Appendix 1: Full Methodology

We have conducted this overview of reviews in accordance with the recommendations for Cochrane overviews of reviews (35). PROSPERO (CRD42016053423)

Search methods and selection criteria

This overview draws together evidence from all six Cochrane reviews which were collectively written to update the previous Cochrane review on interventions for treating obesity in children (34):

- Surgery for the treatment of obesity in children and adolescents (28)
- Drug interventions for the treatment of obesity in children and adolescents (29)
- Parent only interventions for childhood overweight or obesity in children aged 5 to 11 years (30)
- Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in pre-school children up to the age of 6 years (31)
- Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in school children from the age of 6 to 11 years (32)
- Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in adolescents aged 12 to 17 years (33)

All six reviews were extracted from the Cochrane Database of Systematic Reviews.

Data extraction

We used a standardised data collection form to extract the characteristics of each review. To align with previous Cochrane overviews of reviews, one author conducted the data extraction (LE, KR, LA-K, EM), which was checked for accuracy by a second author (EL, KR, CO, TB, LA, JO), with any disagreements resolved by consensus or by a third reviewer (LA, GM, TB, KR, HC). Most summary data are presented as medians and ranges. The primary outcomes of interest were changes in BMI or BMI-z score. The results from all BMI and BMI-z score meta-analyses, including any subgroup and sensitivity analyses, were extracted. We also extracted adverse events, health-related quality of life / self-esteem and other outcomes (such as other anthropometric measures, all-cause mortality and morbidity) as reported in the summary of findings tables of each review.

We did not re-assess the risk of bias of included studies within each review but have reported the review authors' assessment using the Cochrane 'risk of bias' assessment tool (37). The overall quality of the evidence was also recorded according to the original review authors Grading of Recommendations Assessment, Development and Evaluation (GRADE) assessment.

Quality of methodology

The quality of each review was independently assessed by one author (who was not on the original review authorship) (KR, AD, PR, GM, TB), using the revised Assessment of Multiple Systematic Reviews (R-AMSTAR) measure tool (36). The assessment was checked by a second reviewer (TB, JO, PR, AD, GM), with disagreement resolved by discussion or with a third reviewer (GM, AD, PR).

Data synthesis

The unit of analysis for this overview of reviews is the systematic review, not the individual trials in each review. Therefore, we did not conduct any new meta-analyses, but conducted a narrative synthesis of the outcomes from meta-analyses and data already presented within each review.

Additional tables

Table S1: Characteristics of included reviews

Title (author, Year of publication / publication status)	**Surgery for the treatment of obesity in children and adolescents (Ells, 2015)**	**Drug interventions for the treatment of obesity in children and adolescents (Mead, 2016)**	**Parent-only interventions for childhood overweight or obesity in children aged 5 to 11 years (Loveman, 2015)**	**Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children up to the age of 6 years (Colquitt, 2016)**	**Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in school children from the age of 6 to 11 years (Mead, 2017)**	**Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in adolescents aged 12 to 17 years (Al-Khudairy, 2017)**
Review objective	"To assess the effects of surgical interventions for treating obesity in childhood and adolescence."	"To assess the efficacy of pharmacological interventions for treating obesity in childhood and adolescence."	"To assess the efficacy of diet, physical activity and behavioural interventions delivered to parents only for the treatment of overweight and obesity in children aged 5 to 11 years."	"To assess the effects of diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children up to the age of 6 years"	"To determine the effectiveness of interventions to treat obesity, specifically to assess the effect of diet, physical activity and behavioural interventions for the treatment of overweight and obesity in children age 6 to 11 years old."	"To assess the effects of diet, physical activity and behavioural interventions for the treatment of overweight or obesity in adolescents aged 12 to 17 years."
Search timeframe	Database inception to March 2015	Database inception to March 2016	Database inception to March 2015	Database inception to March 2015	Database inception to July 2016	Database inception to July 2016
Databases searched	Cochrane library, Medline, Pubmed, EMBASE, PsycINFO, LILACS, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform. Plus continuous Medline	Cochrane Library, MEDLINE, EMBASE, PubMed, LILACS as well as the trial registers WHO international and ClinicalTrials.gov platform Plus continuous Medline	Cochrane library, Medline, EMBASE, PsycINFO, LILACS, CINAHL, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform Plus continuous Medline	Cochrane library, Medline, EMBASE, PsycINFO, CINAHL, LILACS, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform Plus continuous Medline	Cochrane library, Medline, EMBASE, PsycINFO, CINAHL, LILACS, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform Plus continuous Medline	*Cochrane Library*, MEDLINE, EMBASE, PsycINFO, CINAHL, LILACS, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform Plus continuous Medline

	email alert service	email alert service	email alert service	email alert service	email alert service	email alert service
Type of study Type of study design	Randomised controlled trials [with at least six months of data baseline to follow up].	Randomised controlled trials [with a minimum of three month pharmacological intervention and at least six months of data from baseline]	Randomised controlled trials [with at least six months of data from baseline].	Randomised controlled trials [with at least six months of data baseline to follow up].	Randomised controlled trials [with at least six months of data baseline to follow up].	RCTs [with at least six months of data baseline to follow up].
Participants	Obese participants, with a mean age of less than 18 years at the commencement of the intervention. Pregnant females and the critically ill were excluded, as were children with obesity due to a secondary or syndromic cause	Obese participants with a mean age of less than 18 years at the commencement of the intervention. Excluding pregnant and critically ill participants, those with secondary or syndromic forms of obesity.	Overweight or obese children with a mean study age of 5 to 11 years at the commencement of the intervention. Critically ill children or those with syndromic cause for their obesity were excluded.	Overweight or obese children with a mean trial age of 0 to 6 years at the commencement of the intervention. Excluding the critically ill, or children with a syndromic cause for their obesity.	Overweight or obese participants, with a mean age of ≥6 and <12 years at the commencement of the intervention. Pregnant participants and the critically ill were excluded.	Overweight or obese adolescents with a mean study age of 12 to 17 years at the commencement of the intervention. The critically ill, studies in pregnant or breast feeding women, or adolescents with a syndromic cause for their obesity were excluded.
Intervention	Any form of surgery which aimed to treat paediatric obesity. Interventions that specifically dealt with the treatment of eating disorders or type 2 diabetes were excluded.	Any pharmacological intervention which aimed to treat paediatric obesity. Interventions which included growth hormone therapy or specifically dealt with the treatment of eating disorders or type 2 diabetes were excluded.	Any form of lifestyle intervention which aimed to treat overweight or obesity in children (any form of dietary, physical activity, behavioural therapy, or a combination of these delivered as single or multi-component interventions) directed at the parents as the agents of change (i.e. interventions did not include their children).	Any form of lifestyle intervention which aimed to treat overweight or obesity in children (any form of dietary, physical activity and/or behavioural therapy delivered as single- or multicomponent interventions)."	Any form of lifestyle intervention which aimed to treat overweight or obesity in children (any form of dietary, physical activity and/or behavioural therapy delivered as single- or multicomponent interventions). Interventions that included participants with a secondary or syndromic cause of obesity, were excluded.	Any form of lifestyle intervention which aimed to treat overweight or obesity in adolescents (any form of dietary, physical activity and / or behavioural therapy delivered as a single or multi component intervention). Interventions that included participants with a secondary or syndromic cause of obesity, were excluded.

Comparator	Placebo, usual care (non surgical treatment) with or without a concomitant therapy providing it was conducted in both intervention and control	Placebo, usual care or concomitant therapy if conducted in both control and treatment	Usual care, a parent-child intervention, child only intervention or an alternative concomitant therapy providing it was delivered in the control and intervention	No intervention, usual care (however defined), or an alternative concomitant therapy providing it is delivered in the intervention and control	No treatment, usual care (however defined), or an alternative concomitant therapy providing it is delivered in the intervention and control	No treatment, usual care or an alternative concomitant therapy providing it is delivered in the intervention and control
Primary outcomes	BMI, body weight and adverse events	BMI, body weight and adverse events	BMI, body weight and adverse events.	BMI, body weight, and adverse events	BMI, body weight and adverse events.	BMI, body weight and adverse events.
Secondary outcomes	Health-related quality of life and self esteem, All-cause mortality, Morbidity, Body fat distribution, Behaviour change, Participants views of the intervention, Socioeconomic effects.	Health-related quality of life and self-esteem; All-cause mortality; Morbidity; Body fat distribution; Behaviour change; Participants' views of the intervention; Socioeconomic effects	Health-related quality of life and self esteem. All-cause mortality. Morbidity, Body fat distribution. Behaviour change. Participants' views of the intervention. Socioeconomic effects Parenting skill and relationships	Health related quality of life and self esteem, All cause mortality, Morbidity, Body fat distribution, Behaviour change, Participant views of the intervention, Socioeconomic effects Parenting skill and relationships	Health-related quality of life and self-esteem; All-cause mortality; Morbidity; Body fat distribution; Behaviour change; Participants' views of the intervention; Socioeconomic effects	Health-related quality of life and self-esteem; All-cause mortality; Morbidity; Body fat distribution; Behaviour change; Participants' views of the intervention; Socioeconomic effects Parenting skill and relationships.
Were study authors contacted if so please provide details	Yes authors were contacted to enquire about further unpublished data and any ongoing studies.	Yes all authors were emailed to enquire whether they were willing to answer questions regarding their trials. Thereafter missing information was sought from the author if required.	Yes all authors were emailed to enquire whether they were willing to answer questions regarding their trials. Thereafter missing information was sought from the author if required.	Yes all authors were emailed to enquire whether they were willing to answer questions regarding their trials. Thereafter missing information was sought from the author if required.	Yes all authors were emailed to enquire whether they were willing to answer questions regarding their trials. Thereafter missing information was sought from the author if required.	Yes all authors were emailed to enquire whether they were willing to answer questions regarding their trials. Thereafter missing information was sought from the author if required.
External funding	None to declare	Not reported	NIHR	NIHR.	World Health Organisation	NIHR
Authors declarations	None to declare	N Finer works part time for Novo nordisk	None to declare	None to declare	None to declare	None to declare

Table S2: Characteristics of included RCTs

Review:	**Surgery (Ells, 2015)**	**Drug (Mead 2016)**	**Parent-only (Loveman, 2015)**	**Preschool lifestyle (Colquitt, 2016)**	**Primary school lifestyle (Mead 2017)**	**Adolescent lifestyle (Al-Khudairy, 2017)**
Total number of included RCTs (number meta analysed) [number of individually randomised studies] [number of cluster randomised studies]	1 (0) [1] [0]	21 (16) [21] Including 2 cross overs* [0]	20 (14) [18] [2]	7 (5) [6] [1]	70 (55) [66] Including 2 cross overs* [4]	44 (28) [40] Including 1 cross over* [4]
Number of ongoing studies	4	8	10	4	20	50
Total number of participants (intervention : control)	50 (25 intervention: 25 control)	2484 (1478 intervention: 904 control)	3057 (1773 intervention: 1284 control)	923 (529 intervention: 394 control)	8461 Not all data was split by arm (i.e. cross-over trial)	4781 (2555intervention: 1850 control)
% of randomised population finishing study (or longest follow up) Median (range)	84	78.6 (36.5 to 100)	73 (28 to 92) (not reported in 1 study)	73 (39-94)	74.5 (24- 156) (1 study was terminated prior to end. 3 studies were unclear how many completed)	82.7 (31.1 to 100) (unclear in 2 studies)
Number of interventions in each category: Surgery Pharmaceutical Lifestyle - Parent only - Physical activity only - Diet only	 1 (laparoscopic banding) 0 0 0 0	 0 21 (11 metformin, 6 sibutramine, 4 orlistat) 0 0 0	 0 0 20 0 0	 0 0 0 0 1	 0 0 0 4 2	 0 0 0 5 5

- Psychology only - Multi-component	0 0	0 0	0 0	0 6	0 64	0 34
Number of comparators in each category: - No intervention / waiting list control (true control) - Usual care - Alternative intervention (please state additive intervention)	0 1 Non-surgical (lifestyle intervention control only) 0	1 trial had only placebo 2 metformin and 1 orlistat - no placebo (lifestyle intervention – control only). 17 – provide active drug and placebo in the intervention and control arms alongside a concomitant form of lifestyle intervention delivered in both arms.	6 7 (2 stated usual care, 2 minimal contact and 2 placebo style control) 7 (3 child additive in control, 2 diet/lifestyle additive in control, 1 intensive lifestyle intervention, 1 parent only additive component)	1 4 (2 of which are enhanced usual care) 2 (1 additive was dairy rich or energy restricted diet, 1 additive was behavioural/parenting intervention)	21 34 15	9 23 12
Sample size randomised: Median (range)	50	66 (24 to 539)	95.5 (15 to 645)	88 (18 to 475)	79 (16 to 686)	81 (10-521)
Intervention duration (months): Median (range)	1-2 days	6 (2.75 to 12.5) 1 study only provided a range	5.5 (2.25 to 24) 2 study only provided a range	6 (3.75-12 months)	6 (0.25 to 24)	6 (1.36 - 24 months) 1 study only provided a range
Duration of follow up (months	24 (months)	6 (5.5 to 23	11.88 (5.5 to	24 (12-36months) NB	12 (5.5 to 36)	8.64

baseline to last measure): Median (range)		months) 1 study included data at 23 months which was not used and 1 study provided a range only. Follow ups from cross over and open label periods are not included.	24) 1 study only provided a range	includes 2 trials with 24 month follow up points, although data for these time points was not reported.		(5.5-24) 2 studies only provided a range
Number of studies with post intervention follow up period, [median] (range in - months)	1 [24 months no range – just one study)	4 [3] (2.75-11)	17 [6] (2.75-18.5)	7 [12] (6-32.25) NB whilst all studies reported a follow up data – complete follow up data was not available for 2 studies.	37 [10.25](1-30)	24 [6] (1-21)
Year of publication: - 1960-69 - 1970-79 - 1980-89 - 1990-99 - 2000-09 - 2010+	 0 0 0 0 0 1	 0 0 0 0 12 9 (including one NCT trial results published on register in 2012)	 0 1 0 0 6 13	 0 0 0 0 1 6	 0 0 4 3 20 43 Includes 1 NCT trial	 1 0 1 0 11 29 2 NCT trials with no publication date
Year trials were performed - range	2005-2008	1999-2010 (not reported in 9 trials)	2001-2011 Not reported in 9 studies	2003-2013	1984-2016	1968- 2015
Location [total across reviews]						

– (upper middle income - **bold**)						
Australia [13]	1	1	4		4	3
Austria [1]					1	
Belgium [2]			1			1
Brazil [3]		2			1	
Canada [5]		1			1	3
China [1]						1
Chile [1]		1				
Denmark [1]					1	
Finland [1]					1	
France [1]						1
Germany [6]					5	1
Greece [2]					1	1
Hong Kong [2]					1	1
Iceland [1]					1	
Iran [5]		1	1	1		2
Israel [3]			1		2	
Italy [2]					2	
Japan [1]					1	
Kuwait [1]						1
Malaysia [1]					1	
Mexico [3]		1			1	1
Netherlands [7]		1	2	1	1	2
New Zealand [3]					3	
Spain [3]					3	
Sweden [3]					3	
Switzerland [1]			1			
Turkey [2]		2				
Thailand [1]						1
UK [11]		1		1	6	3
USA [73]		8	10	4	30	21
Germany & Switzerland [1]		1				
USA & Canada [1]		1				
Not reported [1]						1

Study setting - Primary care - Secondary care (hospital/outpatients clinic) - Other clinics (e.g. research) - Community (inc home) - School - Other (please specify)	 0 1 0 0 0 0	 0 20 0 0 0 1 Setting not provided	 2 4 2 4 0 8 (5: university & mixed settings, 3 Setting not reported)	 2 3 1 1 0 0	 11 25 7 11 4 12 (2unclear and 10mixed setting)	 5 12 3 6 8 10 (6 health care (based on authors location), 1 University (based on authors location), 1 University, 1 School and outpatients, 1 Clinic/home)
Number of trials reporting participant views	0	0	4	2	9	8
Number of trials reporting cost	Not reported	Not reported	Not reported.	Not reported	9	Not reported
Mean study age at baseline (years): Median (range) intervention Median (range) control [number of trials <u>not</u> reporting this variable]	16.5 (not median as only one study) 16.6 [0]	13.65 (10.1 to 15.8) 13.65 (10.4 to 15.8) 1 study only reported by gender	8.58 (5.1 to 11.5) 8.25 (4.9 to 11.03) [4]	4.6 (2.5-5.5) 4.7 (2.3-5.7) [0]	10.1 (6.1 to 12.3) 9.9 (6.3 to 12.4) [6]	14.3 (11.9-17.5) 14.35 (12-17.5)[11] and 1 only reported by gender
% female: Median (range) intervention	64 (not median as only one	65 (45 to100)	60 (41 to 100)	64 (25-80)	55.3 (27.5 to 100)	55.8 (0-100)

Median (range) control [number of trials not reporting this variable]	study) 72 [0]	62 (46 to 100) [2]	63 (50 to 100) [3]	64 (40-74) [1]	54.8 (26.5 to 100) [4]	54.5 (0-100) [4]
Ethnicity: % White Median (range) intervention % White Median (range) control [number of trials not reporting this variable]	[1]	56 (37 to 87) 61 (39 to 92) [11 – 2 of which were unclear	74.9 (53.6 to 100) 80.9 (59 to 100) [12]	79 (47-91) 75 (70-90) [2]	80.1 (0 to 100 71 (0 to 100) [40 – 8 of which were unclear]	58.8 (0-100) 34.8 (0-100) [25] and 1 only reported by gender
SES	Not reported in this review	Not reported in this review	Not reported in 11 trials, the remaining 9 used different measurement tools.	Not reported in 2 trials, remaining 5 used different assessment tools,	Not reported in 38 trials the remaining 32 used different assessment tools.	Not reported in 32 studies, the remaining 12 used different assessment tools
Mean Baseline BMI: Median (range) intervention Median (range) control [number of trials not reporting this variable]	42.3 40.4 [0]	34.3 (26.4 to 41.7) 35.4 (26.2 to 41.7) [1] and 1 study only reported by gender]	24.4 (18.16 to 34.6) 25.2 (18.1 to 33.6) [8]	20.8 (18-22.7) 20.1 (19.1-22.4) [2]	26.6 (18.3 to 41.1) 26.5 (18.2 to 36.7) [23]	32.4 (26.6 -45.5) 31.84 (26.6 – 45.5) [10] and 2 studies only reported by gender
Mean Baseline BMI z score: Median (range) intervention Median (range) control [number of trials not reporting this variable]	2.54 2.46 [0]	Not reported in this review	2.23 (1.93 to 2.8) 2.33 (1.88 to 2.8) [11]	2.25 (1-2.7) 2.25 (1.6-2.7) [1]	2.2 (1.3 to 5.6) 2.2 (1.3 to 5.3) [23]	2.2 (1.92-4.2) 2.2 (1.81-4.3) [29]

*** Cross over trials were treated as parallel group by using the first half of the cross only – these trials therefore have no post intervention follow up.**

NB where studies provided duration/follow up in weeks this was converted by dividing by 4.35 and rounded to the nearest 0.25. Please note that some studies only reported average values for all participants (intervention and control), where this occurred the average was used to populate both intervention and control. A number of studies also reported values by gender only, these could not be included in the summary data.

Table S3: R-AMSTAR quality assessment results

Review short title (reference)→ R-AMSTAR question ↓	Surgery (Ells, 2015)	Drug (Mead 2016)	Parent-only (Loveman, 2015)	Preschool lifestyle (Colquitt, 2016)	Primary school lifestyle (Mead, 2017)	Adolescent lifesytle(Al-Khudairy, 2017)
1. Was an 'a priori' design provided?						
(A) 'a priori' design	yes	Yes	yes	yes	yes	yes
(B) statement of inclusion criteria	yes	Yes	yes	yes	yes	yes
(C) PICO/PIPO research question (population, intervention, comparison, prediction, outcome)	yes	yes	yes	yes	yes	yes
Score	4	4	4	4	4	4
2. Was there duplicate study selection and data extraction?						
(A) There should be at least two independent data extractors as stated or implied.	yes	Yes	yes	yes	yes	yes
(B) Statement of recognition or awareness of consensus procedure for disagreements.	yes	Yes	yes	yes	yes	yes
(C) Disagreements among extractors resolved properly as stated or implied	yes	Yes	yes	yes	yes	yes
Score	4	4	4	4	4	4
3. Was a comprehensive literature search performed?						
(A) At least two electronic sources should be searched.	Yes	Yes	Yes	Yes	Yes	yes
(B) The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE).	Yes	Yes	Yes	Yes	Yes	yes
(C) Key words and/or MESH terms must be stated AND where feasible the search strategy outline should be provided such that one can trace the filtering process of the included articles.	Yes	Yes	Yes	Yes	Yes	yes
(D) In addition to the electronic databases (PubMed, EMBASE, Medline), all searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.	Yes	yes	Yes	Yes	Yes	Yes
(E) Journals were "hand-searched" or "manual searched" (i.e. identifying highly relevant journals and conducting a manual, page-by-page search of their entire contents looking for potentially eligible studies)	No	no	yes	yes	yes	yes

Score	4	4	4	4	4	4
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?						
(A) The authors should state that they searched for reports regardless of their publication type.	no	No	no	Yes	Yes	Yes
(B) The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.	no	No	Yes	No	No	Yes
(C) "Non-English papers were translated" or readers sufficiently trained in foreign language	no	Yes	no	no	no	Yes
(D) No language restriction or recognition of non-English articles	yes	Yes	Yes	Yes	Yes	Yes
score	2	3	3	3	3	4
5. Was a list of studies (included and excluded) provided?						
(A) Table/list/or figure of included studies, a reference list does not suffice.	Yes	Yes	Yes	Yes	Yes	Yes
(B) Table/list/figure of excluded studies1 either in the article or in a supplemental source (i.e. online). (Excluded studies refers to those studies seriously considered on the basis of title and/or abstract, but rejected after reading the body of the text)	Yes	Yes	Yes	Yes	Yes	Yes
(C) Author satisfactorily/sufficiently stated the reason for exclusion of the seriously considered studies.	Yes	Yes	Yes	Yes	No	Yes
(D) Reader is able to retrace the included and the excluded studies anywhere in the article bibliography, reference, or supplemental source	Yes	Yes	Yes	Yes	Yes	Yes
score	4	4	4	4	3	4
6. Were the characteristics of the included studies provided?						
(A) In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions AND outcomes.	Yes	Yes	Yes	Yes	Yes	Yes
(B) Provide the ranges of relevant characteristics in the studies analyzed (e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.)	Yes	No	Yes	Yes	Yes	Yes
(C) The information provided appears to be complete and accurate (i.e. there is a tolerable range of subjectivity here. Is the reader left wondering? If so, state the needed information and the reasoning).	Yes	yes	Yes	Yes	Yes	Yes
score	4	3	4	4	4	4
7. Was the scientific quality of the included studies assessed and documented						

(A) 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(B) The scientific quality of the included studies appears to be meaningful.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(C) Discussion/recognition/awareness of level of evidence	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(D) Quality of evidence should be rated/ranked based on characterized instruments. (Characterized instrument is a created instrument that ranks the level of evidence, e.g. GRADE [Grading of Recommendations Assessment, Development and Evaluation.])	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
score	**4**	**4**	**4**	**4**	**4**	**4**
8. Was the scientific quality of the included studies used appropriately in formulating conclusions						
(A) The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(B) The results of the methodological rigor and scientific quality are explicitly stated in formulating recommendations.	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(C) To have conclusions integrated/drives towards a clinical consensus statement	**No**	**Yes**	**No**	**No**	**No**	**No**
(D) This clinical consensus statement drives toward revision or confirmation of clinical practice guidelines	**No**	**no**	**no**	**no**	**no**	**no**
score	**2**	**3**	**2**	**2**	**2**	**2**
9. Were the methods used to combine the findings of studies appropriate?						
(A) Statement of criteria that were used to decide that the studies analyzed were similar enough to be pooled?	**yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(B) For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi-squared test for homogeneity, I2).	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(C) Is there a recognition of heterogeneity or lack of thereof	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(D) If heterogeneity exists a "random effects model" should be used and/or the rationale (i.e. clinical appropriateness) of combining should be taken into consideration (i.e. is it sensible to combine?), or stated explicitly	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(E) If homogeneity exists, author should state a rationale or a statistical test	**No**	**no**	**no**	**no**	**no**	**no**
score	**1**	**4**	**4**	**4**	**4**	**4**
10. Was the likelihood of publication bias (a.k.a. "file drawer" effect) assessed?						
(A) Recognition of publication bias or file-drawer effect	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

(B) An assessment of publication bias should include graphical aids (e.g., funnel plot, other available tests)	**No**	**Yes**	**no**	**no**	**Yes**	**Yes**
(C) Statistical tests (e.g., Egger regression test).	**No**	**Yes**	**no**	**no**	**no**	**no**
score	**2**	**4**	**2**	**2**	**3**	**3**
11. Was the conflict of interest stated?						
(A) Statement of sources of support	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
(B) No conflict of interest. This is subjective and may require some deduction or searching.	**Yes**	**yes**	**Yes**	**Yes**	**Yes**	**Yes**
(C) An awareness/statement of support or conflict of interest in the primary inclusion studies	**yes**	**no**	**no**	**no**	**yes**	**yes**
score	**4**	**3**	**3**	**3**	**4**	**4**
Grand total (out of a possible 44)	**35**	**40**	**38**	**38**	**39**	**41**

Table S4: Risk of bias assessment results

REVIEW SHORT TITLE (REFERENCE)	**Surgery (Ells, 2015)**	**Drug (Mead 2016)**	**Parent-only (Loveman, 2015)**	**Preschool lifestyle (Colquitt, 2016)**	**Primary school lifestyle (Mead 2017)**	**Adolescent lifestyle (Al-Khudairy, 2017)**
BIAS	NUMBER OF TRIALS WITH LOW RISK OF BIAS (%)					
Random sequence generation	0 (0)	14 (67)	10 (50)	7 (100)	48 (69)	22 (50)
Allocation concealment	1 (100)	15 (71)	5 (25)	3 (43)	49 (70)	11(25)
Performance bias subjective outcomes	0 (0)	14 (67)	0 (0)	0 (0)	3 (4)	1 (2)
Performance bias objective outcomes	0 (0)	14 (67)	1 (5)	1 (14)	3 (4)	1 (2)
Detection bias subjective outcomes	0 (0)	13 (62)	3 (15)	0 (0)	18 (26)	6 (14)
Detection bias objective outcomes	0 (0)	13 (62)	9 (45)	7 (100)	21 (30)	44 (100)
Attrition bias subjective outcomes	0 (0)	2 (10)	5 (25)	3 (43)	22 (31)	11 (25)
Attrition bias objective outcomes	1 (100)	2 (10)	9 (45)	3 (43)	27 (39)	17 (39)
Selective reporting bias	0 (0)	5 (24)	1 (5)	2 (29)	17 (24)	13 (30)
Other bias	1 (100)	0 (0)	1 (5)	4 (57)	6 (9)	33 (75)

Table S5: Summary of findings tables:
5A: Surgery

Surgery compared with a multi component lifestyle programme for obese children and adolescents					
Population: children and adolescents with obesity **Settings:** community, clinic **Intervention:** laparoscopic adjustable gastric banding surgery **Comparison:** multi component lifestyle programme					
Outcomes	**Laparoscopic adjustable gastric banding surgery**	**Multi component lifestyle programme**	**No of participants (studies)**	**Quality of the evidence (GRADE)**	**Comments**
a) BMI [kg/m²] **b) Weight loss** [kg] Follow-up: two years	a) -12.7 (-11.3 to -14.2) b) -34.6 (-30.2 to -39.0)	a) -1.3 (-0.4 to -2.9) b) -3.0 (-2.1 to -8.1)	50 (1)	⊕⊕⊖⊖ **low**[a]	-
Adverse events [revisional procedure] Follow-up: two years	7/25 (28%) participants	0/25 (0%)	50 (1)	⊕⊕⊖⊖ **low**[b]	-
Health-related quality of life [CHQ (8 subscores); scale 0 to 100, where 0 indicates the worst possible health state and 100 the best possible health state][c] a) physical functioning (community norm 95)	a) 94 b) 4.4	a) 78 b) 3.6	50 (1)	⊕⊖⊖⊖ **very low**[d]	-

b) change in health (community norm 3.5) Follow-up: two years					
All-cause mortality	See comments	See comments	See comments	See comments	Not reported
Morbidity [metabolic syndrome][e] Follow-up: two years	0/24 (0%) participants completing the study	4/18 (22%) participants completing the study	50 (1)	⨁⊖⊖⊖ **very low**[f]	-
Socioeconomic effects	See comments	See comments	See comments	See comments	Not reported

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CHQ:** child health questionnaire; **CI:** confidence interval; **RR:** risk ratio

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[a]Downgraded by two levels because of one study only with small number of participants, and unclear risk of performance and detection bias
[b]Downgraded by two levels because of one study only with small number of participants
[c]Poor health-related quality of life is defined as two standard deviations below the mean of the normative sample or a physical functioning or psychosocial health summary score less than 30
[d]Downgraded by three levels because of one study only with small number of participants, and high risk of performance, detection and attrition bias
[e]The metabolic syndrome is a weak surrogate endpoint for illness or harm associated with the intervention or the condition

[f]Downgraded by three levels because of one study only with small number of participants, indirectness, and high risk of performance, detection and attrition bias

5B: Drug

Drug interventions for the treatment of obesity in children and adolescents						
Population: obese children and adolescents **Settings:** mainly outpatient settings **Intervention:** metformin, orlistat, sibutramine usually combined with behaviour changing interventions **Comparison:** placebo or no placebo usually with behaviour changing interventions						
Outcomes	**Illustrative comparative risks* (95% CI)**		**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Comparator	**Pharmacological intervention**				
a. BMI (kg/m^2) Follow-up: 6 months (14 trials) - 12 months (2 trials) **b. Body weight (kg)** Follow-up: 6 months (10 trials) -	a. The mean reduction in BMI ranged across control groups from -1.8 to +0.9 b. The mean reduction in weight ranged across control groups from -3.8 kg to +4.9 kg	a. The mean reduction in BMI in the intervention groups was **-1.3 higher** (-1.9 to -0.8 higher) b. The mean reduction in weight in the intervention groups was **-3.9 kg higher** (-5.9 kg to -1.9 kg higher)	-	a. 1884 (16) b. 1180 (11)	a. ⊕⊕⊖⊖ **Low[a]** b. ⊕⊕⊖⊖ **Low[a]**	-

12 months (1 trial)						
Adverse events a. Serious adverse events b. Discontinuation of trial because of adverse events Follow-up: mostly 6 months, maximum 100 weeks (1 trial)	a. **17 per 1000** b. **27 per 1000**	a. **24 per 1000** (11 to 55) b. **40 per 1000** (23 to 69)	a. **RR 1.43** (0.63 to 3.25) b. **RR 1.45** (0.83 to 2.52)	a. 1347 (5) b. 1664 (10)	a. ⨁⨁⨁⊖ **Low**[b] b. ⨁⨁⨁⊖ **Low**[b]	All trials reported if adverse events occurred; however, only 7/20 trials reported the number of participants who experienced at least 1 adverse event
Health-related quality of life 3 questionnaires (1 trial) and SF-36 (1 trial) Follow-up: 6 months	See comment	See comment	See comment	86 (2)	⨁⊖⊖⊖ **Very low**[c]	Results were only reported for SF-36 (1 trial on sibutramine, 46 children), there were no marked differences between intervention and comparator groups
All-cause mortality Follow-up: mostly 6 months, maximum 100 weeks (1 trial)	See comment	See comment	See comment	2176 (20)	⨁⨁⨁⊖ **Low**[d]	1 suicide in the orlistat intervention group
Morbidity	See comment	See comment	See comment	533 (1)	⨁⊖⊖⊖ **Very low**[e]	Only 1 trial investigated morbidity defined as illness or harm associated with the intervention

						(Chanoine 2005). In the orlistat group 6/352 (1.7%) participants developed new gallstones compared with 1/181 (0.6%) in the placebo group
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	Not reported

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI:** confidence interval; **RR:** risk ratio; **SF-36:** Short-Form Health Survey 36 items.

GRADE Working Group grades of evidence
High certainty: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate certainty: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low certainty: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low certainty: We are very uncertain about the estimate.

Footnotes

*Assumed risk was derived from the event rates in the comparator groups.

[a]Downgraded by two levels because of potential other risk of bias, inconsistency and imprecision
[b]Downgraded by two levels because of potential reporting bias, inconsistency and imprecision
[c]Downgraded by three levels because of one trial only with a small number of participants and imprecision
[d]Downgraded by two levels because of short follow-up periods and no trial was powered to investigate mortality
[e]Downgraded by three levels because of one trial only and imprecision

5C: Parent only

Parent-only interventions vs. parent-child interventions for childhood overweight or obesity						
Population: children with overweight or obesity **Settings**: outpatients; community/university **Intervention**: parent-only interventions **Comparison**: parent-child interventions						
Outcomes	**Parent-child**	**Parent-only**	**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
BMI z score change (x * SD) Follow-up: 40-104 weeks	The mean BMI z score change ranged across control groups from -0.16 to -0.24	The mean BMI z score change in the intervention groups was 0.04 lower (0.15 lower to 0.08 higher)	-	267 (3)	⨁⨁⊖⊖ **low**[a]	Lower scores indicate improved weight loss
Adverse events	See comment	See comment	See comment	See comment	See comment	No trials reported adverse events
Health-related quality of life	See comment	See comment	See comment	See comment	See comment	No trials reported health-related quality of life
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No trials reported all-cause mortality
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity
Parent-child relationship or	See comment	See comment	See comment	See comment	See comment	No trials reported outcomes assessing parent-child

assessment of parenting						relationships or an assessment of parenting
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI**: confidence interval; **SD**: standard deviation.

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[a]Downgraded by one level because of serious risk of attrition bias and one level for serious imprecision

Parent-only interventions vs. waiting list control for childhood overweight or obesity						
Population: children with overweight or obesity **Settings**: outpatients; community **Intervention**: parent-only interventions **Comparison**: waiting list control						
Outcomes	**Waiting list**	**Parent-only**	**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
BMI z score change (x * SD) Follow-up: 40-48 weeks	The mean BMI z score change ranged across control groups from -0.13 to 0.02	The mean BMI z score change in the intervention groups was 0.1 lower (0.19 lower to 0.01 lower)	-	136 (2)	⨁⨁⊖⊖ **low**[a]	Lower scores indicate improved weight loss
Adverse events	See comment	See comment	See comment	See comment	See comment	No trials reported adverse events
Health-related quality of life	See comment	See comment	See comment	See comment	See comment	No trials reported health-related quality of life
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No trials reported all-cause mortality
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity
Parent-child relationship or assessment of parenting (parenting scale (PS), 30 items, scored from 1 to 7; lower scores	The mean PS score for the control group was 3.4	The mean PS score in the intervention group was 0.6 points lower	-	101 (1)	⨁⨁⊖⊖ **low**[a]	-

indicate more effective parental discipline practices) Follow-up: 12 weeks						
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI**: confidence interval; **PS**: parenting scale; **SD**: standard deviation.

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[a]Downgraded by one level because of serious risk of attrition bias and one level for serious imprecision

Parent-only interventions vs. minimal contact control for childhood overweight or obesity
Population: children with overweight or obesity **Settings**: outpatients

Intervention: parent-only interventions **Comparison**: minimal contact control						
Outcomes	**Minimal contact**	**Parent-only**	**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
BMI z score change (x * SD) Follow-up: 52 weeks	The mean BMI z score change ranged across control groups from -0.06 to -0.06	The mean BMI z score change in the intervention group was 0.01 lower (-0.07 lower to 0.09 higher)	-	165 (1)	⨁⨁⊖⊖ **low**[a]	Lower scores indicate improved weight loss
Adverse events	See comment	See comment	See comment	See comment	See comment	No trials reported adverse events
Health-related quality of life (Pediatric Health-Related Quality of Life, scale from 0 to 100; higher scores indicate better HRQoL) Follow-up: 24 weeks)	See comment	See comment	See comment	93 (1)	See comment	No data were presented ("'no improvements in health-related quality of life")
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No trials reported all-cause mortality
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity
Parent-child relationship or assessment of parenting (Child Feeding Questionnaire	The mean parent concern score was 4.7 in the control group	The mean parent concern score in the intervention group was 0.1 lower.	-	93 (1)	⨁⨁⊖⊖ **low**[a]	-

subscale parental concern (total of 7 subscales), score range 3-15; higher scores indicate greater parental concern) Follow-up: 12 weeks						
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI**: confidence interval; **HRQoL**: health-related quality of life; **SD**: standard deviation.

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[a]Downgraded by one level because of serious risk of attrition bias and one level for serious imprecision

Parent-only interventions vs. parent-only interventions for childhood overweight or obesity
Population: children with overweight or obesity **Settings**: outpatients; university + primary care

Intervention: parent-only interventions **Comparison**: parent-only interventions						
Outcomes	**Parent-only**	**Parent-only**	**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
BMI z score change (x * SD) Follow-up: 12-24 months	See comment	See comment	See comment	467 (5)	⨁⨁⨀⨀ **low**[a]	No meta-analysis because of little consistency between trial interventions and comparators; there were no substantial differences between different parent-only interventions
Adverse events	See comment	See comment	See comment	See comment	See comment	Two trials reported that there were no serious adverse events (Raynor 2012a; Raynor 2012b)
Health-related quality of life	See comment	See comment	See comment	See comment	See comment	No trials reported health-related quality of life
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No trials reported all-cause mortality
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity
Parent-child relationship or assessment of parenting (Alabama Parenting Questionnaire, 35 items; higher scores indicate improvement) Follow-up: 24 months	See comment	See comment	See comment	106 (1)	See comment	1 study assessed parent-child relationship or assessment of parenting but there were no data for comparisons between intervention groups provided
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI**: confidence interval; **SD**: standard deviation.

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[a]Downgraded by one level because of serious risk of attrition bias and one level for serious imprecision

5D: Preschool

Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children aged 0 to 6 years						
Population: preschool children (aged 0 to 6 years) with overweight or obesity **Settings:** various **Intervention:** multicomponent interventions **Comparison:** usual care/enhanced usual care/information control/wait-list control						
Outcomes	**Control**	**Multicomponent intervention**	**Relative effect (95%**	**No of participants (trials)**	**Quality of the evidence**	**Comments**

			CI)		**(GRADE)**	
Changes in BMI and body weight **a. BMI z score[a] [units]** Follow-up: 12 to 18 months **b. Weight [kg]** Follow-up: 12 to 18 months	a. The mean change in BMI z score ranged across control groups from -0.3 units to +0.4 units b. The mean change in weight ranged across control groups from +3.1 kg to +5.2 kg	b. The mean change in BMI z score in the intervention groups was **0.4 units lower (0.6 to 0.2 lower)** b. The mean change in weight in the intervention group was **2.8 kg lower (4.4 to 1.2 lower)**	-	a. 202 (4) b. 202 (4)	a. ⨁⨁⊖⊖ **low[b]** b. ⨁⨁⊖⊖ **low[b]**	Lower units indicate more weight loss
Adverse events Follow-up: 24 months	See comment	See comment	See comment	88 (1)	⨁⊖⊖⊖ **very low[c]**	Only 1 trial (abstract only) reported on adverse events, stating no adverse events were observed
HrQoL and self esteem **a. DUX 25** (Dutch Child AZL TNO Quality-of-Life tool: total score and 4 domains; scale 0 to 100; higher score indicates better HrQoL) Follow-up: 12 months **b. CHQ-PF50** (Dutch	See comment	See comment	See comment	a. 40 (1) b. 40 (1) c. 17 (1) d. 16 (1)	a/b/c/d ⨁⊖⊖⊖ **very low[c]**	No trials reported self esteem a. Change in median of the total score: +5 in the intervention group versus -5 in the control group; change in median of 1 of 4 domains (physical functioning): +8 in the intervention group versus -4 in the control group b. No statistically significant differences in any of the 15 items

edition of the Child Health Questionnaire Parent Form: 15 items; score 0 to 100; higher score indicates better HrQoL) Follow-up: 12 months **c. PedsQL** (Pediatric Quality of Life Inventory, physical functioning subscale; higher score indicates better HrQoL) Follow-up: 6 months/12 months **d. PedsQL** (total score) Follow-up: 12 months						c. 6 months' change in mean: +9.5 units in the intervention group versus -1.7 units in the control group, data not reported for total score and 3 other subscales; 12 months' change in mean +13.8 units in the intervention group versus -2.7 units in the control group, data not reported for total score and 3 other subscales d. No substantial differences between multicomponent intervention and control group
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No trials reported all-cause mortality
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity
Parent-child relationship or assessment of parenting (CFQ - Child Feeding Questionnaire: 31 items)	See comment	See comment	See comment	44 (2)	⨁⊖⊖⊖ **very low**[c]	Limited data were reported, no substantial differences between intervention and control groups

Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

BMI: body mass index; **CI:** confidence interval; **HrQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

Footnotes

[b]Downgraded by two levels because of risk of bias (reporting bias), imprecision, and indirectness;

[c]Downgraded by three levels because of serious risk of bias (performance bias, detection bias, reporting bias) and imprecision (small number of trials and participants);

Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children aged 0 to 6 years

Patient or population: preschool children (aged 0 to 6 years) with overweight or obesity

Settings: obesity research clinic

Intervention: dietary interventions + healthy lifestyle education

Comparison: healthy lifestyle education

Outcomes	**Healthy lifestyle**	**Dietary**	**Relative**	**No of**	**Quality of**	**Comments**

	education	intervention + healthy lifestyle education	effect (95% CI)	participants (trials)	the evidence (GRADE)	
Changes in BMI and body weight **1. Dairy-rich diet** **a. BMI z score [units][a]** Follow-up: 6 months **b. BMI z score [units]** Follow-up: 36 months **2. Energy-restricted diet** **a. BMI z score [units]** Follow-up: 6 months **b. BMI z score [kg/m²]** Follow-up: 36	**1. Dairy-rich diet** a. The mean change in BMI z score was -0.5 units in the control group b. The mean change in BMI z score was +0.6 units in the control group **2. Energy-restricted diet** a. The mean change in BMI z score was -0.5 units in the control group b. The mean change in BMI z score was +0.6 units in the control group	**1. Dairy-rich diet** a. The mean change in BMI z score in the intervention group was **0.1 units lower (0.11 lower to 0.09 lower)** b. The mean change in BMI z score in the intervention group was **0.7 units lower (0.71 lower to 0.69 lower)** **2. Energy-restricted diet** a. The mean change in BMI z score in the intervention group was **0.1 units lower (0.11 lower to 0.09**	-	**1. Dairy-rich diet** a. 59 (1) b. 52 (1) **2. Energy-restricted diet** a. 57 (1) b. 47 (1)	**1. Dairy-rich diet** a/b ⨁⊖⊖⊖ **very low[b]** **2. Energy-restricted diet** a/b ⨁⊖⊖⊖ **very low[b]**	Lower units indicate more weight loss 2 dietary interventions and 1 control compared in one 3-arm randomised controlled trial (the number of participants in the control group was halved for the analysis and is shown here)

months		**lower)** b. The mean change in BMI z score in the intervention group was **0.1 units higher (0.09 higher to 0.11 higher)**				
Adverse events	See comment	See comment	See comment	See comment	See comment	Not reported
Health-related quality of life and self esteem	See comment	See comment	See comment	See comment	See comment	Not reported
All-cause mortality	See comment	See comment	See comment	See comment	See comment	Not reported
Morbidity	See comment	See comment	See comment	See comment	See comment	Not reported
Parent-child relationship or assessment of parenting	See comment	See comment	See comment	See comment	See comment	No trials reported parent-child relationship or assessment of parenting
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	Not reported

*The basis for the **assumed risk** (e.g. the median control group risk across trials) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI:** confidence interval

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.

Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.

Footnotes

[b]Downgraded by three levels because of reporting bias, indirectness, and imprecision (one trial only with small number of participants); see

5E: Primary school

Diet, physical activity and behavioural interventions for the treatment of overweight or obesity in children aged 6 to 11 years						
Population: children (aged 6 to 11 years) being overweight or obesity **Settings:** various **Intervention:** behaviour changing interventions (behavioural, diet and/or physical activity components) **Comparison:** no treatment or usual care						
Outcomes	**Illustrative comparative risks* (95% CI)**		**Relative effect (95% CI)**	**No of participants (studies)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	No treatment or usual care	**Behaviour changing intervention**				
a. Change in BMI [kg/m^2] Follow-up: 6 to 36 months	a. The mean change in BMI ranged across control groups	a. The mean change in BMI in the intervention groups was **0.53 kg/m^2 lower** (0.82 lower to	-	a. 2785 (24) b. 4019 (37)	a.⊕⊕⊖⊖ **low[a]** b.⊕⊕⊖⊖	Lower units indicate weight loss

b. Change in BMI z score [units] Follow-up: 6 to 36 months **c. Change in weight [kg]** Follow-up: 6 to 36 months	from -0.3 to +2.8 kg/m2 b. The mean change in BMI z score ranged across control groups from -1.1 to +0.26 units c. The mean change in weight ranged across control groups from +1.95 to +17.1 kg	0.24 lower) b. The mean change in BMI z score in the intervention groups was **0.06 units lower** (0.10 lower to 0.02 lower) c. The mean change in weight in the intervention group was **1.45 kg lower** (1.88 lower to 1.02 lower)		c. 1774 (17)	**low**[a] c. ⨁⨁⊖⊖ **low**[a]	
Adverse events (serious adverse events) Follow-up: 0 to 36 months	**4 per 1000**	**2 per 1000** (from 1 to 7)	0.57 (0.17 to 1.93)	4096 (31)	⨁⨁⊖⊖ **low**[b]	No adverse events occurred in 28 trials. Only two of 31 trials with data reported the occurence of serious adverse events.
Change in health-related quality of life (SMD) a. Parent-reported measures (PedsQLparent-proxy: 23 items that yield total, physical summary, and psychosocial summary scores, each with a possible range of 0-100 (100 =	a. The SMD in caregiver PedsQL ranged across control groups from -0.18 units to 0.47 units b.The SMD change in child PedsQL ranged	a. The SMD in caregiver PedsQL in the intervention group was 0.13 **units higher** (0.06lower to 0.32 higher) b.The mean change in child PedsQL in the intervention group was	-	a. 718 (5) b. 164 (3)	a. ⨁⊖⊖⊖ **low**[c] b. ⨁⊖⊖⊖ **very low**[d]	Higher units indicate improvement in health-related quality of life and self-esteem The minimal clinically important difference (MCID) for a PedsQL child's self-report is 4.36 raw units and for PedsQL

best possible health)) (Child Health Questionnaire, Parent Version (CHQ-PF50) Physical and psychosocial concepts.) Follow-up: 6 to 15 months b. Child-reported measures (PedsQLchild self-report: 23 items that yield total, physical summary, and psychosocial summary scores, each with a possible range of 0-100 (100 = best possible health)) (KINDL-R questionnaire: total score includes domains of well-being, emotional well-being, self-esteem, family, friends, school. 5-point Likert scale) Follow-up: 6 months	across control groups from -0.27 units to0.44 units	**0.15 units higher** (0.34 lower to 0.64 higher)				parents' proxy report 4.50 raw units
All-cause mortality	See comment	See comment	See comment	See comment	See comment	No deaths were reported in any of the trials
Morbidity	See comment	See comment	See comment	See comment	See comment	No trials reported morbidity

Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	No trials reported socioeconomic effects

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
BMI: body mass index; **CI:** confidence interval; **PedsQL:** Pediatric Quality of Life Inventory; **RR:** risk ratio;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[*]Assumed risk was derived from the event rates in the comparator groups

[a]Downgraded by two levels because of risk of performance and detection bias and inconsistency (high I^2 value)
[b]Downgraded by two levels because of risk of performance and detection bias, and imprecision (low event rate)
[c]Downgraded by two levels due to risk of bias (performance bias and a subjective measure used) and inconsistency (inconsistent direction of effect)

[d]Downgraded by three levels due to risk of bias (performance bias and a subjective measure used), inconsistency (high I^2 value and inconsistent direction of effect) and imprecision (small sample size and number of studies)

5F: Adolescent

Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in adolescents aged 12 to 17 years						
Patient or population: adolescents (aged 12 to 17 years) with overweight or obesity **Settings:** school; community; healthcare **Intervention:** diet; physical activity; multidisciplinary interventions **Comparision:** usual care; concomitant therapy; no intervention/wait list						
Outcomes	**Illustrative comparative risks* (95% CI)**		**Relative effect (95% CI)**	**No of participants (trials)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Usual care, concomitant therapy, no intervention/wait list	**Behaviour-changing intervention**				
a) BMI change Follow-up: 6-24 months **b) BMI-z score change** Follow-up: 6-24 months	a) the mean BMI change ranged across control groups from -1.18 kg/m^2 to 2.1 kg/m^2 b) the mean BMI z score change ranged across control groups from -0.31 units to 0.13 units	a) the mean BMI change in the intervention groups was **1.18 kg/m^2 lower** (1.67 to 0.69 lower) b) the mean BMI z score change in the intervention groups was **0.13 units lower** (0.21 to 0.05	-	a) 2774 (28) b) 2399 (20) c) 1993 (20)	a) ⨁⨁⊖⊖ **low**[a] b) ⨁⨁⊖⊖ **low**[b] c) ⨁⨁⨁⊖ **moderate**[c]	a) Lower BMI indicates weight loss b) Lower units indicate weight loss c) Lower kg indicate weight loss

c) Change in weight (kg) Follow-up: 6-24 months	c) the mean change in weight ranged across control groups from -1.8 kg to 8.3 kg	lower) c) the mean change in weight in the intervention groups was **-- 3.67 kg lower** (-5.21 lower to -2.13 lower)				
Adverse events	See comment	See comment	see comment	see comment	⨁⨁⨀⨀ **low**[e]	Only five trials reported adverse events and of these details were provided in only one showing no substantial differences between intervention and comparator groups.
Health-related quality of life Validated self-reported measures Follow-up: 6-24 months	The standardised mean difference for health-related quality of life ranged across control groups from -1.34 to 9.73	The standardised mean difference for health-related quality of life in the intervention groups was **0.44 standard deviations higher** (0.09 to 0.79 higher)		972 (7)	⨁⨁⨀⨀ **low**[f]	A standard deviation of 0.44 represents a moderate difference between groups[g]
All-cause mortality	See comment	See comment	See comment	See comment	See comment	Not reported
Morbidity	See comment	See comment	See comment	See comment	See comment	Not reported
Socioeconomic effects	See comment	See comment	See comment	See comment	See comment	Not reported

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** confidence interval; **RR:** risk ratio;
GRADE Working Group grades of evidence **High quality:** Further research is very unlikely to change our confidence in the estimate of effect. **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. **Very low quality:** We are very uncertain about the estimate.

Footnotes

[a]Downgraded one level due to inconsistency (I^2 = 78%), one level due to indirectness (surrogate outcome used)

[b]Downgraded one level due to inconsistency (I^2 = 86%), one level due to indirectness (surrogate outcome used)

[c]Downgraded one level due to inconsistency (I^2 = 96%) -
[d]"A BMI z score or standard deviation score indicates how many units (of the standard deviation) a child's BMI is above or below the average BMI value for their age group and sex. For instance, a z score of 1.5 indicates that a child is 1.5 standard deviations above the average value, and a z score of -1.5 indicates a child is 1.5 standard deviations below the average value"
[e]Downgraded one level due to reporting and other bias and limited information (small number of studies and the majority of trials had less than 80% of participants enrolled included in the analysis)
[f]Downgraded one level due to reporting and detection bias (no blinding of participants and personnel) and inconsistency (I^2 = 85%) [g]A rule of thumb of how to interpret the standard mean difference (SMD): < 0.40 = small, 0.40 - 0.70 = moderate, > 0.70 = large

Table S6: Summary of outcomes across reviews

Surgery – no meta-analyses.

Drug review (BMI only)

All drug interventions – change in BMI						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	Heterogeneity (I^2)	P value from subgroup test
1.1 Change in BMI (all trials) [kg/m2]	16	1884	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	N/A
1.2 Change in BMI (drug type) [kg/m2]	16	1884	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.13
1.2.1 Metformin	8	543	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.35 [-2.00, -0.69]	48%	
1.2.2 Orlistat	3	773	Mean Difference (IV, Random, 95% CI [kg/m2])	-0.79 [-1.08, -0.51]	0%	
1.2.3 Sibutramine	5	568	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.70 [-2.89, -0.51]	87%	
1.3 Change in BMI (dropout rate) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.03
1.3.1 Dropouts < 20%	9	597	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.11 [-1.78, -0.44]	69%	

1.3.2 Dropouts ≥ 20%	6	1145	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.42 [-2.34, -0.50]	84%	
1.3.3 Unclear dropout rate	1	120	Mean Difference (IV, Random, 95% CI [kg/m2])	-2.73 [-3.74, -1.72]	N/A	
1.4 Change in BMI (intention-to-treat (ITT) analysis) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.59
1.4.1 No ITT	5	282	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.56 [-2.52, -0.60]	62%	
1.4.2 ITT used	11	1580	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.25 [-1.86, -0.65]	80%	
1.5 Change in BMI (funding) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.86
1.5.1 Commercial	5	1009	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.50 [-2.69, -0.31]	92%	
1.5.2 Noncommercial	5	271	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.10 [-1.77, -0.44]	0%	
1.5.3 Commercial + noncommercial	4	262	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.17 [-1.86, -0.47]	26%	
1.5.4 Unclear	2	320	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.79 [-3.54, -0.04]	88%	

1.6 Change in BMI (publication date) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.78
1.6.1 2007 or before	8	1163	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.41 [-2.21, -0.60]	86%	
1.6.2 After 2007	8	699	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.26 [-1.90, -0.62]	53%	
1.7 Change in BMI (quality of trial) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.87
1.7.1 Low	6	322	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.40 [-2.28, -0.52]	61%	
1.7.2 Moderate	10	1540	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.31 [-1.95, -0.67]	82%	
1.8 Change in BMI (country) [kg/m2]	16	1862	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.004
1.8.1 Middle income	3	216	Mean Difference (IV, Random, 95% CI [kg/m2])	-2.39 [-3.08, -1.69]	25%	
1.8.2 High income	13	1646	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.09 [-1.62, -0.56]	74%	
1.9 Change in BMI (mean age) [kg/m2]	16	1884	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.34 [-1.85, -0.83]	77%	0.43
1.9.1 Mean age <	2	220	Mean Difference	-1.93 [-3.53, -0.34]	78%	

12 years			(IV, Random, 95% CI [kg/m2])			
1.9.2 Mean age ≥ 12 years	14	1664	Mean Difference (IV, Random, 95% CI [kg/m2])	-1.25 [-1.79, -0.71]	77%	

Parent only review:

Parent-only interventions versus parent-child interventions						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
1.1 BMI z score change post intervention [x * SD]	3	277	Mean Difference (IV, Random, 95% CI [x * SD])	-0.06 [-0.13, 0.02]	37%	0.14
1.1.1 Parent-only vs. parent-child	2	112	Mean Difference (IV, Random, 95% CI [x * SD])	-0.05 [-0.13, 0.04]	0%	
1.1.2 Parent-only vs. parent-child physical activity	1	84	Mean Difference (IV, Random, 95% CI [x * SD])	-0.15 [-0.26, -0.04]	N/A	
1.1.3 Parent-only vs. parent-child physical activity + diet	1	81	Mean Difference (IV, Random, 95% CI [x * SD])	0.00 [-0.11, 0.11]	N/A	
1.2 BMI z score change longest follow-up [x * SD]	3	267	Mean Difference (IV, Random, 95% CI [x * SD])	-0.04 [-0.15, 0.08]	38%	0.11
1.2.1 Parent-only vs. parent-child	2	102	Mean Difference (IV, Random, 95% CI [x * SD])	0.06 [-0.05, 0.16]	0%	
1.2.2 Parent-only	1	84	Mean Difference	-0.16 [-0.36, 0.04]	N/A	

vs. parent-child physical activity			(IV, Random, 95% CI [x * SD])			
1.2.3 Parent-only vs. parent-child physical activity + diet	1	81	Mean Difference (IV, Random, 95% CI [x * SD])	-0.11 [-0.31, 0.09]	N/A	

Parent-only interventions versus waiting list interventions

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
2.1 BMI z score change post intervention [x * SD]	2	153	Mean Difference (IV, Random, 95% CI [x * SD])	-0.12 [-0.21, -0.04]	0%	N/A
2.2 BMI z score change longest follow-up [x * SD]	2	136	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.10 [-0.19, -0.01]	0%	0.53
2.2.1 Parent-only vs. waiting list	2	92	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.11 [-0.21, -0.01]	0%	
2.2.2 Parent-only intensive education vs. waiting list	1	44	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.02 [-0.29, 0.25]	N/A	
2.3 BMI percentile change post intervention [%]	1		Mean Difference (IV, Fixed, 95% CI [%])	No totals	N/A	N/A
2.4 BMI percentile change longest follow-up [%]	1		Mean Difference (IV, Fixed, 95% CI [%])	No totals	N/A	N/A
2.5 BMI change post intervention [kg/m2]	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	N/A

2.5.1 Parent-only reinforcement vs. waiting list	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	
2.5.2 Parent-only vs. waiting list	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	
2.6 BMI change longest follow-up [kg/m2]	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	N/A
2.6.1 Parent-only reinforcement vs. waiting list	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	
2.6.2 Parent-only vs. waiting list	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	

Parent-only interventions versus minimal contact interventions

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
3.1 BMI z score change post intervention [x * SD]	1	170	Mean Difference (IV, Random, 95% CI [x * SD])	-0.00 [-0.08, 0.08]	0%	0.62
3.1.1 Parent-only IVR vs. control	1	87	Mean Difference (IV, Random, 95% CI [x * SD])	-0.02 [-0.13, 0.09]	N/A	
3.1.2 Parent-only vs. control	1	83	Mean Difference (IV, Random, 95% CI [x * SD])	0.02 [-0.09, 0.13]	N/A	
3.2 BMI z score change longest follow-up [x * SD]	1	165	Mean Difference (IV, Fixed, 95% CI [x * SD])	0.01 [-0.07, 0.09]	0%	0.45

3.2.1 Parent-only interactive voice response vs. control	1	86	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.02 [-0.13, 0.09]	N/A	
3.2.2 Parent-only vs. control	1	79	Mean Difference (IV, Fixed, 95% CI [x * SD])	0.04 [-0.07, 0.15]	N/A	
3.3 BMI percentile change post intervention [%]	4		Mean Difference (IV, Random, 95% CI [%])	No totals	N/A	N/A
3.3.1 Parent-only vs. minimal contact control	3		Mean Difference (IV, Random, 95% CI [%])	No totals	N/A	
3.3.2 Parent motivational interviewing vs. minimal contact control	1		Mean Difference (IV, Random, 95% CI [%])	No totals	N/A	
3.3.3 Parent motivational interviewing + dietician vs. minimal contact control	1		Mean Difference (IV, Random, 95% CI [%])	No totals	N/A	
3.4 BMI percentile change longest follow-up [%]	1		Mean Difference (IV, Fixed, 95% CI [%])	No totals	N/A	N/A
3.5 BMI change post intervention [kg/m2]	1		Mean Difference (IV, Random, 95% CI [kg/m2])	No totals	N/A	N/A
3.6 BMI change longest follow-up [kg/m2]	2	614	Mean Difference (IV, Random, 95% CI [kg/m2])	-0.12 [-0.39, 0.15]	0%	N/A

Parent-only intervention versus parent-only intervention						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
4.1 BMI z score change post intervention [x * SD]	5	507	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.22 [-0.28, -0.17]	94%	<0.00001
4.1.1 Parent-only interactive voice response vs. parent-only	1	132	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.04 [-0.16, 0.08]	N/A	
4.1.2 Parent-only intensive vs. parent-only	1	57	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.09 [-0.38, 0.20]	N/A	
4.1.3 Parent health lifestyle vs. healthy lifestyle	1	136	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.07 [-0.29, 0.15]	N/A	
4.1.4 Parent-only vs. decrease	1	52	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.04 [-0.17, 0.09]	N/A	
4.1.5 Parent-only vs. increase	1	49	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.01 [-0.14, 0.12]	N/A	
4.1.6 Parent-only vs. substitute	1	40	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.70 [-0.86, -0.54]	N/A	
4.1.7 Parent-only vs. traditional	1	41	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.69 [-0.83, -0.55]	N/A	
4.2 BMI z score change longest	5	467	Mean Difference (IV, Fixed, 95% CI [x	-0.03 [-0.10, 0.03]	0%	0.99

follow-up [x * SD]			* SD])			
4.2.1 Parent-only interactive voice response vs. parent-only	1	119	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.06 [-0.18, 0.06]	N/A	
4.2.2 Parent-only intensive vs. parent-only	1	60	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.09 [-0.32, 0.14]	N/A	
4.2.3 Parent health lifestyle vs. healthy lifestyle	1	106	Mean Difference (IV, Fixed, 95% CI [x * SD])	0.03 [-0.24, 0.30]	N/A	
4.2.4 Parent-only vs. decrease	1	52	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.04 [-0.19, 0.11]	N/A	
4.2.5 Parent-only vs. increase	1	49	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.02 [-0.17, 0.13]	N/A	
4.2.6 Parent-only vs. substitute	1	41	Mean Difference (IV, Fixed, 95% CI [x * SD])	-0.03 [-0.24, 0.18]	N/A	
4.2.7 Parent-only vs. traditional	1	40	Mean Difference (IV, Fixed, 95% CI [x * SD])	0.01 [-0.17, 0.19]	N/A	
4.3 BMI change post intervention [kg/m2]	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	N/A
4.3 BMI change post intervention [kg/m2]	1		Mean Difference (IV, Fixed, 95% CI [kg/m2])	No totals	N/A	N/A
4.5 BMI percentile change post	1		Mean Difference (IV, Random, 95%	No totals	N/A	N/A

intervention [%]			CI)			

Preschool meta-analysis:

Multicomponent intervention versus control						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
1.1 Changes in BMI z score [kg/m²]	5		Mean Difference (IV, Random, 95% CI [kg/m²])	Subtotals only	N/A	N/A
1.1.1 End of intervention (6-12 months)	4	210	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.26 [-0.37, -0.16]	14%	
1.1.2 12-18 months follow-up (6-8 months post intervention)	4	202	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.38 [-0.58, -0.19]	48%	
1.1.3 24 months follow-up (12 months post intervention)	1	96	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.25 [-0.40, -0.10]	N/A	
1.2 Changes in BMI [kg/m²]	2		Mean Difference (IV, Random, 95% CI [kg/m²])	Subtotals only	N/A	N/A

1.2.1 End of intervention (6-12 months)	1	64	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.40 [-0.85, 0.05]	N/A	
1.2.2 12 months follow-up (8 months post intervention)	1	57	Mean Difference (IV, Random, 95% CI [kg/m²])	-1.00 [-1.79, -0.21]	N/A	
1.3 Changes in % over BMI [kg/m²]	1		Mean Difference (IV, Fixed, 95% CI [kg/m²])	No totals	N/A	N/A
1.3.1 End of intervention (12 months)	1		Mean Difference (IV, Fixed, 95% CI [kg/m²])	No totals	N/A	
1.3.2 18 months follow-up (6 months post intervention)	1		Mean Difference (IV, Fixed, 95% CI [kg/m²])	No totals	N/A	
1.3.3 24 months follow-up (12 months post intervention)	1		Mean Difference (IV, Fixed, 95% CI [kg/m²])	No totals	N/A	
1.4 Changes in BMI percentile	2		Mean Difference (IV, Random, 95% CI)	Subtotals only	N/A	N/A
1.4.1 End of intervention (6 months)	2	50	Mean Difference (IV, Random, 95% CI)	-1.54 [-2.82, -0.26]	48%	
1.4.2 12 months follow-up (6 months post intervention)	2	49	Mean Difference (IV, Random, 95% CI)	-3.47 [-5.11, -1.82]	0%	
Diet intervention versus control						
Outcome or	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from**

Subgroup						subgroup test
2.1 Changes in BMI z score	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	N/A
2.1.1 Dairy rich: end of intervention (6 months)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.2 Energy restricted: end of intervention (6 months)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.3 Dairy rich: 12 months follow-up (6 months post intervention)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.4 Energy restricted: 12 months follow-up (6 months post intervention)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.5 Dairy rich: 24 months follow-up (18 months post intervention)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.6 Energy restricted: 24 months follow-up (18 months post intervention)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	
2.1.7 Dairy rich: 36 months follow-up (30 months post	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	

intervention)						
2.1.8 Energy restricted: 36 months follow-up (30 months post intervention)	1		Mean Difference (IV, Random, 95% CI)	No totals	N/A	

Primary school review (age 5 to <12)

Lifestyle intervention versus no treatment/usual care						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
1.1 Change in BMI (all trials) [kg/m²]	24	2785	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.53 [-0.82, -0.24]	**65%**	**N/A**
1.2 Change in BMI z score (all trials)	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	56%	N/A
1.13 Change in BMI - type of control	24	2785	Mean Difference (IV, Random, 95% CI)	-0.53 [-0.82, -0.24]	65%	0.47
1.13.1 Intervention versus no treatment	11	1452	Mean Difference (IV, Random, 95% CI)	-0.43 [-0.87, -0.00]	69%	
1.13.2 Intervention versus usual care	13	1333	Mean Difference (IV, Random, 95%	-0.67 [-1.12, -0.21]	65%	

			CI)			
1.14 Change in BMI z score - type of control	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	56%	0.86
1.14.1 No treatment	15	1709	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.12, 0.01]	64%	
1.14.2 Usual care	22	2310	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.11, -0.02]	52%	
1.16 Change in BMI - type of intervention	24	2785	Mean Difference (IV, Random, 95% CI)	-0.53 [-0.82, -0.24]	65%	0.65
1.16.1 Diet only	1	73	Mean Difference (IV, Random, 95% CI)	-0.12 [-0.85, 0.61]	N/A	
1.16.2 Physical activity only	4	443	Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]	0%	
1.16.3 Behavioural therapy only	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable	N/A	
1.16.4 Diet and physical activity	2	209	Mean Difference (IV, Random, 95% CI)	-1.03 [-3.43, 1.38]	80%	
1.16.5 Diet and behavioural therapy	1	39	Mean Difference (IV, Random, 95% CI)	-0.70 [-3.65, 2.25]	N/A	
1.16.6 Physical activity and behavioural therapy	1	230	Mean Difference (IV, Random, 95% CI)	-0.01 [-1.29, 1.27]	N/A	

1.16.7 Diet, physical activity and behavioural therapy	15	1791	Mean Difference (IV, Random, 95% CI)	-0.67 [-1.12, -0.23]	76%	
1.17 Change in BMI z score - type of intervention	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	55%	0.96
1.17.1 Diet only	1	73	Mean Difference (IV, Random, 95% CI)	-0.05 [-0.17, 0.07]	N/A	
1.17.2 Physical activity only	3	365	Mean Difference (IV, Random, 95% CI)	-0.05 [-0.23, 0.14]	0%	
1.17.3 Behavioural therapy only	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable	N/A	
1.17.4 Diet and physical activity	7	577	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.10, 0.04]	52%	
1.17.5 Diet and behavioural therapy	2	152	Mean Difference (IV, Random, 95% CI)	-0.07 [-0.16, 0.03]	**0%**	
1.17.6 Physical activity and behavioural therapy	1	230	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.26, 0.20]	N/A	
1.17.7 Diet, physical activity and behavioural therapy	24	2622	Mean Difference (IV, Random, 95% CI)	-0.08 [-0.13, -0.02]	66%	
1.19 Change in BMI - attrition bias	24	2785	Mean Difference (IV, Random, 95% CI)	-0.53 [-0.82, -0.24]	65%	0.85
1.19.1 High	4	238	Mean Difference	-0.47 [-1.04, 0.10]	10%	

			(IV, Random, 95% CI)			
1.19.2 Low	15	1910	Mean Difference (IV, Random, 95% CI)	-0.50 [-0.93, -0.07]	73%	
1.19.3 Unclear	5	637	Mean Difference (IV, Random, 95% CI)	-0.72 [-1.45, 0.01]	59%	
1.20 Change in BMI z score - attrition bias	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	56%	0.35
1.20.2 Low	17	1745	Mean Difference (IV, Random, 95% CI)	-0.08 [-0.16, -0.01]	68%	
1.20.3 Unclear	9	897	Mean Difference (IV, Random, 95% CI)	-0.05 [-0.13, 0.03]	55%	
1.20.4 High	11	1377	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.06, 0.01]	5%	
1.22 Change in BMI - setting	24	2785	Mean Difference (IV, Random, 95% CI)	-0.55 [-0.85, -0.26]	65%	0.15
1.22.1 Schools	1	21	Mean Difference (IV, Random, 95% CI)	-0.57 [-4.94, 3.80]	N/A	
1.22.2 Community	1	78	Mean Difference (IV, Random, 95% CI)	-0.53 [-1.05, -0.01]	**N/A**	
1.22.3 Child's home	4	667	Mean Difference (IV, Random, 95%	-0.32 [-0.86, 0.22]	45%	

			CI)			
1.22.4 Primary care	6	1055	Mean Difference (IV, Random, 95% CI)	-0.10 [-0.35, 0.14]	0%	
1.22.5 Secondary care (outpatient)	7	384	Mean Difference (IV, Random, 95% CI)	-1.46 [-2.42, -0.50]	80%	
1.22.6 Hospital inpatient	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable	N/A	
1.22.7 Research clinic	3	295	Mean Difference (IV, Random, 95% CI)	-0.24 [-0.86, 0.37]	0%	
1.22.8 Mixed	3	285	Mean Difference (IV, Random, 95% CI)	-0.79 [-1.87, 0.30]	30%	
1.23 Change in BMI z score - setting	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.03]	56%	0.13
1.23.1 Schools	2	76	Mean Difference (IV, Random, 95% CI)	-0.01 [-0.17, 0.15]	0%	
1.23.2 Community	2	76	Mean Difference (IV, Random, 95% CI)	0.04 [-0.04, 0.11]	0%	
1.23.3 Child's home	6	998	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.12, -0.00]	0%	
1.23.4 Primary care	8	864	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.12, -0.01]	10%	

1.23.5 Secondary care (outpatient)	10	583	Mean Difference (IV, Random, 95% CI)	-0.12 [-0.25, 0.01]	81%	
1.23.6 Hospital inpatient	1	523	Mean Difference (IV, Random, 95% CI)	0.02 [-0.06, 0.10]	N/A	
1.23.7 Research clinic	4	388	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.07, 0.02]	0%	
1.23.8 Mixed	5	511	Mean Difference (IV, Random, 95% CI)	-0.09 [-0.16, -0.01]	28%	
1.25 Change in BMI - post-intervention follow up [kg/m²]	24	2785	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.53 [-0.82, -0.24]	65%	0.03
1.25.1 no post-intervention follow up	15	1573	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.68 [-1.10, -0.27]	74%	
1.25.3 post-intervention follow up <6 months	3	153	Mean Difference (IV, Random, 95% CI [kg/m²])	-1.49 [-2.93, -0.05]	0%	
1.25.4 post-intervention follow up 6 months to <12 months	2	282	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.59 [-2.34, 1.15]	43%	
1.19.5 post-intervention follow up 12 months or more	4	777	Mean Difference (IV, Random, 95% CI [kg/m²])	-0.07 [-0.34, 0.20]	0%	
1.26 Change in BMI z score - post-	37	4019	Mean Difference (IV, Random, 95%	-0.06 [-0.10, -0.02]	56%	0.10

intervention follow up			CI)			
1.26.2 no post-intervention follow up	21	2278	Mean Difference (IV, Random, 95% CI)	-0.09 [-0.15, -0.04]	65%	
1.26.3 post-intervention follow up <6 months	6	228	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.15, 0.04]	36%	
1.26.4 post-intervention follow up 6 months to <12 months	3	168	Mean Difference (IV, Random, 95% CI)	0.04 [-0.09, 0.16]	34%	
1.26.5 post-intervention follow up 12 months or more	7	1345	Mean Difference (IV, Random, 95% CI)	-0.01 [-0.06, 0.03]	0%	
1.28 Change in BMI - type of parental involvement	24	2785	Mean Difference (IV, Random, 95% CI)	-0.53 [-0.82, -0.24]	65%	0.20
1.28.1 Parent involvement	20	2217	Mean Difference (IV, Random, 95% CI)	-0.65 [-1.04, -0.25]	70%	
1.28.2 No parental involvement	3	422	Mean Difference (IV, Random, 95% CI)	-0.29 [-0.50, -0.09]	0%	
1.28.3 Parent targeted	1	146	Mean Difference (IV, Random, 95% CI)	0.00 [-0.81, 0.81]	N/A	
1.29 Change in BMI z score - type of parental	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	56%	0.18

involvement						
1.29.1 Parent involvement	32	2927	Mean Difference (IV, Random, 95% CI)	-0.07 [-0.11, -0.03]	60%	
1.29.2 No parental involvement	2	344	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.24, 0.19]	0%	
1.29.3 Parent targetted	3	748	Mean Difference (IV, Random, 95% CI)	0.01 [-0.06, 0.08]	0%	
1.31 Change in BMI z score - baseline BMI z score	37	4019	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.10, -0.02]	56%	0.40
1.31.2 Baseline BMI z score <2.67 units	29	3549	Mean Difference (IV, Random, 95% CI)	-0.07 [-0.11, -0.03]	60%	
1.31.3 Baseline BMI z score ≥2.67 units	8	470	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.11, 0.05]	39%	

Lifestyle intervention versus concomitant

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
2.1 Change in BMI [kg/m2]	4	195	Mean Difference (IV, Random, 95% CI)	-0.75 [-1.42, -0.09]	9%	N/A
2.2 Change in BMI z score	5	212	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.10, 0.04]	8%	N/A

Maintenance intervention versus no treatment/usual care

Outcome or	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from

Subgroup						subgroup test
3.1 Change in BMI z score	2	263	Mean Difference (IV, Random, 95% CI)	-0.07 [-0.19, 0.04]	**0%**	**N/A**
Cluster RCTs versus comparator						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
4.1 Change in BMI [kg/m2)	2	629	Mean Difference (IV, Random, 95% CI)	-0.49 [-1.24, 0.27]	**0%**	**N/A**
4.2 Change in BMI z scores	1	549	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.12, -0.00]	**N/A**	**N/A**

Adolescent review

Adolescent obesity interventions (all) versus controls, longest follow-up						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
1.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	**78%**	**N/A**
1.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	**86%**	**N/A**
1.3 BMI percentile change	4		Mean Difference (IV, Random, 95% CI)	Subtotals only	**N/A**	**N/A**
Adolescent obesity interventions vs controls, by duration of intervention, <6 months, >6 months, longest follow-up						
Outcome or Subgroup	**Studies**	**Participants**	**Statistical Method**	**Effect Estimate**	**Heterogeneity (I^2)**	**P value from subgroup test**
2.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	**78%**	**0.91**
2.1.1 BMI interventions 6 months or less	19	1863	Mean Difference (IV, Random, 95% CI)	-1.17 [-1.79, -0.55]	**81%**	
2.1.2 BMI interventions greater than 6 months	9	911	Mean Difference (IV, Random, 95% CI)	-1.23 [-2.04, -0.41]	**69%**	

2.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	**86%**	**0.02**
2.2.1 BMI-z interventions 6 months or less	12	1539	Mean Difference (IV, Random, 95% CI)	-0.02 [-0.06, 0.02]	**0%**	
2.2.2 BMI-z interventions greater than 6 months	8	860	Mean Difference (IV, Random, 95% CI)	-0.26 [-0.46, -0.07]	**93%**	

Adolescent obesity interventions vs control by duration of follow up, 6-9 months, 12 months, 18-24 months

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
3.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	**78%**	**0.59**
3.1.1 BMI 6-9 months	13	1116	Mean Difference (IV, Random, 95% CI)	-1.25 [-1.91, -0.59]	**81%**	
3.1.2 BMI 12 months	9	898	Mean Difference (IV, Random, 95% CI)	-0.79 [-1.7, -0.12]	**56%**	
3.1.3 BMI 18-24 months	6	760	Mean Difference (IV, Random, 95% CI)	-1.49 [-2.56, -0.41]	**77%**	
3.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	**84%**	**0.23**
3.2.1 BMI-z score 6-9 months	8	461	Mean Difference (IV, Random, 95%	-0.07 [-0.2, -0.05]	**82%**	

			CI)			
3.2.2 BMI-z score 12 months	7	1336	Mean Difference (IV, Random, 95% CI)	-0.06[-0.11, 0.00]	**39%**	
3.2.3 BMI-z score 18-24 months	5	602	Mean Difference (IV, Random, 95% CI)	-0.34 [-0.66, -0.02]	**95%**	

Adolescent obesity interventions vs controls, by duration of post intervention follow-up, 0, <6 months, 6 to <12 months, 12 months or more

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
4.1 BMI change	24	2594	Mean Difference (IV, Random, 95% CI)	-1.12 [-1.69, -0.54]	88%	0.80
4.1.1 No post intervention follow-up	12	1004	Mean Difference (IV, Random, 95% CI)	-0.87 [-1.49, -0.26]	77%	
4.1.2 Less than 6 months	7	683	Mean Difference (IV, Random, 95% CI)	-1.53 [-2.76, -0.30]	92%	
4.1.3 6 to less than 12 months	3	524	Mean Difference (IV, Random, 95% CI)	-0.99 [-2.17, 0.19]	0%	
4.1.4 12 months and more	2	383	Mean Difference (IV, Random, 95% CI)	-1.49 [-3.95, 0.96]	91%	
4.2 BMI-z score change	17	2253	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.22, -0.04]	87%	0.007

4.2.1 No post intervention follow-up	9	687	Mean Difference (IV, Random, 95% CI)	-0.19 [-0.39, 0.01]	93%
4.2.2 Less than 6 months	2	163	Mean Difference (IV, Random, 95% CI)	0.01 [-0.07, 0.08]	0%
4.2.3 6 to less than 12 months	4	1162	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.14, 0.02]	35%
4.2.4 12 months and more	2	241	Mean Difference (IV, Random, 95% CI)	-0.15 [-0.21, -0.09]	0%

Adolescent obesity interventions by control type, no intervention, usual care, concomitant therapy, longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
5.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	**78%**	**0.008**
5.1.1 Interventions vs no intervention/wait list control	6	992	Mean Difference (IV, Random, 95% CI)	-1.79 [-2.73, -0.85]	**85%**	
5.1.2 Interventions vs usual care controls	13	763	Mean Difference (IV, Random, 95% CI)	-1.41 [-2.00, -0.83]	**56%**	
5.1.3 Interventions vs concomitant therapy controls	9	1019	Mean Difference (IV, Random, 95% CI)	-0.39 [-0.93, 0.14]	**24%**	
5.2 BMI-z score change	20	2399	Mean Difference	-0.14 [-0.22, -0.05]	**85%**	**0.006**

			(IV, Random, 95% CI)			
5.2.1 Interventions vs no intervention/wait list control	4	527	Mean Difference (IV, Random, 95% CI)	-0.23 [-0.42, -0.05]	**72%**	
5.2.2 Interventions vs usual care controls	13	1583	Mean Difference (IV, Random, 95% CI)	-0.14 [-0.24, -0.04]	**88%**	
5.2.3 Interventions vs concomitant therapy controls	3	289	Mean Difference (IV, Random, 95% CI)	0.05 [-0.05, 0.16]	**0%**	

Adolescent obesity interventions by mode (group vs individual), longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
6.1 BMI change	26	2726	Mean Difference (IV, Random, 95% CI)	-1.15 [-1.65, -0.66]	79%	**0.6**
6.1.1 Group interventions	14	1641	Mean Difference (IV, Random, 95% CI)	-1.33 [-2.1, -0.55]	83%	
6.1.2 Individual interventions	9	984	Mean Difference (IV, Random, 95% CI)	-0.90 [-1.52, -0.27]	63%	
6.1.3 Mixed interventions	3	101	Mean Difference (IV, Random, 95% CI)	-1.29 [-1.89, -0.69]	0%	
6.2 BMI-z score change	19	2377	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.22, -0.05]	86%	**0.16**
6.2.1 Group	9	1229	Mean Difference	-0.05 [-0.13, 0.02]	64%	

interventions			(IV, Random, 95% CI)			
6.2.2 Individual interventions	8	1015	Mean Difference (IV, Random, 95% CI)	-0.26 [-0.45, -0.06]	93%	
6.2.3 Mixed interventions	2	133	Mean Difference (IV, Random, 95% CI)	-0.06 [-0.25, 0.41]	22%	

Adolescent obesity interventions by setting, school, community, healthcare, longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
7.1 BMI change	27	2750	Mean Difference (IV, Random, 95% CI)	-1.17 [-1.66, -0.68]	78%	0.79
7.1.1 School based	7	613	Mean Difference (IV, Random, 95% CI)	-0.91 [-1.97, 0.15]	86%	
7.1.2 Community based	7	1030	Mean Difference (IV, Random, 95% CI)	-1.2 [-2.11, -0.29]	88%	
7.1.3 Healthcare based	13	1107	Mean Difference (IV, Random, 95% CI)	-1.32 [-1.81, -0.82]	10%	
7.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	85%	0.52
7.2.1 School based	2	150	Mean Difference (IV, Random, 95% CI)	-0.70 [-2.06, 0.66]	99%	

7.2.2 Community based	3	289	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.20, 0.15]	63%	
7.2.3 Healthcare based	15	1960	Mean Difference (IV, Random, 95% CI)	-0.1 [-0.17, -0.03]	71%	

Adolescent obesity interventions vs controls by intervention type, longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
8.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	78%	0.24
8.1.1 Multidisciplinary interventions	22	2298	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.75, -0.62]	78%	
8.1.2 Physical activity only	4	199	Mean Difference (IV, Random, 95% CI)	-1.80 [-3.21, -0.40]	28%	
8.1.3 Diet only	3	277	Mean Difference (IV, Random, 95% CI)	-0.62 [-1.29, 0.06]	21%	
8.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	86%	0.36
8.2.1 Multidisciplinary interventions	17	2209	Mean Difference (IV, Random, 95% CI)	-0.11 [-0.19, -0.03]	84%	
8.2.2 Physical activity only	0	0	Mean Difference (IV, Random, 95% CI)	Not estimable	N/A	

8.2.3 Diet only	3	190	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.55, 0.04]	85%	

Adolescent obesity interventions vs controls psychological approach, longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
9.1 BMI change	27	2652	Mean Difference (IV, Random, 95% CI)	-0.94 [-1.33, -0.55]	61%	0.09
9.1.1 Cognitive behavioural	6	553	Mean Difference (IV, Random, 95% CI)	-0.35 [-0.69, -0.00]	0%	
9.1.2 Motivational Interviewing	4	570	Mean Difference (IV, Random, 95% CI)	-1.04 [-2.21, 0.13]	0%	
9.1.3 Other psychological theory	9	680	Mean Difference (IV, Random, 95% CI)	-1.34 [-2.25, -0.42]	80%	
9.1.4 No theoretical basis / no psychological component	8	849	Mean Difference (IV, Random, 95% CI)	-0.83 [-1.21, -0.45]	3%	
9.2 BMI-z score change	18	1856	Mean Difference (IV, Random, 95% CI)	-0.14 [-0.24, -0.05]	86%	0.1
9.2.1 Cognitive behavioural	5	528	Mean Difference (IV, Random, 95% CI)	-0.01 [-0.09, 0.07]	25%	
9.2.2 Motivational Interviewing	2	409	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.26, -0.01]	3%	

9.2.3 Other psychological theory	8	729	Mean Difference (IV, Random, 95% CI)	-0.19 [-0.36, -0.02]	92%	
9.2.4 No theoretic basis / no psychological component	3	190	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.55, 0.04]	85%	

Adolescent obesity interventions vs controls parental involvement, longest follow-up

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate	Heterogeneity (I^2)	P value from subgroup test
10.1 BMI change	28	2774	Mean Difference (IV, Random, 95% CI)	-1.18 [-1.67, -0.69]	78%	0.85
10.1.1 Parent involvement	18	1820	Mean Difference (IV, Random, 95% CI)	-1.13 [-1.9, -0.35]	84%	
10.1.2 No parental involvement	13	954	Mean Difference (IV, Random, 95% CI)	-1.22 [-1.76, -0.67]	58%	
10.2 BMI-z score change	20	2399	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.21, -0.05]	86%	0.71
10.2.1 Parental involvement	14	1370	Mean Difference (IV, Random, 95% CI)	-0.15 [-0.26, -0.03]	86%	
10.2.2 No parental involvement	7	1029	Mean Difference (IV, Random, 95% CI)	-0.11 [-0.25, 0.03]	86%	