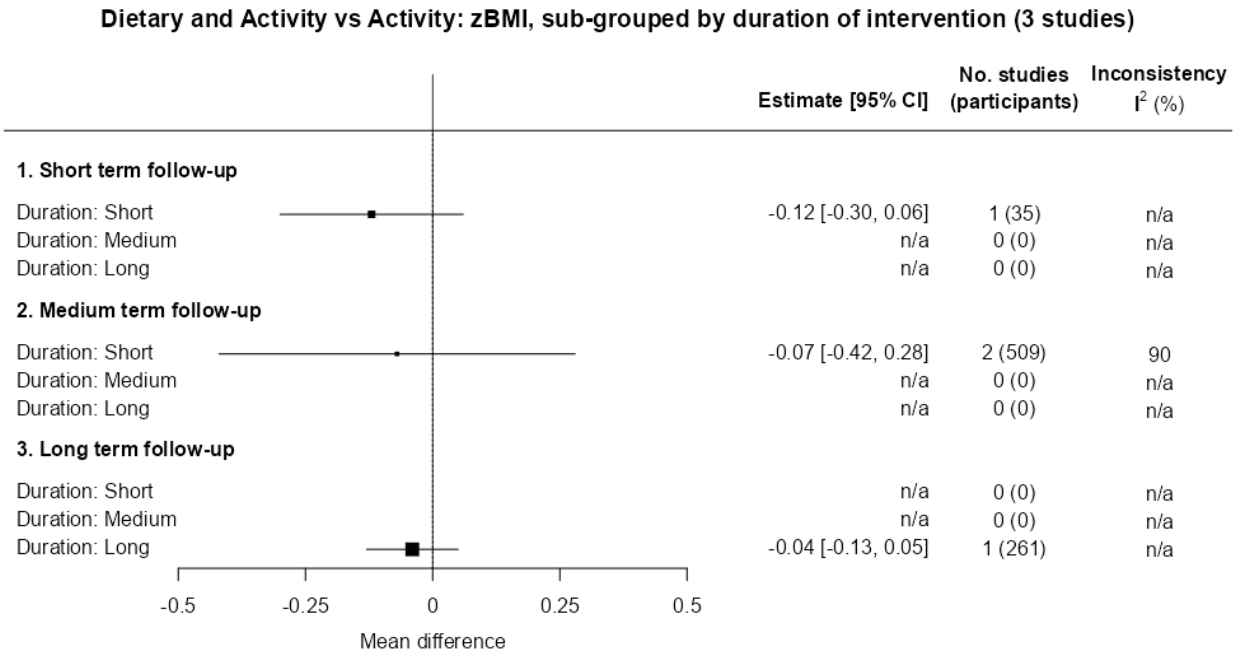


Figure 63. Summary of meta-analysis results for dietary interventions vs control on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

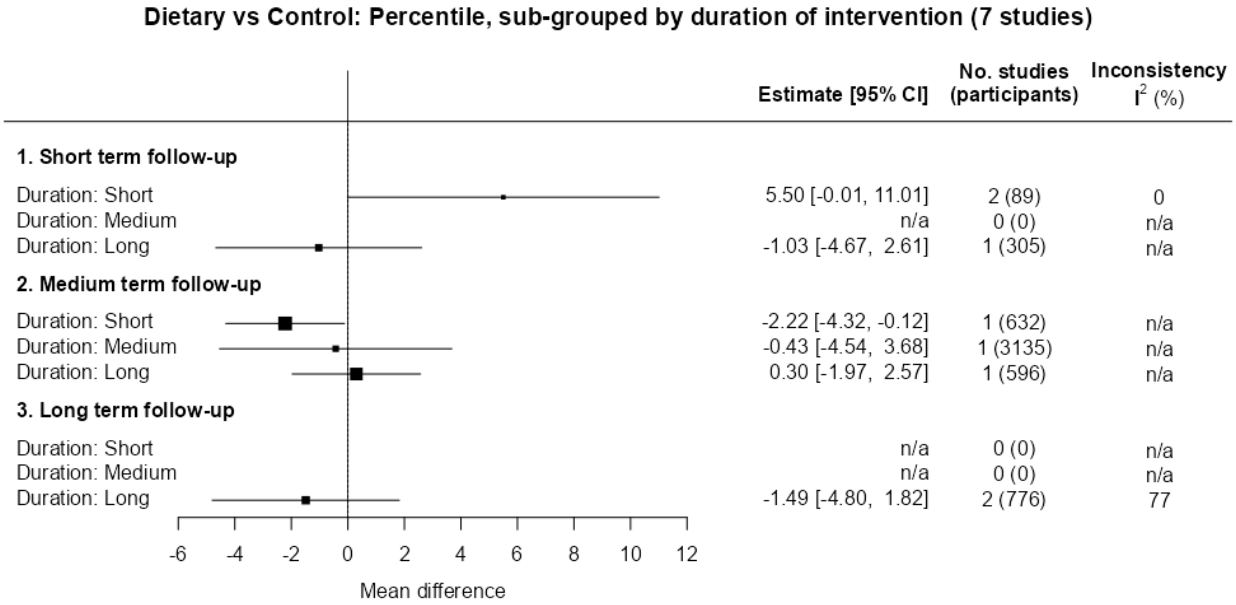


Figure 64. Summary of meta-analysis results for activity interventions vs control on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

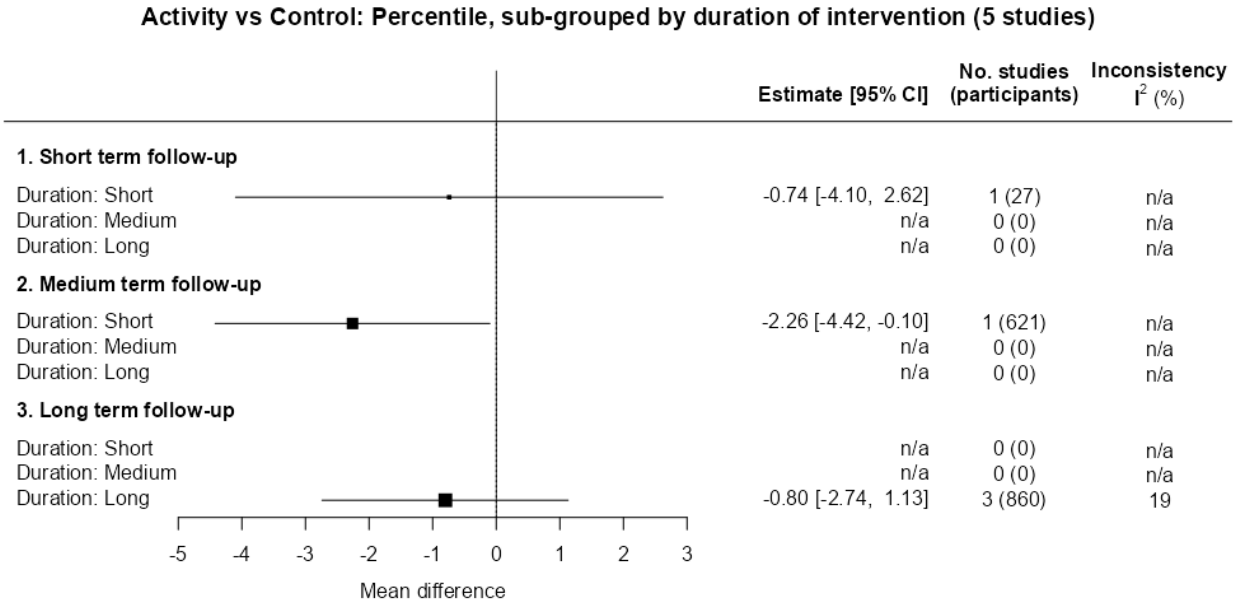


Figure 65. Summary of meta-analysis results for dietary and activity interventions vs control on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

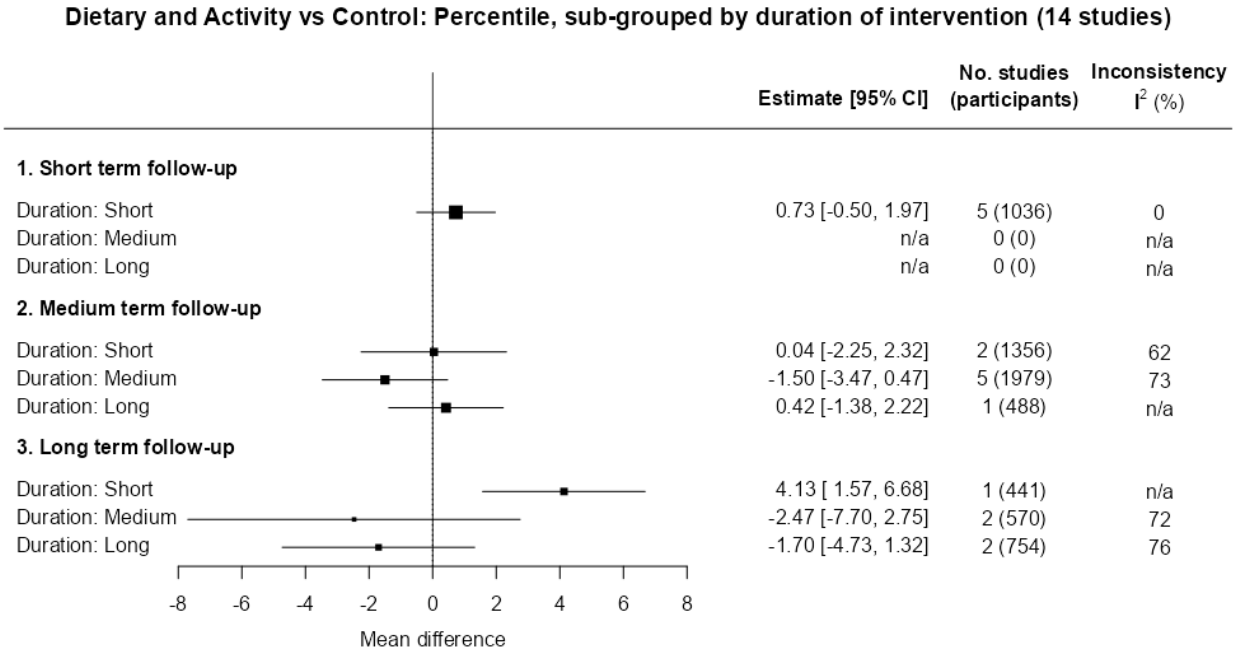


Figure 66. Summary of meta-analysis results for activity interventions vs dietary interventions on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

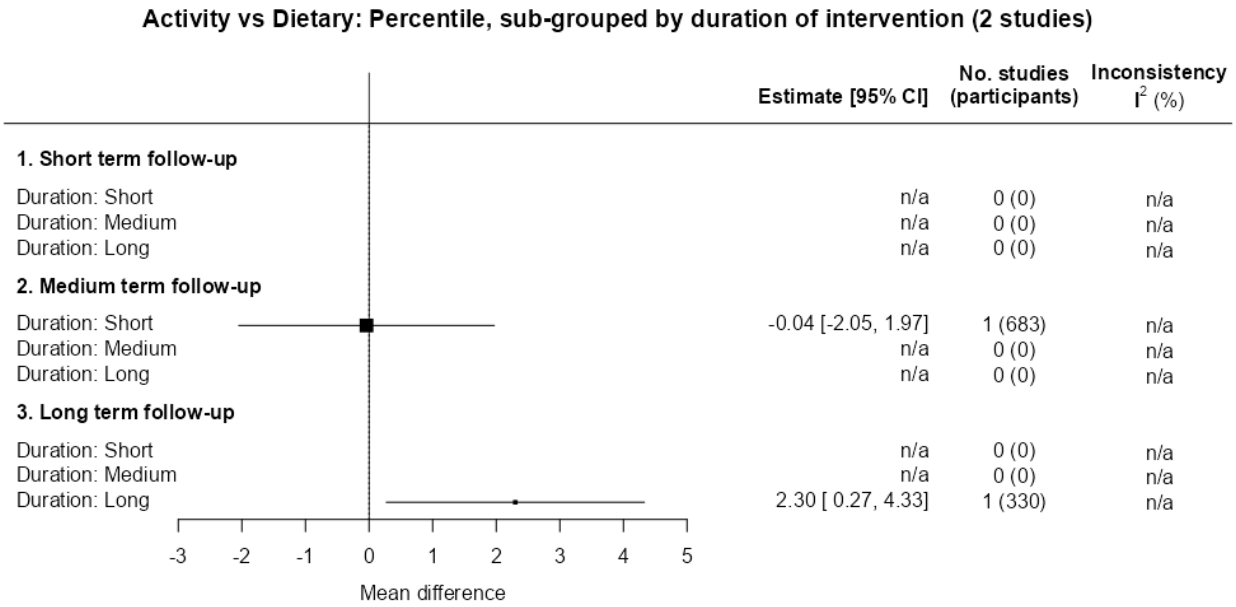


Figure 67. Summary of meta-analysis results for dietary and activity interventions vs dietary interventions on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus

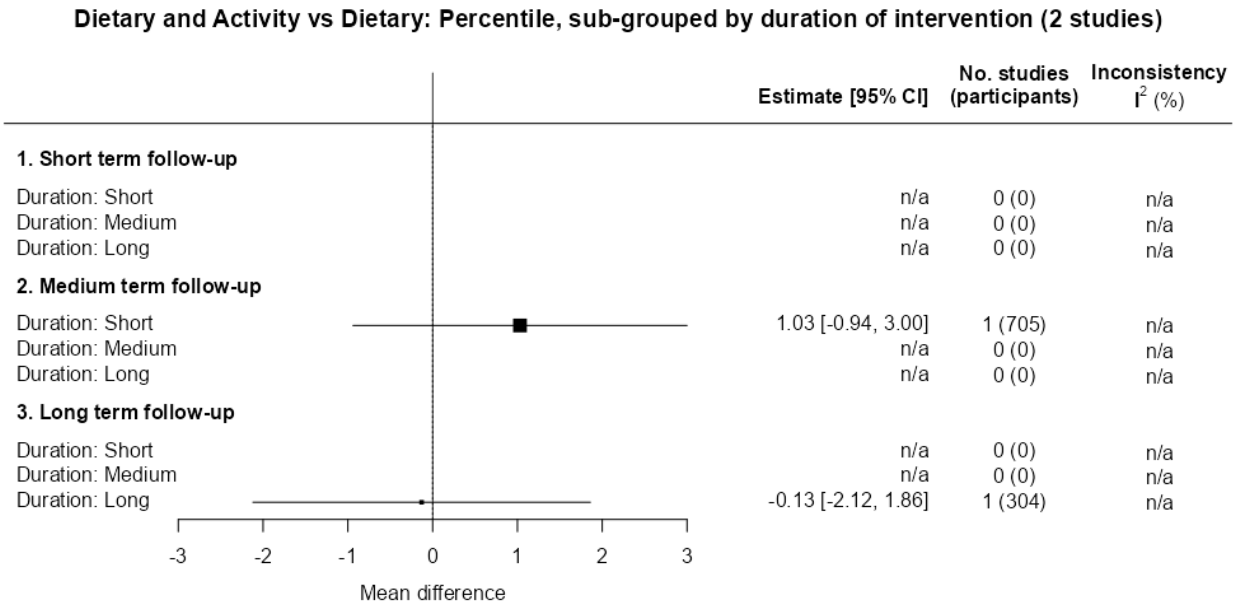
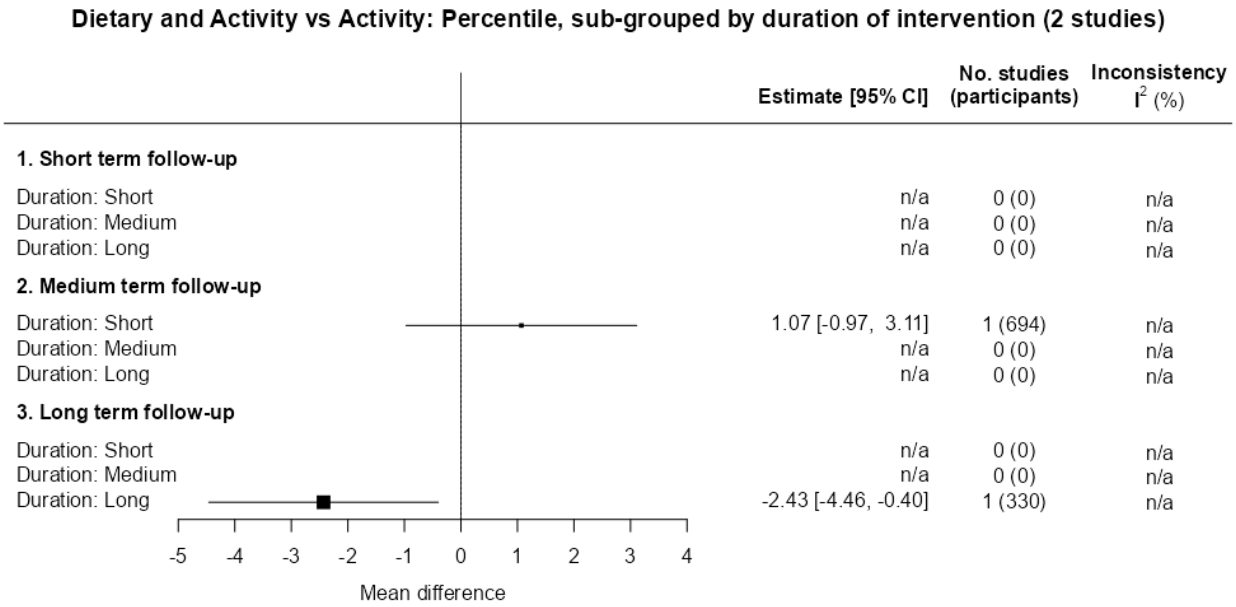


Figure 68. Summary of meta-analysis results for dietary and activity interventions vs activity interventions on BMI percentile subgrouped by duration of intervention. ***Abbreviations***
CI: confidence interval
I^2: percentage of variation in effect estimates across studies that is due to heterogeneity rather than chance
No.: number
n/a: not applicable
SES: socioeconomic status
vs: versus



For dietary intervention versus control there was evidence of differences in effect between subgroups in BMI percentile at short-term follow-up (P = 0.05) but not in BMI at medium-term (P = 0.87) and long-term follow-up (P = 0.3), in zBMI at short-term (P = 0.2), medium-term (P = 0.71) and long-term follow-up (P = 0.69), and in BMI percentile at medium-term follow-up (P = 0.27).

For activity intervention versus control there was evidence of differences in effect between subgroups in BMI at medium-term (P = 0.02) and long-term follow-up (P = 0.03), but not in zBMI at short-term (P = 0.14), medium-term (P = 0.37) and long-term follow-up (P = 0.2).

For dietary and activity intervention versus control there was evidence of differences in effect between subgroups in BMI at short-term follow-up (P < 0.0001), in zBMI at medium-follow-up (P = 0.003) and in BMI percentile at long-term follow-up (P = 0.005), but not in BMI at medium-term (P = 0.11) and long-term follow-up (P = 0.8), in zBMI at short-term (P = 0.51) and long-term follow-up (P = 0.218), and in BMI percentile at medium-term follow-up (P = 0.35).

For activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.55) and in zBMI at medium-term follow-up (P = 0.52).

For dietary and activity interventions versus dietary interventions there was little evidence of differences in effect between subgroups in BMI at medium-term follow-up (P = 0.45) and in zBMI at medium-term follow-up (P = 0.89).

8.5.1 Short duration

In studies in which the duration of the interventions was short (< 9 months) we found that dietary interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.22, 95% CI -4.32 to -0.12; 1 study, 632 participants), but may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD 0, 95% CI -0.1 to 0.1; 5 studies, 2107 participants; zBMI: MD -0.04, 95% CI -0.13 to 0.04; 7 studies, 3054 participants; BMI percentile: MD 5.5, 95% CI -0.01 to 11.01; 2 studies, 89 participants), BMI and zBMI at medium-term follow-up (BMI: MD -0.06, 95% CI -0.3 to 0.18; 2 studies, 630 participants; zBMI: MD 0, 95% CI -0.11 to 0.11; 1 study, 323 participants), and zBMI at long-term follow-up (MD 0, 95% CI -0.14 to 0.14; 1 study, 456 participants).

We found that activity interventions, compared with control, may reduce BMI percentile at medium-term follow-up (MD -2.26, 95% CI -4.42 to -0.1; 1 study, 621 participants), but may have little to no effect on BMI, zBMI and BMI percentile at short-term follow-up (BMI: MD -0.02, 95% CI -0.17 to 0.13; 14 studies, 4069 participants; zBMI: MD -0.04, 95% CI -0.1 to 0.01; 5 studies, 1937 participants; BMI percentile: MD -0.74, 95% CI -4.1 to 2.62; 1 study, 27 participants) and on BMI and zBMI at medium-term follow-up (BMI: MD -0.04, 95% CI -0.13 to 0.06; 5 studies, 2572 participants; zBMI: MD -0.04, 95% CI -0.11 to 0.02; 3 studies, 991 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI and zBMI at short-term follow-up (BMI: MD -0.13, 95% CI -0.25 to -0.02; 21 studies, 11,535 participants; zBMI: MD -0.04, 95% CI -0.07 to 0; 21 studies, 8123 participants) and may increase BMI percentile at long-term follow-up (MD 4.13, 95% CI 1.57 to 6.68; 1 study, 441 participants), but may have little to no effect on BMI percentile at short-term follow-up (MD 0.73, 95% CI -0.5 to 1.97; 5 studies, 1036 participants), on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.01, 95% CI -0.19 to 0.17; 4 studies, 1624 participants; zBMI: MD 0.01, 95% CI -0.04 to 0.05; 6 studies, 1849 participants; BMI percentile: MD 0.04, 95% CI -2.25 to 2.32; 2 studies, 1356 participants) and on zBMI at long-term follow-up (MD 0.05, 95% CI -0.03 to 0.13; 3 studies, 2772 participants).

We found that activity interventions, compared with dietary interventions, may reduce zBMI at medium-term follow-up (MD -0.12, 95% CI -0.23 to -0.01; 1 study, 439 participants), but may have little to no effect on BMI and BMI percentile at medium-term follow-up (BMI: MD -0.28, 95% CI -0.6 to 0.04; 1 study, 439 participants; BMI percentile: MD -0.04, 95% CI -2.05 to 1.97; 1 study, 683 participants).

We found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD -0.09, 95% CI -0.41 to 0.23; 1 study, 359 participants; zBMI: MD -0.02, 95% CI -0.13 to 0.09; 1 study, 359 participants; BMI percentile: MD 1.03, 95% CI -0.94 to 3; 1 study, 705 participants).

We found that dietary and activity interventions, compared with activity interventions, may have little to no effect on BMI and zBMI at short-term follow-up (BMI: MD 0.34, 95% CI -0.25 to 0.93; 2 studies, 95 participants; zBMI: MD -0.12, 95% CI -0.3 to 0.06; 1 study, 35 participants) and on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0.19, 95% CI -0.12 to 0.49; 2 studies, 509 participants; zBMI: MD -0.07, 95% CI -0.42 to 0.28; 2 studies, 509 participants; BMI percentile: MD 1.07, 95% CI -0.97 to 3.11; 1 study, 694 participants).

8.5.2 Medium duration

In studies in which the duration of the interventions was medium (9 months to < 15 months), we found that dietary interventions, compared with control, may have little to no effect on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0.01, 95% CI -0.19 to 0.2; 6 studies, 5589 participants; zBMI: MD -0.03, 95% CI -0.09 to 0.03; 5 studies, 5008 participants; BMI percentile: MD -0.43, 95% CI -4.54 to 3.68; 1 study, 3135 participants) and on BMI and zBMI at long-term follow-up (BMI: MD -0.26, 95% CI -0.58 to 0.06; 1 study, 434 participants; zBMI: MD -0.02, 95% CI -0.2 to 0.16; 2 studies, 583 participants).

We found that activity interventions, compared with control, may reduce BMI and zBMI at medium-term follow-up (BMI: MD -0.19, 95% CI -0.27 to -0.11; 9 studies, 17,220 participants; zBMI: MD -0.08, 95% CI -0.14 to -0.01; 7 studies, 18,131 participants), but may have little to no effect on BMI at medium-term follow-up (MD 0.01, 95% CI -0.03 to 0.05; 1 study, 1643 participants) and on BMI and zBMI at long-term follow-up (BMI: MD 0.01, 95% CI -0.03 to 0.05; 1 study, 1643 participants; zBMI: MD 0.03, 95% CI -0.04 to 0.1; 2 studies, 4744 participants).

We found that dietary and activity interventions, compared with control, may reduce BMI at short-term follow-up (MD -0.17, 95% CI -0.29 to -0.06; 5 studies, 3671 participants), and BMI and zBMI at medium-term follow-up (BMI: MD -0.18, 95% CI -0.31 to -0.04; 14 studies, 14,375 participants; zBMI: MD -0.08, 95% CI -0.12 to -0.03; 15 studies, 16,800 participants), but may have little to no effect on zBMI at short-term follow-up (MD -0.03, 95% CI -0.17 to 0.11; 3 studies, 3416 participants), BMI percentile at medium-term follow-up (MD -1.5, 95% CI -3.47 to 0.47; 5 studies, 1979 participants), and on BMI, zBMI and BMI percentile at medium-term follow-up (BMI: MD 0, 95% CI -0.22 to 0.23; 6 studies, 3144 participants; zBMI: MD -0.04, 95% CI -0.11 to 0.03; 7 studies, 3783 participants; BMI percentile: MD -2.47, 95% CI -7.7 to 2.75; 2 studies, 570 participants).

We found that activity interventions, compared with dietary interventions, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD 0.02, 95% CI -0.91 to 0.95; 1 study, 1205 participants; zBMI: MD 0.01, 95% CI -0.37 to 0.39; 1 study, 1205 participants).

We found that dietary and activity interventions, compared with dietary interventions, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD -0.3, 95% CI -0.75 to 0.15; 1 study, 97 participants; MD -0.03, 95% CI -0.12 to 0.06; 1 study, 97 participants).

8.5.3 Long duration

In studies in which the duration of the interventions was long (15 months or more) we found that dietary interventions, compared with control, may reduce zBMI at short-term follow-up (MD -0.1, 95% CI -0.12 to -0.08; 1 study, 641 participants), but may have little to no effect on BMI percentile at short-term follow-up (MD -1.03, 95% CI -4.67 to 2.61; 1 study, 305 participants), on BMI, zBMI and BMI percentile at medium-term (BMI: MD -0.1, 95% CI -0.59 to 0.39; 1 study, 596 participants; zBMI: MD -0.06, 95% CI -0.16 to 0.03; 3 studies, 1717 participants; BMI percentile: MD 0.3, 95% CI -1.97 to 2.57; 1 study, 596 participants) and at long-term follow-up (BMI: MD 0.1, 95% CI -0.5 to 0.7; 1 study, 511 participants; zBMI: MD -0.06, 95% CI -0.13 to 0.01; 4 studies, 4246 participants; BMI percentile: MD -1.49, 95% CI -4.8 to 1.82; 2 studies, 776 participants).

We found that activity interventions, compared with control, may have little to no effect on BMI and zBMI at medium-term follow-up (BMI: MD -0.04, 95% CI -0.16 to 0.08; 2 studies, 1494 participants; zBMI: MD -0.02, 95% CI -0.07 to 0.02; 3 studies, 1478 participants) and on BMI, zBMI and BMI percentile at long-term follow-up (BMI: MD -0.16, 95% CI -0.36 to 0.04; 5 studies, 3262 participants; zBMI: MD -0.04, 95% CI -0.13 to 0.04; 4 studies, 2196 participants; BMI percentile: MD -0.8, 95% CI -2.74 to 1.13; 3 studies, 860 participants).

We found that dietary and activity interventions, compared with control, may increase BMI at short-term follow-up (MD 0.91, 95% CI 0.42 to 1.39; 1 study, 860 participants), but may have little to no effect on zBMI at short-term follow-up (MD 0.04, 95% CI -0.08 to 0.17; 2 studies, 1245 participants), on BMI, zBMI and BMI percentile at medium-term (BMI: MD 0.21, 95% CI -0.2 to 0.63; 3 studies, 1548 participants; zBMI: MD 0, 95% CI -0.01 to 0.01; 3 studies, 2349 participants; BMI percentile: MD 0.42, 95% CI -1.38 to 2.22; 1 study, 488 participants) and long-term follow-up (BMI: MD 0.04, 95% CI -0.14 to 0.23; 10 studies, 18,954 participants; zBMI: MD -0.03, 95% CI -0.08 to 0.02; 12 studies, 17,039 participants; BMI percentile: MD -1.7, 95% CI -4.73 to 1.32; 2 studies, 754 participants).

We found that activity interventions, compared with dietary interventions, may have little to no effect on BMI percentile long-term follow-up (MD -0.13, 95% CI -2.12 to 1.86; 1 study, 304 participants).

We also found that dietary and activity interventions, compared with activity interventions, may decrease BMI percentile at long-term follow-up (MD -2.43, 95% CI -4.46 to -0.4; 1 study, 330 participants), but may have little to no effect on BMI an zBMI at long-term follow-up (BMI: MD -0.08, 95% CI -0.43 to 0.27; 1 study, 261 participants; zBMI: MD -0.04, 95% CI -0.13 to 0.05; 1 study, 261 participants).

HISTORY

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CONTRIBUTIONS OF AUTHORS

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

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

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

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

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

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

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

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

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

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

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

LW edited and provided advice on the manuscript.

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

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

DECLARATIONS OF INTEREST

- **Francesca Spiga:** declares that they have no conflict of interest.

- **Eve Tomlinson:** declares that they have no conflict of interest.
- **Annabel Davies:** declares that they have no conflict of interest.
- **Theresa HM Moore:** reports being employed by Cochrane as a Methodology Editor, and was not part of the peer review process for this review. The author was not involved in the editorial process.
- **Katie Breheny**: receives support from the National Institute for Health Research(NIHR) Applied Research Collaboration ARC West and Alzheimer's Society and is funded through a Post-Doctoral Fellowship. Previously, Katie Breheny received support from the NIHR School for Public Health Research (SPHR) through a Post-Doctoral Launching Fellowship. KB was involved in Breheny 2020: Effectiveness and cost-effectiveness of the Daily Mile. This was funded by an NIHR Career Development Fellowship (awarded to Professor Emma Frew) and Birmingham City Council, through a Section 106 agreement. Neither the NIHR Academy nor Birmingham City Council had any role in this review, and Katie Breheny was not involved in assessing its eligibility, extracting data or assessing the risk of bias or GRADE for Breheny 2020.
- **Sarah Dawson:** reports being employed by Cochrane as an Information Specialist (Common Mental Disorders Group). The author was not involved in the editorial process.
- **Jelena Savovic:** reports being a Cochrane member. Cochrane has published previous reviews on this topic. JS has received payment from Core Models Ltd. in 2021 to deliver online teaching of introductory systematic review methods.
- **Yang Gao:** declares that they have no conflict of interest.
- **Sophie M Phillips:** declares that they have no conflict of interest.
- **Frances Hillier-Brown:** declares that they have no conflict of interest.
- **Rebecca K Hodder:** reports working as a Program Manager, Hunter New England Population Health, Hunter New England Local Health District, responsible for the delivery of chronic disease prevention programmes in secondary schools. RKH works as a research associate for Cochrane Public Health and had no role in the editorial process for the review.
- **Luke Wolfenden:** reports research grants to undertake trials likely to be included in the review; paid to University of Newcastle. LW reports that he benefited financially from these payments and/or has access to or control of the funds. LW reports involvement in conducting one study included in the work: Barnes 2021. LW was not involved in decisions regarding study selection, data extraction, assessment of risk of bias or grading of the certainty of the evidence (GRADE) for this study. LW has received funding, via grants awarded to his institution, for his time to undertake research, and to conduct research trials including activities from study development, conduct, analysis and reporting from NSW Ministry of Health, Nib Foundation, Heart Foundation and National Health and Medical Research Council. LW reports that he has published numerous opinions, commentary or editorials on topics pertaining to chronic disease prevention, healthy eating, physical activity and obesity. LW reports working as a health promotion programme manager at Hunter New England Local Health District, a government-funded health service. LW is Co-ordinating Editor of Cochrane Public Health; however, he was not involved in any stage of the editorial management or assessment of this review.
- **Julian PT Higgins:** receives support from the National Institute for Health Research (Public Health Research, NIHR131572).
- **Carolyn D Summerbell:** reports being affiliated with the WHO, and contributed to their work for their 'Ending Childhood Obesity' report.

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

- We changed the author list to reflect contributions to the review.
- We ran a search for retractions and corrigenda.
- We added BMI percentile as an outcome as we found studies reporting only this interpretation of BMI.
- We changed the coding of the subgroup analysis by setting and socioeconomic status to reflect the setting and population of the included studies.
- We prepared summary of findings tables for each of our main comparisons for BMI and zBMI at short-, medium- and long-term follow-up.
- We changed the order of the outcomes in the Objectives and Methods sections to reflect the order by which we reported the outcomes in the summary of findings tables and results sections.
- We did not carry out the following:
  - Write to authors to request missing data, due to scarcity of time and resources.
  - Undertake additional analyses ('syntheses without meta-analysis') using methods based on P values and directions of effect. We made extensive efforts to estimate intervention effects from diversely reported results (e.g. from regression coefficients, from P values and from analyses based on dichotomised BMI scores (Higgins 2019b)). However, very few of the studies not included in meta-analyses provided this basic information.
  - Undertake subgroup analyses according to sex because not enough studies presented subgroup analyses by sex.
  - Undertake SMD sensitivity analyses; we observed that studies included importantly different age ranges (e.g. many in single year groups but others across multiple year groups), so that the SDs for BMI used for the standardisation would be expected to reflect mainly the spread of age ranges rather than the differences in the measurement scale (section 8.2, *Cochrane Handbook for Systematic Reviews of Interventions*; Higgins 2022).