Environmental approaches to childhood obesity prevention: an overview of systematic reviews

Appendix S1: Ovid MEDLINE(R) Search Strategy

#	Searches	Results
1	obesity/ or obesity, abdominal/ or obesity, morbid/ or pediatric obesity/ or body mass index/ or skinfold thickness/ or waist-hip ratio/ or Waist Circumference/	216561
2	(obesity or overweight or body mass index or BMI or adiposity or body fat or skin fold thickness or waist-hip ratio or waist circumference or BMI Z score).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	335529
3	1 or 2	337833
4	environment/ or city planning/ or environment design/ or exercise/ or recreation/	132778
5	(environment* or obesogenic* or built environment or physical environment or social environment or political environment or path* or playground* or playing field or park* or school* or community or neighbo?rhood* or food outlet* or food store* or grocer* or supermarket* or restaurant* or urban design or urban planning or land-mix or public transport).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	3358684
6	4 or 5	3422735
7	adolescent/ or young adult/ or child/	2592789
8	(children or child or adoles* or student* or boy* or girl* or teenag* or school-children or schoolchildren).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	2962488
9	7 or 8	3155219
10	3 and 6 and 9	28166
11	((review or meta-analysis) not (comment or letter or editorial)).pt.	2023058
12	10 and 11	2748
13	limit 12 to yr="1995 -Current"	2581

Appendix S2: List of excluded SRs with reason for exclusion

First author name	Reason for exclusion
Ajie 2014 [1]	No eligible intervention(s) with extractable anthropometric outcome data
Ayliffe 2010 [2]	No eligible intervention(s) with extractable anthropometric outcome data
Baranowski 2002 [3]	No eligible intervention(s) with extractable anthropometric outcome data
Barr-Anderson 2011 [4]	No eligible intervention(s) with extractable anthropometric outcome data
Bautista-Castaño 2004 [5]	Not a primary systematic review
Branscum 2012 [6]	No eligible intervention(s) with extractable anthropometric outcome data
Campbell 2001 [7]	More recent update available (Campbell 2002)
Cesa 2014 [8]	No eligible intervention(s) with extractable anthropometric outcome data
Cleland 2012 [9]	No eligible intervention(s) with extractable anthropometric outcome data
Clemmens 2004 [10]	No eligible intervention(s) with extractable anthropometric outcome data
Connelly 2007 [11]	No eligible intervention(s) with extractable anthropometric outcome data
Daley 2009 [12]	Not a primary systematic review
Dangour 2013 [13]	No eligible intervention(s) with extractable anthropometric outcome data
de La Hunty 2013 [14]	No eligible intervention(s) with extractable anthropometric outcome data
de Meester 2009 [15]	No eligible intervention(s) with extractable anthropometric outcome data
de Souza 2011 [16]	No eligible intervention(s) with extractable anthropometric outcome data
DeMattia 2007 [17]	No eligible intervention(s) with extractable anthropometric outcome data
Ding 2012 [18]	No intervention outcome data
Ding 2011 [19]	No intervention outcome data
Doak 2006 [20]	Not a primary systematic review
Faith 2007 [21]	No eligible intervention(s) with extractable anthropometric outcome data
Fogelholm 2002 [22]	Not a primary systematic review
Friedrich 2012 [23]	No eligible intervention(s) with extractable anthropometric outcome data
Gao 2008 [24]	Focus on obese children
Gerards 2011 [25]	No eligible intervention(s) with extractable anthropometric outcome data
Gonzalez-Suarez 2009 [26]	No eligible intervention(s) with extractable anthropometric outcome data
Guerra 2014 [27]	No eligible intervention(s) with extractable anthropometric outcome data
Harris 2009 [28]	No eligible intervention(s) with extractable anthropometric outcome data
Hingle 2010 [29]	No eligible intervention(s) with extractable anthropometric outcome data
Hoelscher 2013 [30]	Not a primary systematic review
Katz 2009 [31]	Not a primary systematic review
Kellou 2014 [32]	No eligible intervention(s) with extractable anthropometric outcome data
Lopez 2010 [33]	No eligible intervention(s) with extractable anthropometric outcome data
Luckner 2011 [34]	No eligible intervention(s) with extractable anthropometric outcome data
Malik 2006 [35]	More recent update available
Matson-Koffman 2005 [36]	No eligible intervention(s) with extractable anthropometric outcome data
Mayne 2015 [37]	No eligible intervention(s) with extractable anthropometric outcome data
Meininger 2000 [38]	No eligible intervention(s) with extractable anthropometric outcome data
Mozaffarian 2012 [39]	Not a primary systematic review
Mueller 2005 [40]	Not a primary systematic review
Nelson 2011 [41]	No intervention outcome data

First author name	Reason for exclusion
Osei-Assibey 2012 [42]	No eligible intervention(s) with extractable anthropometric outcome data
Penney 2014 [43]	Not a primary systematic review
Perez-Morales 2009 [44]	No eligible intervention(s) with extractable anthropometric outcome data
Powell 2013 [45]	No intervention outcome data
Robbins 2011 [46]	No eligible intervention(s) with extractable anthropometric outcome data
Robinson 2014 [47]	No eligible intervention(s) with extractable anthropometric outcome data
Schwartz 2012 [48]	No eligible intervention(s) with extractable anthropometric outcome data
Sharma 2011 [49]	No eligible intervention(s) with extractable anthropometric outcome data
Shaya 2008 [50]	No eligible intervention(s) with extractable anthropometric outcome data
Soler 2010 [51]	No eligible intervention(s) with extractable anthropometric outcome data
Staniford- Brown 2009 [52]	No eligible intervention(s) with extractable anthropometric outcome data
Story 1999 [53]	Focus on obese children
Summerbell 2005 [54]	More recent update available
Sun 2013 [55]	No eligible intervention(s) with extractable anthropometric outcome data
Szajewska 2010 [56]	No intervention outcome data
Thomas 2006 [57]	No eligible intervention(s) with extractable anthropometric outcome data
Upton 2014 [58]	Focus on obese children
Van Cauwenberghe 2010 [59]	No eligible intervention(s) with extractable anthropometric outcome data
van der Kruk 2013 [60]	No eligible intervention(s) with extractable anthropometric outcome data
Van Lippevelde 2012 [61]	No eligible intervention(s) with extractable anthropometric outcome data
Van Sluijs 2007 [62]	No eligible intervention(s) with extractable anthropometric outcome data
Verrotti 2014 [63]	Not a primary systematic review
Vine 2013 [64]	Focus on clinical settings
Wahi 2011 [65]	No eligible intervention(s) with extractable anthropometric outcome data
Wall 2006 [66]	Focus on adults
Wang 2015 [67]	No eligible intervention(s) with extractable anthropometric outcome data
Whittemore 2013 [68]	No eligible intervention(s) with extractable anthropometric outcome data
Whitt-Glover 2009 [69]	No eligible intervention(s) with extractable anthropometric outcome data
Wilson 2003 [70]	Not a primary systematic review
Williams 2014 [71]	No eligible intervention(s) with extractable anthropometric outcome data

Appendix S3 - Characteristics of SRs (Part 1)

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
Avery *et al.* 2015 [72]	Clarify which interventions aimed at children help to reduce the consumption of SSBs and whether these interventions lead to subsequent changes in body fatness.	Date range: Jan 2000 - Aug 2013 Databases: Embase, Medline, WoS Language: English	Study design: RCT Setting: Any Participants: 2-18 years Primary outcome focus: SSB consumption leading to changes in body fatness Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Jadad Scale) Funding Sources: British Dietetic Association	3
Baker *et al.* 2011 [73]	Evaluate the effects of community wide, multi-strategic interventions upon population levels of physical activity.	Date range: Jan 1995 - Nov 2009 Databases: Cochrane Public Health Group Specialised Register, The Cochrane Library, Medline, Embase, CINAHL, LILACS, PsycINFO, ASSIA, The British Nursing Index, Chinese CNKI databases, EPPI-Centre, DoPHER, TRoPHI, ERIC, HMIC, Sociological Abstracts, SPORTDiscus, Transport Database, WoS (SCI, SSCI, CPCI), reference lists, experts contacted, websites searched Language: No restrictions	Study design: CRCT, RCT, Q-RCT, ITS, PCCS Setting: Community Participants: whole population Primary outcome focus: PA Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: Health Practitioner Research Scheme, Queensland Health, Australia; NIHR	11
Barr-Anderson *et al.* 2014 [74]	Identify weight-related behavioural interventions for African American children aged between 5 and 18 years that took place during Outside-of-School Time (OST) and identify key intervention components that are relevant when focusing on specific OST periods.	Date range: up to Sep 2013 Databases: AGRICOLA, CINAHL, Cochrane Library, ERIC, NIH RePORTER, PsycINFO, PubMed, reference lists Language: English	Study design: Not reported Setting: Not in school Participants: African American children and adolescents aged 5-18 years Primary outcome focus: Weight/related behaviour Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (author-derived aggregate score) Funding Sources: Robert Wood Johnson Foundation	7
Beauchamp *et al.* 2014 [75]	Summarize the effectiveness of interventions for the primary prevention of obesity that report their effect on anthropometric outcomes by socioeconomic strata, and to identify common attributes of interventions that may be most likely to benefit all SEP groups.	Date range: up to Sep 2012 Databases: Medline, Embase, CINAHL, EBM reviews, SCOPUS, Cochrane collaboration, Cochrane Public Health Group, EPPI-Centre, SIGLE, the Virtual Library for Public Health Language: English	Study design: RCT, Q-nRCT, Cohort, repeated XS Setting: Any Participants: whole population Primary outcome focus: Obesity-related (by SES) Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: Australian National Preventive Health Agency Grant (188PEE2011); Australian Research Council grant (ARC	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			LP12010041), National Health and Medical Research Council Career Development Award; National Heart Foundation (PH 12 M6824)	
Bleich *et al.* 2013 [76]	Review the evidence on community-based childhood obesity-prevention programs in high-income countries.	Date range: up to Aug 2012 Databases: Medline, Embase, PsychInfo, CINAHL, Cochrane Library Language: English	Study design: RCT, QE, NE Setting: Community Participants: 2-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Down and Black) Funding Sources: AHRQ contract 290-2007- 10061-I; NHLBI grant 1K01HL096409	6
Brandt *et al.* 2010 [77]	Compare results of school-based prevention programs and to identify effective methods.	Date range: Jan 1990 - Apr 2009 Databases: PubMed, reference lists Language: Not reported	Study design: RCT, CCT Setting: School Participants: 4-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	1
Branscum and Sharma 2011 [78]	Systematically analyze and summarize findings for health education and promotion interventions aimed at the prevention of childhood overweight and obesity among primarily Hispanic children.	Date range: Jan 2000 - May 2010 Databases: CINAHL, ERIC, PubMed Language: English	Study design: Not reported Setting: Any Participants: Hispanic, Latino or Mexican American children Primary outcome focus: Any Intervention type: Health education and promotion Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	2
Brown and Summerbell 2009 [79]	Determine effectiveness of school-based interventions that focus on changing dietary intake and physical activity levels to prevent childhood obesity.	Date range: Jan 2006 - Sep 2007 Databases: Embase, Medline, reference lists Language: No restrictions	Study design: RCT, CCT Setting: School Participants: 5-18 years Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	3
Brown *et al.* 2015 [80]	Assess the effectiveness of diet and physical activity interventions to prevent or treat obesity in South Asian children and adults and to	Date range: 2006 – 2014 Databases: ASSIA, CCTR, Embase, Medline, SSCI, Google, reference lists, experts contacted Language: English	Study design: RCT, CCT, CBA Setting: Any Participants: South Asian ethnicity (whole population)	10

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
	describe the characteristics of effective interventions.		Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Meta-analysis Assessed study quality: Yes (Six Item Checklist Of Quality Of Execution (adapted from the Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: NIHR, Project ID: RP-PG-0407-10044	
Budd and Volpe 2006 [81]	Review the school-based RCTs aimed at reducing body weight or preventing weight gain.	Date range: 1985 - 2004 Databases: Medline, CINAHL, PsycINFO, CDSR reference lists, websites of professional organizations and governmental agencies (unspecified) Language: Not reported	Study design: RCT Setting: School Participants: elementary, middle, or high school students Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: NINR grant 2-T32 NR 007100-06	3
Calancie *et al.* 2015 [82]	Synthesize available evidence on the adaptation, implementation, and effectiveness of policy and environmental obesity-prevention strategies in rural settings.	Date range: Jan 2002 - Jun 2013 Databases: PubMed, CINAHL, PAIS, Cochrane databases, reference lists, experts contacted Language: English	Study design: Not reported Setting: Community Participants: whole population Primary outcome focus: Any Intervention type: Nutrition-related policy/environmental Synthesis: Narrative Assessed study quality: No Funding Sources: NOPREN Rural Food Access Working Group (grant no. 5-37850); University of North Carolina (no. U48/DP000059); NINR grants T32NR007091 & 5T32NR008856	5
Campbell *et al*. 2002 [83]	Assess the effectiveness of educational, health promotion and/or psychological/ family/behavioural /counselling/management interventions that focussed on diet, physical activity and/or lifestyle and social support, and were designed to prevent obesity in childhood.	Date range: 1985 - July 2001 Databases: Medline, Psyclit, Embase, SCI, SSCI, CINAHL, CCTR and the Cochrane Heart Group's specialised register Language: No restrictions	Study design: RCT, nRCT Setting: Any Participants: 0-18 years Primary outcome focus: anthropometric Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Jadad Scale) Funding Sources: Collaborating Institutes acknowledged but main source of funding unclear; external sources of support were the Department of Human Services, Victoria, Australia; NHS Centre for Reviews and Dissemination, University of York, UK	9
Chen and	Evaluate the literature reporting on the effectiveness of technology-based interventions in preventing obesity in	Date range: Jan 1990 - Jan 2014 Databases: CINAHL, Embase, PubMed, PsycINFO, the Cochrane Library, reference lists	Study design: RCT, QE Setting: Any	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
Wilkosz 2014 [84]	adolescents and to explore components of these interventions that are associated with significant BMI outcomes.	Language: English	Participants: 2-18 years Primary outcome focus: Obesity-related/behavioural Intervention type: internet/active video game Synthesis: Narrative Assessed study quality: Yes (Cochrane Effective Practice and Organization of Care Review Group's methodological rigor assessment) Funding Sources: Not reported	
Chriqui 2013 [85]	Examine the influence of state laws and local policies on changes to school and other environments, individual activity and nutrition-related behaviours, and obesity and weight outcomes.	Date range: Jan 2012 - March 2013 Databases: PubMed, PAIS, EconLit Language: Not reported	Study design: quantitative, review, and qualitative studies Setting: Any Participants: whole population Primary outcome focus: Any Intervention type: Policy Synthesis: Narrative Assessed study quality: No Funding Sources: Robert Wood Johnson Foundation; NIDDKD grant R01DK089096; NCI grant R01CA158035	2
Chriqui *et al.* 2014 [86]	Examine the influence of specific state laws and district level competitive food policies on changes to student BMI and weight outcomes; student consumption, purchasing, and dietary intake; or in-school competitive food availability and access.	Date range: Jan 2005 - March 2013 Databases: PubMed, CINAHL, EconLit, ERIC, PAIS, "Childhood Obesity" journal archives Language: English	Study design: NE Setting: Any Participants: pre-school to grade 12 Primary outcome focus: Obesity-related /SSB consumption or availability Intervention type: Policy Synthesis: Narrative Assessed study quality: No Funding Sources: Robert Wood Johnson Foundation	4
Cole *et al.* 2006 [87]	Describe the theoretical and methodological characteristics of effective school-based interventions that used healthy lifestyle education, dietary habits, and/or physical activity interventions.	Date range: up to Feb 2005 Databases: PubMed, CINAHL, reference lists Language: Not reported	Study design: RCT, nRCT Setting: School Participants: 4-14 years Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	1
Cook-Cottone *et al.* 2009 [88]	Examine study factors and effect sizes in school-based obesity prevention studies.	Date range: Jan 1997 – July 2008 Databases: Medline, PsycINFO, CINAHL, Academic Search Premier, CDSR, reference lists Language: English	Study design: RCT, nRCT Setting: School Participants: Pre-school to Grade 12 Primary outcome focus: Obesity-related	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Intervention type: Any Synthesis: Meta-analysis Assessed study quality: No Funding Sources: Not reported	
De Bourdeaudhuij *et al.* 2010 [89]	Systematically review the evidence of school-based interventions targeting dietary and physical activity behaviour in primary (6–12 years old) and secondary school (12–18 years old) children in Europe.	Date range: 1990 to Dec 2007; rerun Jan and Jun 2008 Databases: PubMed, WoS, CINAHL, The Cochrane Library and MDConsult, reference lists, websites of groups conducting systematic reviews (unspecified), SIGLE, Social Care Online and British National Bibliography for Report Literature, supplements of: 'International Journal of Obesity' and 'Acta Paediatrica' Language: English	Study design: No restrictions Setting: School Participants: 6-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: European Commission's Sixth Framework Programme	27
de Sa and Lock 2008 [90]	Systematically synthesize worldwide evidence from published and unpublished literature on interventions to promote fruit and/or vegetable consumption in children in school settings.	Date range: up to Aug 2007 Databases: PubMed, CABDirect, Cochrane Library, WoK, IBSS, PsycINFO, Embase, Biomed Central, reference lists, experts contacted Language: English abstract but no language restrictions	Study design: RCT, CRCT, nRCT Setting: School Participants: 5-18 years Primary outcome focus: F&V consumption/knowledge Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (using a published tool utilised previously in a similar review. No details provided) Funding Sources: No external funding sources	5
Dobbins *et al.* 2013 [91]	Summarize the evidence of the effectiveness of school-based interventions in promoting physical activity and fitness in children and adolescents.	Date range: 1985 to Jul 2007 Databases: Medline, BIOSIS, CINAHL, Embase, SPORTDiscus, PsycINFO, Sociological Abstracts, CENTRAL, reference lists, experts contacted Language: No restrictions	Study design: RCT Setting: School Participants: 6-18 years Primary outcome focus: PA Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: Cochrane Health Promotion and Public Health Field, Australia and the City of Hamilton Public Health Services, Canada.	10
Flodmark *et al.* 2006 [92]	Update the findings of a 2002 report by the Swedish Council on Technology Assessment in Health Care (SBU) on preventive	Date range: 2001 – 2004 Databases: PubMed, NHS - Economic Evaluation Database, Cochrane Library Language: Swedish, Norwegian, Danish, English, German, French	Study design: RCT, CCT Setting: Any Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related	5

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
	interventions against obesity in children and adolescents.		Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (author- proposed quality criteria) Funding Sources: Not reported	
Gao and Chen 2014 [93]	Synthesize the exergame-related research carried out in less controlled field-based settings including homes, schools and communities, and discuss the effectiveness of exergames on children's obesity-related outcomes.	Date range: 1985 – 2013 Databases: Academic Search Complete, ERIC, Medline, PubMed, PsycINFO, SPORTDiscus, reference lists Language: English	Study design: RCT, CCT Setting: Any Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related /fitness Intervention type: Exergaming Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	6
Haynos and O'Donohue 2012 [94]	Review RCTs of universal prevention of obesity in children.	Date range: Not reported Databases: Medline, PsycINFO, reference lists Language: Not reported	Study design: RCT Setting: Any Participants: 0-18 years Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (No specific tool; quality assessment criteria included: description of participant sample, interventionist variables, and intervention settings, intervention components, study design, and criterion measures) Funding Sources: Not reported	1
Holub *et al.* 2014 [95]	Examine the effects of obesity-related interventions on Latino children in U.S. schools and identify specific strategies that can be used to combat childhood obesity, specifically in Latino youth.	Date range: 1965 – 2010 Databases: PsycINFO, Medline, CINAHL, Cochrane Library, Current Controlled Trials, LILACS, Global Health, Global Index Medicus, WoS Language: English, Spanish, Portuguese	Study design: Not reported Setting: School Participants: children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: multi-component, obesity related Synthesis: Narrative Assessed study quality: Yes (CDC's Community Guide) Funding Sources: CDC grant 1U48 DP001917	6
Ickes *et al.* 2014 [96]	Compare and contrast U.S. and international school-based obesity prevention interventions and highlight efficacious strategies.	Date range: Jan 2002 - Dec 2013 Databases: Academic Search Premier, CINAHL, Medline, ERIC, Psychology and Behavioral Sciences Collection Language: English	Study design: Not reported Setting: School Participants: children and adolescents (age unspecified) Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: No	4

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Funding Sources: Not reported	
Jaime and Lock 2009 [97]	Systematically review the evidence on the effectiveness of school-based nutrition policy on the food environment, and student's dietary intake and BMI	Databases: PubMed, CAB abstracts, WoK (including WoS and ISI databases), The Cochrane Library, and LILACS, Google, reference lists, experts contacted Language: Not reported	Study design: RCT, nRCT, NRNCT, XS Setting: School Participants: children and adolescents (age unspecified) Primary outcome focus: menu composition; availability/sales of school food and beverages; dietary intake; BMI Intervention type: Food/Nutrition policies Synthesis: Narrative Assessed study quality: No Funding Sources: International Nutrition Foundation; Ellison Medical Foundation	6
Kaiser *et al.* 2013 [98]	Assess whether: (i) an increase in SSB intake increases body weight or BMI in humans; (ii) a reduction of SSB intake reduces body weight or BMI in humans.	Date range: Jan 2010 - Oct 2012 Databases: PubMed, PsycINFO, the Cochrane Collaborative Website, SCOPUS, PROQUEST Language: No restrictions	Study design: RCT Setting: Any Participants: whole population Primary outcome focus: Obesity-related Intervention type: SSB consumption Synthesis: Narrative Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: NIH grant P30DK056336	9
Kamath *et al.* 2008 [99]	Assess the effectiveness of behavioural interventions to prevent childhood obesity.	Date range: up to Feb 2006 Databases: Medline, ERIC, Embase, CINAHL, PsycINFO, Dissertation Abstracts, SCI, SSCI, CENTRAL, reference lists, experts contacted Language: Not reported	Study design: RCT Setting: Any Participants: 2-18 years Primary outcome focus: Nutrition/PA/BMI Intervention type: Behavioural Synthesis: Meta-analysis Assessed study quality: Yes (No specific tool; quality assessment criteria included: allocation concealment; blinding of participants (to allocation and to study hypothesis), health care providers and/or data collectors; use of intention to treat analysis; and extent of losses to follow up.) Funding Sources: The Endocrine Society	8
Kanekar and Sharma 2008 [100]	Assess the effect of school-based interventions to prevent childhood obesity, and conduct a meta-analysis focusing on the outcome indicator of BMI.	Date range: 2000 – 2007 Databases: Medline, CINAHL, reference lists Language: English	Study design: Not reported Setting: School Participants: 0-18 years Primary outcome focus: BMI Intervention type: Curricular Synthesis: Meta-analysis Assessed study quality: Yes (Author- proposed quality criteria)	4

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Funding Sources: Not reported	
Katz *et al.* 2008 [101]	Evaluate the effectiveness of school-based strategies to control or prevent obesity.	Date range: up to Oct 2004 Databases: Medline, HealthSTAR, PsycINFO, Embase searched up to Feb 2000. Update searches performed on Medline, CINAHL and PsycINFO from Feb 2000 to Oct 2004. Language: English	Study design: RCT, nRCT Setting: School Participants: 3-18 years Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Meta-analysis Assessed study quality: Yes (CDC's Community Guide) Funding Sources: Not reported	5
Kesten *et al*. 2011 [102]	Evaluate the effectiveness of interventions to prevent overweight and obesity in pre-adolescent girls.	Date range: 1990 - Feb 2010 Databases: Medline, SPORTDiscus, PsycINFO, WoS, Biological Sciences, PEI Language: English	Study design: RCTs, CBA, Non-controlled studies Setting: Any Participants: Pre-adolescent girls (7-11 years) Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: Not reported	6
Knowlden and Sharma 2013 [103]	Examine the usefulness of school-based obesity-prevention interventions targeting African American and Hispanic children, and develop a set of recommendations to enhance their effectivness.	Date range: Jan 2001 - May 2012 Databases: CINAHL, ERIC , Medline, Psychology and Behavioral Sciences Collection, CENTRAL Language: Not reported	Study design: Experimental, QE Setting: School Participants: African American or Hispanic children Primary outcome focus: Anthropometric Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	1
Kropski *et al.* 2008 [104]	Examine the effectiveness of and provide a focused evaluation of the quality and results of long-term school-based obesity prevention programs, and to offer guidance for future investigations.	Date range: Jan 1990 - Dec 2005 Databases: PubMed, Biological Abstracts, Education Abstracts, reference lists, experts contacted Language: Not reported	Study design: Experimental, QE Setting: School Participants: children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: Curricular/environmental Synthesis: Narrative Assessed study quality: Yes (GRADE) Funding Sources: Not reported	6
Lambogli a *et al.* 2013 [105]	Evaluate the use of exergaming as a strategic tool for the promotion of healthy behaviours.	Date range: Jan 2008 - Apr 2012 Databases: SciELO, LILACS, PubMed, EBSCO, Science Direct Language: Portuguese, English	Study design: XS, Experimental Setting: Any Participants: 6-15 years Primary outcome focus: PA; body composition; fitness levels	3

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Intervention type: Exergaming Synthesis: Narrative Assessed study quality: No Funding Sources: CAPES; FUNCAP	
Lavelle *et al.* 2012 [106]	Determine the efficacy of school-based interventions on reducing BMI in children.	Date range: up to Feb 2011 Databases: Medline, Embase, reference lists Language: English	Study design: RCT, C-RCT, efficacy trail, QE, PCS Setting: School Participants: 0-18 years Primary outcome focus: BMI Intervention type: Any Synthesis: Meta-analysis Assessed study quality: No Funding Sources: Not erported	6
LeBlanc *et al.* 2013 [107]	Explore the relationship between active video games and several health and behavioural indicators in young people aged 0 to 17 years.	Date range: Not reported Databases: Medline, Embase, PsycINFO, SPORTDiscus, CENTRAL Language: English, French	Study design: RCT, CS, CR, CC Setting: Any Participants: 0-17 years Primary outcome focus: Health or behavioural indicator Intervention type: Active video game Synthesis: Narrative Assessed study quality: Yes (GRADE) Funding Sources: Active Healthy Kids, Canada	7
Leung et al. 2012 [108]	Assess the effectiveness of interventions that focus on reducing sedentary behaviour among school-age youth and to identify elements associated with interventions' potential for translation into practice settings.	Date range: 1980 - Apr 2011 Databases: Medline, PubMed, PsycINFO, Cochrane Library Language: English	Study design: RCT Setting: Any Participants: 6-19 years Primary outcome focus: Sedentary behaviour Intervention type: educational, health promotion or behavioural strategies at the individual and family levels Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	1
Li *et al.* 2008 [109]	Systematically review intervention studies aimed at the prevention or control of excess weight among children and adolescents in China.	Date range: 1990 – 2006 Databases: China Journal Full Text Database, Wanfang Database, Medline, Meditext Language: Chinese, English	Study design: RCT, nRCT Setting: School Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related, knowledge Intervention type: Behavioural Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool)	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Funding Sources: National Health and Medical Research Council of Australia	
Liao *et al.* 2014 [110]	Assess the effects of sedentary behaviour interventions on BMI in children, and to compare whether multi-component interventions have a higher mean effect size than interventions with single component.	Date range: up to July 2012 Databases: Medline, PsycINFO, WoS, Google Scholar, reference lists Language: English	Study design: RCT Setting: Any Participants: 0-18 years Primary outcome focus: BMI Intervention type: Behavioural Synthesis: Meta-analysis Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: NIH grant R25 CA57712; American Cancer Society grant 118283-MRSGT-10-012-01-CPPB	8
Lissau 2007 [111]	Identify studies on the prevention of paediatric obesity within the school arena.	Date range: 2001 – Aug 2005 Databases: PubMed, Embase, PsycINFO, NHS – Economic Evaluation Database, ERIC, experts contacted Language: Not reported	Study design: RCT, CCT Setting: School Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	3
Lobelo *et al.* 2013 [112]	Examine the effectiveness of school-based intervention aimed at preventing or treating obesity among youth in Latin America.	Date range: 1965 - Dec 2010 Databases: PsycINFO, Medline, CINAHL, Cochrane Library, Current Controlled Trials, LILACS, Global Health, Global Index Medicus, WoS Language: English, Spanish, Portuguese	Study design: RCT, CBA, Crossover design Setting: School Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (CDC's Community Guide) Funding Sources: CDC 1U48DP001917	7
Malik *et al.* 2013 [113]	Conduct a systematic review and meta-analyses of prospective cohort studies and RCTs in children and adults and to provide a comprehensive summary of the literature evaluating SSBs and body weight gain	Date range: up to Mar 2013 Databases: PubMed, Embase, The Cochrane library, reference lists Language: English	Study design: RCT, PCS Setting: Any Participants: whole population Primary outcome focus: body weight Intervention type: SSB Synthesis: Meta-analysis Assessed study quality: Yes (Newcastle Ottawa scale; Cochrane risk of bias tool) Funding Sources: NIH grants DK58845, P30 DK46200, U54CA155626, and HL60712	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
Marsh *et al.* 2014 [114]	Systematically synthesize evidence from RCTs of interventions with a family component that targeted reduction of sedentary time, including TV viewing, video games and computer use, in children.	Date range: up to Mar 2012 Databases: Medline, PubMed, PsycINFO, CINAHL, Embase, reference lists, experts contacted Language: English	Study design: RCT Setting: Family-based Participants: 2-18 years Primary outcome focus: Sedentary behaviour Intervention type: Active parental involvement Synthesis: Narrative Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: Not reported	4
Pérez-Morales *et al.* 2012 [115]	Conduct a systematic review of childhood overweight and obesity prevention interventions among Hispanic children in the United States.	Date range: Jan 2001 - Jan 2012 Databases: PubMed, CINAHL, EBSCO Language: English	Study design: RCT, QE Setting: Any Participants: Hispanic children in the US Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	1
Peterson and Fox 2007 [116]	Review the evidence on the effectiveness of school-based interventions and contribute to the design and implementation of the "next generation" of school-based obesity prevention interventions.	Date range: 1966 – 2001 Databases: Not reported (referred to a 'parent' CDC Guide to Community Preventive Services Task Force report) Language: English	Study design: RCT, QE Setting: School Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Not reported	3
Reilly and McDowell 2003 [117]	Systematically review and critically appraise intervention studies in paediatric obesity prevention and treatment; examine the clinical relevance of intervention effects and make suggestions for further research	Date range: Jun 2000 - May 2002 Databases: Medline, Embase, CINAHL, Healthstar, Cochrane Library, internet search, reference lists Language: Not reported	Study design: RCT Setting: Any Participants: Children and adolescents (age unspecified) Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Scottish Intercollegiate Guidelines Network) Funding Sources: Sport Aiding Medical Research for Kids (SPARKS), the British Heart Foundation and the Scottish Executive Health Department.	4
Sbruzzi *et al.* 2013 [118]	Assess the effectiveness of educational interventions to prevent or treat childhood obesity through a	Date range: up to May 2012 Databases: Medline, CENTRAL, Embase, reference lists Language: No restrictions	Study design: RCT Setting: School/Home Participants: 6-12 years	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
	systematic review and meta-analysis of randomized trials.		Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Meta-analysis Assessed study quality: Yes (GRADE) Funding Sources: Instituto de Cardiologia grant MCT/CNPq/CT-Saúde/MS/SCTIE/ DECIT (no. 067/2009); Conselho Nacional de Desenvolvimento Científico e Tecnológico; CAPES	
Sharma 2007 [119]	Review and summarise international (excluding the US) school-based interventions for preventing obesity in children aged between 3 - 18 years	Date range: 1999 – 2005 Databases: CINAHL, ERIC, Medline Language: English	Study design: RCT, nRCT, QE Setting: School Participants: 3-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Nor reported	2
Shirley *et al.* 2014 [120]	Update the findings of an AHRQ review on obesity prevention programs for children and adolescents, focusing on elementary school students in the US. A secondary aim was to examine the importance of parental and community involvement in the success of school-based obesity prevention programmes.	Date range: Jan 2007 - Dec 2012 Databases: PubMed, CINAHL Language: English	Study design: Experimental, QE Setting: School Participants: 6-12 years Primary outcome focus: Obesity-related Intervention type: Educational, PA or nutrition modification Synthesis: Narrative Assessed study quality: No Funding Sources: National Institute on Drug Abuse; NIH grants K12 DA031794 and K23DA034879	6
Showell *et al*. 2013 [121]	Review the effectiveness of home-based interventions on weight, intermediate (e.g. diet and physical activity), and clinical outcomes.	Date range: up to Aug 2012 Databases: Medline, Embase, PsycINFO, CINAHL, clinical-trails.gov, Cochrane Library, reference lists, grey literature search Language: Not reported	Study design: RCT, QE, NE Setting: Home Participants: 2-18 years Primary outcome focus: Obesity-related Intervention type: Diet/PA/Sedentary behaviour modification Synthesis: Narrative Assessed study quality: Yes (Down and Black) Funding Sources: AHRQ contract 290-2007-10061-I; NICHD grant U54HD070725; AHRQ grant T32 HS19488-01	8
Silveira *et al.* 2013 [122]	Assess the effectiveness of school-based nutrition education interventions in reducing or preventing overweight and obesity among children and adolescents	Date range: up to May 2010 (additional PubMed search up to May 2012) Databases: PubMed/Medline, Embase, WoS, CENTRAL, ERIC, CINAHL, LILACS, PsycINFO, SPORTDiscus,	Study design: RCT Setting: School Participants: 5-18 years Primary outcome focus: bmi Intervention type: Nutrition education	6

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
		ASSIA, PEI, Social Care Online, Social Services Abstracts, Sociological Abstracts, reference lists Language: Any language except those based on logograms (e.g. Chinese and Japanese)	Synthesis: Meta-analysis Assessed study quality: Yes (Aggregate score derived using: (i) GRADE; (ii) Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: FAPESP protocol no. 09/12438-5).	
Silveira *et al.* 2011 [123]	Examine the effectiveness of school-based nutrition education interventions to prevent and reduce obesity in children and adolescents	Date range: up to May 2010 Databases: PubMed, Embase, WoS, CENTRAL, ERIC, CINAHL, LILACS, PsycINFO, SPORTDiscus, ASSIA, PEI, Social Care Online, Social Services Abstracts, Sociological Abstracts Language: No restrictions	Study design: RCT Setting: School Participants: 5-18 years Primary outcome focus: Obesity-related or dietary Intervention type: Behavioural Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: FAPESP; CAPES	7
Small *et al.* 2007 [124]	Identify effective early treatment or prevention intervention programmes for use in primary care for young children who are overweight or obese, or who are at high risk of obesity	Date range: not reported Databases: Medline, PsychInfo, CINAHL Language: Not reported	Study design: RCT Setting: Primary care Participants: 4-7 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Not formally assessed; aspects of study quality were assessed and reported in table form) Funding Sources: Not reported	2
Sobol-Goldberg *et al*. 2013 [125]	Evaluate the effectiveness of school-based obesity prevention programmes	Date range: 2006 – Jan 2012 Databases: Medline, ERIC, Embase, CINHAL, PyscInfo, DAI, SCI, SSCI, CENTRAL Language: English	Study design: RCT Setting: School Participants: 5-18 years Primary outcome focus: BMI Intervention type: Any Synthesis: Meta-analysis Assessed study quality: Yes (No specific tool used; quality assessment criteria included: allocation concealment; blinding of patients ,healthcare providers, data collectors; use of intention to treat analysis; and loss to follow up) Funding Sources: Not reported	8
Stice *et al.* 2006 [126]	Evaluate obesity prevention programmes for children and adolescents, and to assess the characteristics of those interventions associated with larger effects.	Date range: 1980 - Oct 2005 Databases: PsycINFO, Medline, CINAHL, DAI, reference lists, experts contacted Language: Not reported	Study design: CT Setting: Any Participants: 0-22 years Primary outcome focus: Obesity-related	5

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
			Intervention type: Any Synthesis: Meta-analysis Assessed study quality: No Funding Sources: NIH grants MH/DK61957 and MH70699	
Towns *et al.* 2014 [127]	Identify and describe interventions specifically aimed at reducing overweight or obesity risk among Aboriginal children and to present evidence of their effectiveness.	Date range: Jan 2000 - Jun 2013 (additional search on Google Scholar in Oct 2013) Databases: PubMed, PsycINFO, Databases: ERIC, Medline, WoS, reference lists, Google Scholar Language: Not reported	Study design: RCT, QE, Pre-Post test Setting: Any Participants: 0-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: No Funding Sources: Canadian Institutes for Health Research/Institute	4
van Grieken *et al.* 2012 [128]	Evaluate the effects of interventions, at school or in the community, to prevent excessive sedentary behaviour, in children and adolescents, on their sedentary behaviour and BMI.	Date range: 1990 - Mar 2011 Databases: PubMed, Embase, WoS, PsycINFO, CDSR, reference lists Language: Not reported	Study design: RCT, CT Setting: Any Participants: 0-18 years Primary outcome focus: Obesity-related Intervention type: Sedentary behaviour Synthesis: Meta-analysis Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: Netherlands Organisation for Health Research and Development project no. 121020027)	6
Vasques *et al.* 2014 [129]	Assess the efficacy of school-based and after-school interventions programs on children and adolescents' BMI reduction addressing the correlation between some moderating variables.	Date range: 2000 – 2011 Databases: PubMed, Medline, WoS, Academic Search Complete, Latindex, SciELO.org and editors: Elsevier, Wiley, Springer, Taylor & Francis, reference lists Language: Not reported	Study design: RCT, nRCT Setting: School Participants: 0-18 years Primary outcome focus: BMI, % Overweight and obese, body fat Intervention type: Any Synthesis: Meta-analysis Assessed study quality: No Funding Sources: Not reported	6
Verstraeten *et al.* 2012 [130]	Systematically review the evidence on the effectiveness of school-based interventions targeting dietary behavior and/or physical activity for the primary prevention of obesity in children and adolescents aged 6–18 y in low- and middle-income countries.	Date range: Jan 1990 - Jul 2011 Databases: Medline, Embase, WoS, CENTRAL, ERIC, Cochrane Library, CRD Language: English, Spanish, French, German, Dutch	Study design: CT Setting: School Participants: 6-18 years Primary outcome focus: Diet/PA, anthropometric Intervention type: Dietary/PA behaviour Synthesis: Narrative Assessed study quality: Yes (Effective Public Health Practice Project Quality Assessment Tool) Funding Sources: No external funding sources	7

Author	Review aim	Search Strategy*	Study design eligible for inclusion in the review **	AMSTAR score
Waters *et al*. 2011 [131]	Update the previous Cochrane review and determine the effectiveness of educational, health promotion and/or psychological/family/behavioural therapy/counselling/management interventions which focus on diet, physical activity or lifestyle support, or both and were designed, or had an underlying intention to prevent obesity/further weight gain, in children.	Date range: 1990 - Mar 2010 Databases: CENTRAL, Medline, Embase, PsycINFO, CINAHL, reference lists, experts contacted; grey literature: The Campbell Library, CRD, The Cochrane Library, DARE, Health evidence - Canada, (http://www.health-evidence.ca/), NHS Evidence, EPPI-Centre database, ICTRP, Google Language: No restrictions	Study design: C-RCT, CT Setting: Any Participants: 0-18 years Primary outcome focus: Any (BMI for meta-analysis) Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: Department of Health, UK; WHO; Victorian Health Promotion Foundation (VicHealth), Victoria, Australia; Commonwealth Department of Health and Ageing, Australia; the National Health and Medical Research Council Capacity Building Grant, Australia; the Jack Brockhoff Foundation, Australia and other author-specific sources	11
William s *et al.* 2013 [132]	Evaluate the effects of policies related to diet and physical activity in schools, either alone, or as part of an intervention programme on the weight status of children aged 4 to 11 years	Date range: up to Jun 2011 Databases: Medline, Embase, PsycINFO, SportDISCUS, WoS, ERIC, BEI, AEI, CINAHL Plus, Cochrane Library, reference lists; Grey literature search (in July 2011): metaRegister of Controlled Trials, Clinical Trials.gov, International Clinical Trials Registry Platform, Robert Wood Johnson Foundation website Language: Not reported	Study design: RCT, CBA, ITS, CS, XS Setting: School Participants: 4-11 years Primary outcome focus: Obesity-related Intervention type: Nutrition/PA policy Synthesis: Meta-analysis Assessed study quality: Yes (Newcastle-Ottawa Scale) Funding Sources Medical Research Council Doctoral Training; University of Exeter; NIHR; CLAHRC	7
Wolfen den *et al.* 2014 [133]	Evaluate the effects of whole of community interventions to prevent excessive population weight gain.	Date range: 1990 – 2011 Databases: Medline, Embase, CENTRAL, Google Scholar, reference lists Language: English	Study design: RCT, C-RCT, QE with a parallel control group Setting: Community Participants: whole population Primary outcome focus: Obesity-related Intervention type: Any Synthesis: Meta-analysis Assessed study quality: Yes (Cochrane risk of bias tool) Funding Sources: Not reported	7
Zenzen and Kridli 2009 [134]	Conduct an integrative review using Cooper's framework to provide an overview of the degree of variability in the methodological approaches and theoretical frameworks of school-based obesity programs.	Date range: 2000 – 2007 Databases: Medline, PsycINFO, CINAHL, reference lists Language: English	Study design: Not reported Setting: School Participants: 4-18 years Primary outcome focus: Any Intervention type: Any Synthesis: Narrative Assessed study quality: Yes (Stetler's quality criteria of research) Funding Sources: Not reported	2

* Databases: AEI (Australian Education Index), AHRQ (Agency for Healthcare Research and Quality), ASSIA (Applied Social Sciences Index and Abstracts), BEI (British Education Index), BIOSIS (Biosciences Information Service), CDSR (Cochrane Database of Systematic Reviews), CCTR (Cochrane Controlled Trials Register), CENTRAL (Cochrane Central Register of Controlled Trails), CINAHL (Cumulative Index to Nursing and Allied Health Library), CPCI (Conference Proceedings Citation Index), CRD (The Centre for Reviews and Dissemination), DAI (Dissertation Abstracts International), DARE (Database of Abstracts of Reviews of Effects), DoPHER (Database of Promoting Health Effectiveness Reviews), , Embase (Excerpta Medica database), EPPI-Centre (The Evidence for Policy and Practice Information and Coordinating Centre database for health promotion research), ERIC (Education Resource Information Center), HMIC (Health Management Information Consortium), IBSS (International Bibliography of the Social Sciences), ICTRP (World Health Organization International Clinical Trials, Registry Platform), LILACS (Literatura Latino Americana em Ciências da Saúde), Medline (Medical Literature Analysis and Retrieval System Online), NCCHTA (NIHR Coordinating Centre for Health Technology), NICE (National Institute for Health and Care Excellence), PAIS (Public Affairs Information Service), PEI (Physical Education Index), PsycINFO (Psychological Information Database), SCI (Science Citation Index), SSCI (Social Sciences Citation Index), SciELO (Scientific Electronic Library Online), SIGN (Scottish Intercollegiate Guidance Network), SIGLE (System for Information on Grey Literature in Europe), TRoPHI (Trials Register of Promoting Health Interventions, WoK (Web of Knowledge, including WoS and ISI databases), WoS (Web of Science)

** Study design specified for inclusion in the SR: CT (Controlled Trial, with or without randomisation), CCT (Controlled Clinical Trial), RCT (Randomized controlled trial), nRCT (non-RCT), Q-RCT (Quasi-RCT); Q-nRCT (Quasi-experimental nRCT), NRNCT (Non-Randomised Non-Controlled Trials) C-RCT (Cluster RCT), CBA (Controlled before-and-after study), PCS (Prospective cohort study), RCS (Retrospective cohort study), PCCS (Prospective controlled cohort studies), HCT (Historically controlled trial), NCC (Nested case-control study), CC (Case-control study), XS (Cross-sectional study), CR/CS (Case report/Case series), ITS (Interrupted Time Series), NE (Natural experiments), QE (Quasi-experimental study), PPT (Pre- and Post-test repeated measures design), QE-PPT (Quasi-experimental Pre- and Post-test evaluation), PA (Physical activity)

*** % BF (Percentage Body Fat), BMI (Body Mass Index), FFST (fat-free soft tissue), FMI (Fat Mass Index) RR (Relative Risk), SFT (Skin Fold Testing), TSF (Triceps Skin Fold), WC (Waist Circumference), WHR (Waist-to-Hip Ratio)

Appendix S4 – Characteristics of SRs (Part 2)

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
Avery et al. 2015 [72]	Inclusion criteria: (i) trial involves ≥100 healthy children; (ii) focus on reducing consumption of sugary drinks; (iii) control data available; (iv) change in consumption of SSBs and weight outcomes; (v) ≥6 months duration Exclusion criteria: not reported	School-based education programmes focusing on reducing SSB consumption, and which include follow-up modules, are effective. Peer support and changing the school environment could improve effectiveness. There is a lack of relevant reported interventions carried out outside of the school environment.	Practice: Medium intensity (4 - 10 x 1-h sessions over 6 weeks to 12 months) nutrition education programme focussing on beverage choices could be an effective way of reducing consumption of sugary drinks in school-aged children. The use of computer or web-based nutrition education may offer an effective contemporary educational route Research: Rigorous trials including maintenance sessions are key to long-term effectiveness	Small number of studies selected for comparison; heterogeneous studies; exclusion of unpublished data and studies
Baker *et al.* 2011 [73]	Inclusion criteria: (i) ≥6 month follow up from the start of the intervention to measurement of outcomes; (ii) Community wide interventions had to comprise at least two broad strategies aimed at physical activity for the whole population Exclusion criteria: Studies which randomised individuals from the same community were excluded	There was a noticeable inconsistency of findings, confounded by serious methodological issues within the included studies. The most intense interventions failed to demonstrate consistent improvements. Further, effectiveness was not demonstrated in the long term studies, which some shorter included studies had recommended. The body of evidence in this review does not support the hypothesis that multi-component community wide interventions effectively increase population levels of physical activity.	Practice: No evidence that adherence to a particular theoretical framework or model is advantageous. There are significant challenges to implementing multi-strategic community wide interventions. Research: review demonstrates a need for: (i) further exploration of combined community interventions using rigorously designed studies; (ii) more sensitive, reliable and valid tools to measure PA at multiple points; (iii) consideration of gender differences in effectiveness and during study design; (iv) a focus on outcomes by population characteristics; (v) publication of process evaluations with information on potential facilitators and barriers; (vi) economic evaluations	Potential publication bias: the inclusion criteria required studies to have at least two intervention strategies and this excluded a number of large scale mass media interventions. Studies showing a single strategy approach without evidence of multiple strategies were excluded
Barr-Anderson *et al.* 2014 [74]	Inclusion criteria: (i) > 12 weeks duration; (ii) study sample ≥80% African American or results specific to African American youth available); (iii) intervention conducted outside school time; (iv) intervention included pre- and post-measurements; (v) conducted in the United States Exclusion criteria: not reported	The inconsistency in MQ scores, imbalance of full trials vs. pilot studies and variability of study designs among the interventions made it challenging to draw overarching conclusions about effective strategies in minority youth. Findings were inconsistent due to a lack of scientific rigor, dearth of full trials powered to detect differences compared to the excess of pilot studies, and heterogeneity of study designs. There was no consistent pattern of cultural adaptation or community engagement for eligible programmes. However, regardless of the study design, after-school studies tended to positively impact physical activity,	Practice: After-school and summer programmes, alone or in combination, may favourably influence diet and physical activity behaviour in African American youth Research: More high-quality, full-length trials with consistent methodologies are needed	None reported

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
		fruit/vegetable consumption and caloric intake and body composition		
Beaucham p *et al.* 2014 [75]	Inclusion criteria: (i) studies aimed at whole population ; (ii) interventions aimed at primary prevention of weight gain or with a primary goal of preventing further weight gain in overweight/obese children Exclusion criteria: Interventions that (i) are clinical in nature; (ii) specifically target weight loss in overweight/ obese populations; (iii) are directed at particular ethnic, socioeconomic or otherwise minority groups (unless the study results were stratified by a measure of SEP)	Information-based interventions targeting individual-level behaviour change may be less successful in lower SEP populations. Studies that were shown to be effective in lower SEP participants primarily included community-based strategies or policies aimed at structural changes to the environment. Such Interventions must be given priority in order to reduce population levels of obesity without increasing socioeconomic inequalities in population weight, although it is difficult to draw firm conclusions due to the generally weaker quality of interventions that were not effective in lower SEP groups.	Practice: Effective interventions in lower SEP groups tend to be those of longer duration that incorporate some environmental, structural, community or social support for behaviour change (e.g. improved community access to physical activity or mandatory school nutrition policies); Information-based interventions risk increasing existing health inequalities. Research: Further research is required to identify and evaluate appropriate support strategies for obesity prevention; strategies based solely on information provision should be evaluated for their socioeconomic impact and supported by additional strategies targeted towards preventing weight gain among lower SEP groups, in addition to being embedded within broader strategic initiatives	Publication bias: only English-language papers included; It was unclear whether interventions were sufficiently powered to stratify by SEP; Studies reporting unadjusted BMI percentiles do not take into account normal BMI variation with age and must be interpreted with caution
Bleich *et al.* 2013 [76]	Inclusion criteria: (i) community-based studies; (ii) at least 1 year of follow up after baseline; (iii) control group present; (iv) reported differences in anthropometric outcomes Exclusion criteria: Studies that (i) targeted only overweight or obese subjects or those with a chronic medical condition; (ii) observational studies; (iii) studies expressly targeted at weight loss; (iv) qualitative studies	Moderate evidence that community-based interventions that include a school component and use interventions focused on both diet and physical activity effectively prevent obesity or overweight in children, regardless of study design	Practice: Combination interventions implemented in multiple settings may be more effective at preventing weight gain in children than single-component interventions located in the community only. Research: More research and more consistent methods are needed to understand the comparative effectiveness of these intervention programs	Sub-optimal design of included studies; restriction to interventions located primarily in the community setting excluded several studies that included the community as a secondary component; Possible publication bias as successful programs may not have been included in the analysis because of a lack of published data; English language articles only
Brandt *et al.* 2010 [77]	Inclusion criteria: interventions that (i) had anthopometric and behavioural primary outcomes; (ii) > 6 months duration; (iii) took place in the school and/or involved the environment; (iv) aimed at children	Combined interventions including nutrition, physical activity, and television viewing modification lasting at least one year are effective. Installation of water fountains in schools, implementation of the topics “sugar-containing drinks” and “television viewing” in	Practice: None stated Research: More research needed to: determine ideal starting age and duration of interventions; to determine whether use of BMI to determine the effectiveness of an intervention is appropriate; to investigate the role of	Language restrictions not reported, search was only performed in PubMed

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
	of any weight Interventions designed to address both normal weight and overweight children Exclusion criteria: Not reported	the curriculum, modification of existing physical education and more physical activity during the school day are effective prevention strategies	parents and the family play; to evaluate cost and potential savings; need to include variables such as cultural background and socio-economic status of children/families in analysis; develop guidelines for the content and implementation of school-based interventions	
Branscum and Sharma 2011 [78]	Inclusion criteria: (i) any form of intervention strategy for the treatment or prevention of childhood obesity (ii) the primary audience for intervention was Hispanic, Latino or Mexican American Exclusion criteria: Reviews were excluded	Interventions were more likely to be successful when participants were at higher risk for obesity, a parental component was included, the intervention contained theoretical underpinnings, the intervention was delivered by a dedicated staff, the intervention served older children and the intervention was of longer duration	Practice: interventions should target both physical activity (participation in 60 min of MVPA on most days of the week) and dietary behaviours (e.g. increasing fruit and vegetable consumption, decreasing fat intake, decreasing the consumption of SSB, adequate consumption of water and/or non-caloric beverages and restricting portion sizes of meals and snacks) Research: Study evaluation should be a priority. Theories should also be better operationalized and evaluated for future studies; important constructs that would be important to target include self-efficacy, proxy-efficacy, and self-control. Culturally appropriate and sensitive materials and approaches should be developed and utilized	Risk of publication bias: Few databases searched (no grey literature searched); search restricted to English only; no appraisal of risk of bias
Brown and Summerbell 2009 [79]	Inclusion criteria: Studies were (i) lifestyle interventions; (ii) set in schools; (iii) > 12 weeks duration. Study designs that compared lifestyle interventions with usual care or with other active interventions were included. Exclusion criteria: Studies on children with critical illnesses or eating disorders	Studies were grouped by type of intervention: dietary interventions alone, physical activity interventions alone, combination of diet and physical activity. Of 38 studies, one out of three diet studies, five out of 15 physical activity studies and nine out of 20 combined diet and physical activity studies found significant and positive differences between intervention and control for BMI. Evidence is insufficient to assess the effectiveness of dietary interventions or diet vs. physical activity interventions to prevent obesity in school children, but overall results suggest that combined diet and physical activity school-based interventions may prevent children from becoming overweight in the long term	Practice: The success of interventions varies by gender, age or weight status of children Research: Existing studies need to be better evaluated. Studies need to be adequately powered and of sufficient length and intensity to produce a change in weight or BMI. Better reporting is needed to enable meta-analysis. There is a need for research that views behaviour change within the context of an obesogenic environment.	Poor analysis plan and synthesis of findings. Results summarized methods of studies but did not synthesis or draw together general findings or summary conclusions. Did not include critical appraisal.
Brown *et al.* 2015 [80]	Inclusion criteria: any type of lifestyle intervention, of any length of follow-up, that reported any	Meta-analysis of a limited number of controlled trials found an unclear picture of the effects of interventions on BMI for South Asian children.	Practice: None stated	Possible publication bias: studies which undertook subgroup analysis by

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
	anthropometric measure for children or adults of South Asian ethnicity, regardless of health status Exclusion criteria: interventions focused on food supplementation, fortification, or complementary feeding; the prevention or treatment of undernutrition; eating disorders; surgery or drug treatment	The quality of evidence varied considerably. One high quality study in South Asian children found that a culturally sensitive, school-based physical activity intervention that was delivered within the normal school day was effective.	Research: More research on obesity interventions targeting South Asian populations, particularly those targeting pre-school children and their families, is needed. These studies should report: (i) culturally adaptations; (ii) types of underpinning behaviour change techniques and theories; (iii) anthropometric outcomes by measures of SES; (iv) implementation and running costs; (v) differential effects of lifestyle interventions for South Asians compared with other ethnicities	South Asian ethnicity but did not report this in the abstract might have been missed
Budd and Volpe 2006 [81]	Inclusion criteria: (i) studies including BMI for age and gender as an outcome, (ii) studies conducted in US schools during the school day, (iii) publication in a peer-reviewed journal Exclusion criteria: studies with non-significant findings or which cannot be implemented in the typical school setting	Several successful interventions targeted older children who were better-suited participants for the behaviour change curriculum. Older adolescents are more likely to possess the needed competencies for health-related instruction and behaviour change. In addition, the use of a multicomponent, comprehensive, and detailed nutrition and physical activity curricula for the students in higher grades greatly contributed to the success of programs	Practice: Schools must consider classroom and policy strategies to prevent the problem of childhood obesity, tailored to the age of students. Strategies might include: (i) using behaviour modification techniques with younger students to reduce sedentary behaviour, increase physical activity, and encourage proper nutrition; (ii) instituting a schedule of physical education classes with longer and more vigorous exercise; (iii) working with the broader health community to maximise efficiency Research: Few research studies have examined BMI as an end point of school-based obesity prevention interventions and many are more than 5 years old. There was significant study heterogeneity in type of intervention, duration of follow up and study population, making concrete conclusions difficult	Results summarized methods of studies but did not synthesise general findings or summary conclusions. Did not include critical appraisal
Calancie *et al.* 2015 [82]	Inclusion criteria: Studies that reported findings from empirical formative, process, or outcome research related to policy or environmental obesity-prevention strategies in rural communities in the United States or Canada. Articles that included both rural and urban communities were included only if they reported rural-specific findings Exclusion criteria: Not reported	The CDC Recommended Community Strategies and Measurements to Prevent Obesity in the United States (COCOMO) strategies most commonly implemented in rural areas focused on increasing the availability of healthy foods and beverages in small retail food outlets and increasing access to farmers markets and limiting the availability of unhealthy ones. Fewer studies examined approaches to limiting advertising of less healthy foods and beverages or modifying portion sizes. None of the studies reviewed sought to improve the geographic availability of supermarkets.	Practice: None stated Research: Need for research that (i) compares the effectiveness of interventions in urban and suburban settings versus rural settings; (ii) assessed policy and environmental, social, psychosocial, behavioural, and biological outcomes associated with nutrition-related policy and environmental strategies; (iii) is applied to a variety of intervention settings (e.g. parks, recreational sites and hospitals) to identify the mix of settings that will yield the greatest population-level reach and effects; (iv) explores the possibility of aligning federal food and nutrition assistance programs with efforts to increase access to local foods; (v) reports on the costs	None reported

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
			and economic impact; (vi) explores the role of local champions related to increasing access to local foods	
Campbell *et al*. 2002 [83]	Inclusion criteria: (i) > 3 months duration; (ii) reported report one or more of the following primary outcomes: % BF, BMI, ponderal index, SFT; (iv) reported outcome data at baseline and at post-intervention, or at baseline and change from baseline Exclusion criteria: (i) drug or surgical interventions ; (ii) Pregnant women; (iii) people with eating disorders and the critically ill	Ten studies were included; seven were long-term (> 1 year), three were shorter term (at least 3 months). Eight were school/nursery-based interventions, one was a community-based intervention targeting low-income African-American families, and one was a family-based intervention that targeted non-obese children of obese parents. There is limited high quality data on the effectiveness of obesity prevention programs and no generalizable conclusions can be drawn. However, concentration on strategies that encourage reduction in sedentary behaviours and increase in physical activity may be fruitful	Practice: None stated Research: the need for well-designed studies which examine a range of interventions remains a priority. Future studies should pay attention to: (i) Sufficient power-adequate numbers; (ii) Adequate follow-up ; (iii) Reliability of outcome measurements (reporting of BMI); (iv) Process indicators; (v) Cost effectiveness; (vi) Appropriate and adequate statistical analysis; (vii) Sustainability and generalisability	Not reported by authors. No appraisal of risk of bias
Chen and Wilkosz 2014 [84]	Inclusion criteria: (i) primary outcome including BMI or BMI z-score and health behaviours; (ii) trials that tested lifestyle/weight management interventions; (iii) using at least one eHealth/mHealth component including web (Internet)-based, social media, and mobile communication technology Exclusion criteria: (i) primary prevention interventions; (ii) majority of participants were over 18 years of age; (iii) non-English language articles	All effective interventions utilized dietary and physical activity strategies as part of intervention components. Because of the variation in duration of intervention (range 10 weeks to 2 years), it is not clear what length of intervention is most effective	Practice: None stated Research: Future research should include rigorous evaluation of cost-effectiveness as well as the mediating and moderating factors associated with effective technology based interventions. More long-term follow-up and assessment of weight-related health outcomes, such as physical activity, sedentary activity, dietary behaviours, self-efficacy, and quality of life, should be included in future research	Not reported

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
Chriqui 2013 [85]	Inclusion criteria: To be included, the study must have empirically examined a formal, public policy adopted at the state, local, and/or school district level in the United States Exclusion criteria: Simulation models, extrapolation studies, survey studies that contain data on policies reported by respondents, or summaries of the literature that failed to document the formal public policy(ies) studied	Most studies were cross-sectional and focused on policies affecting school environments, primarily reporting on policy implementation rather than impacts on physical activity behaviours, food intake, and/or obesity-related outcomes. Existing state and school district policies can influence school PE and PA environments, but they alone are not sufficient to change the rates of child and adolescent PA to meet the national recommendations of 60 minutes of daily PA	Practice: Schools are only one piece of the obesogenic environment. Thus, it is important for policy makers to start to look beyond schools by focusing on broader population-based strategies that aim to improve all aspects of society, particularly given that school-level changes alone are insufficient for addressing the obesity problem. Research: More research is needed to: (i) examine the influence of state and local natural policy experiments affecting non-school environments; (ii) study impacts beyond policy implementation, without which it will be difficult to convince policy makers to adopt such policies. Policy impacts are critical to facilitate the diffusion and adoption of such policies nationwide	Not reported
Chriqui *et al.* 2014 [86]	Inclusion criteria: Studies that (i) were based in the United States based; (ii) focused on the food and beverage environment in schools; (ii) examine the effects of a formally adopted policy at state and/or district levels; (iv) focus on the relationship between the policy and BMI and weight outcomes or student consumption, purchasing, and dietary intake or in-school availability/access to competitive foods Exclusion criteria: (i) non peer-reviewed; (ii) describe self-reported policies or information obtained from surveys; (iii) report categories that are not related to Competitive Food & Beverages; (iv) qualitative, pilot or non-scientific studies; (v) do not report on outcomes of interest	The studies reported mixed results, and many lacked rigorous study designs. Furthermore, many had very limited (if any) time lags between their policy date and the outcomes examined, which could have contributed to the mixed results. However, in 15 of the 24 studies reviewed, state laws and/or district policies have influenced outcomes in the expected direction. Most of the studies reporting results in the expected direction focused on in-school availability and/or in-school consumption, but studies examining BMI and weight outcomes and overall consumption were mixed	Practice: Societal changes may be required to facilitate sustained changes to overall consumption and student BMI/weight outcomes, but schools play a critical role in shaping children's food and beverage environments and should be a national focal point for obesity prevention. Changes made in schools should be reinforced in environments outside the school setting Research: more research is needed to understand the influence of CF&B policies on overall (in- and out-of-school) student consumption behaviours and student BMI and weight outcomes. In particular: (i) more robust, longitudinal study designs; (ii) examining the impact of CF&B policies on changes in NSLP/SBP participation rates and food service revenues; (iii) examine whether implementation of the impending federal rule will vary based on the strength of existing state and/or district policies; (iv) resources are clearly needed for more longitudinal outcome data nationwide	No quality assessment of included studies was carried out; threats to internal and external validity due to the inherent nature of the included studies were acknowledged

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Cole et al. 2006 [87]	Inclusion criteria: (i) school-based; (ii) manipulation of at least one of the variables of healthy lifestyle education, dietary habits, and/or physical activity; (iii) statistically significant decrease in BMI or weight Exclusion criteria: Studies not meeting inclusion criteria	The majority of school-based interventions used multiple treatment modalities. Providing education in a nonthreatening, familiar setting with a supportive network of friends and family is an effective educational strategy for targeting childhood overweight. In addition, the provision of incentives to promote positive behavioural changes may be effective in younger children. Teachers were commonly responsible for the teaching of the healthy lifestyle curriculum and are important role models in the school setting for children	Practice: Social Cognitive Theory is a sound theoretical perspective for designing and implementing successful interventions with children. Modeling is a primary techniques that should be encouraged when designing interventions for children in the school setting. Demonstration of and the opportunity to rehearse behaviours that improve overweight in children by teachers, peers, and students themselves should be highlighted. The use of contracts with goals and rewards can regulate and reinforce new behaviours and improve self-efficacy Research: Not reported	Only trials with statistically significant decrease in BMI were reported; No attempt made to evaluate the quality of the studies, including sample size and power. No conclusion about the actual effectiveness of the interventions can be drawn.
Cook-Cottone *et al.* 2009 [88]	Inclusion criteria: Studies that (i) are published in English; (ii) school based (during or after school hours); (iii) obesity-prevention programs; (iv)have an objective anthropometric outcome measure;(v) targeting children of normal weight along with children who may have been at risk for overweight or who were overweight at the time of the program's implementation Exclusion criteria: Treatment interventions; trials measuring only PA or dietary outcomes; clinical populations; eating disorder prevention programs; Head Start and community programs	Of studies reviewed, only 38% yielded significant weight gain prevention effects. Overall the findings indicated small effects on BMI for school-based obesity prevention programmes ($r = 0.05$ [0.04, 0.06], $P = 0.000$) with significant variance among outcomes (Q [65] = 626.40, $P < 0.001$). The most significant moderators included interventions delivered predominately among Asian students; by combination of school teachers and interventionists; with high parental involvement; which encouraged healthy eating and which were aimed at reducing sedentary behaviours.	Practice: Weight prevention programmes must be carefully planned and suited to each school's population, risk and needs. Goals must include more than BMI reduction or weight loss Research: Research that assesses the efficacy of integrating a holistic approach with integral prevention of binge eating and eating disorders is required. Further analysis is required to explore possible interaction between moderator variables. For example, more research is needed to explore the relationships between program length and outcomes, given that this meta-analysis found programs with longer durations to be associated with efficacy, whereas others have found brevity to be associated with efficacy	Poor description of study selection. Did not provide flow chart of selection process. Did not perform a critical appraisal of the quality of included studies
De Bourdeaudhuij *et al.* 2010 [89]	Inclusion criteria: studies had to report at least the effects on behaviour or on measures of obesity. Studies were considered regardless of their design Exclusion criteria: (i) non-European studies; (ii) published before 1990; (iii) conducted mainly	European studies constitute only a small proportion (around 10%) of the literature. Interventions that include only an educational component without any environmental strategy seem to be ineffective. There was moderate evidence that multi-component interventions focussing on healthy diets and PA habits that combining an educational and an environmental component had a positive impact upon obesity	Practice: There is a need to implement sustainable interventions under real life conditions, without a continued need for external help or support from a research team. A combination of approaches combining educational and environmental strategies focussing on both nutrition and PA habits seems to be most effective. Policy initiatives to ensure that schools are able to implement these strategies locally are warranted	The authors' conclusions appear somewhat strong given the evidence and so should be interpreted with some caution.

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	outside the school setting (e.g. community, family); (iv) treatment interventions; (v) studies that did not report the effect on behaviour and/or on measures of obesity	measures in adolescent girls. Combining computer interventions providing tailored feedback with an environmental component for PA (including opportunities to be physically active during breaks, at noon or after school; organization of noncompetitive activities; extra sports and PE classes) and for nutrition (including changes in school canteens; reduced price/increased availability of water and fruit and increased price/reduced availability of soft drinks and sweet desserts) are promising strategies in preventing overweight in adolescent girls in Europe. The evidence for effectiveness in younger children (6–12 years old) is inconclusive	Research: Future research should combine educational and environmental components and focus on both sides of the energy balance equation. Studies should preferably use effectiveness trials, with strong study designs, objective methods to measure behaviour, BMI and other outcomes, longer follow-up periods and specific attention to selection and allocation biases. Further research is also needed to investigate whether computer-tailored education is really superior to generic classroom-based education	
de Sa and Lock 2008 [90]	Inclusion criteria: (i) controlled studies; (ii) schoolbased intervention to encourage fruit and/or vegetable; (iii) > 3 months follow up; (iv) record one change in intake of fruit and/or vegetables or a change in knowledge, attitude or preference to fruit and/or vegetables Exclusion criteria: Not reported	School schemes are effective at increasing both intake and knowledge, and results can be maintained long term, but multiple changes in social, economic and physical aspects of children's environments are also likely to be required to sustain increased FV intake. The EU agriculture policy for school fruits and vegetables schemes should be an effective approach with both public health and agricultural benefits	Practice: Implementation of effective school-based interventions to promote fruit/vegetable consumption requires careful consideration of context-specific factors such as differences in education systems, school meal programmes, producer organisations, supply chains and food cultures Research: None stated	Lack of details on data extraction and validity assessment make it difficult to rule out reviewer error and/or bias or to assess the reliability of the primary studies. Pooling of different study designs without explicitly consideration of quality means that the results may not be reliable
Dobbins *et al.* 2013 [91]	Inclusion criteria: (i) health promotion study; (ii) not conducted by physicians but implemented, facilitated, or promoted by staff in local public health units; (iii) school setting; (iv) aimed at increasing PA; (v) included all school-attending children; (vi) > 12 weeks duration Exclusion criteria: studies not focused on changing PA and fitness levels or were not implemented primarily in the school setting	There is evidence that school-based PA interventions have a positive impact on duration of PA, television viewing, VO2 max, and physical activity rates (MVPA during school hours; odds ratio (OR) 2.74, 95% confidence interval (CI), 2.01 to 3.75). There was no positive impact on blood cholesterol. However, given these studies are at a minimum of moderate risk of bias, and the magnitude of effect is generally small, these results should be interpreted cautiously.	Practice: (i) PA interventions should continue; (ii) school-based PA interventions should focus on fostering positive attitudes toward PA and be geared toward the developmental level of students; (iii) staff should encourage students to be more physically active during the course of the school day, including PA during school-based interventions; (iv) Parental involvement could be an integral part of such interventions; (v) collaboration with public health staff to increase resources for the promotion of PA within the school system would be beneficial	It is possible that bias was introduced during the review process despite the implementation of strategies to reduce bias. Publication bias due to focus on English-language articles (e.g. articles published in Chinese that were not indexed in English language databases were not eligible for inclusion).

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	among healthy children aged 6 to 18 years, or were implemented by physicians, or fitness experts.		Research: Future research should: (i) assess the impact on PA rates, duration and intensity; (ii) assess the validity and appropriateness of outcomes, including: student satisfaction, health-related quality of life, self-esteem, self-efficacy for PA, reduction in alcohol/drug consumption, involvement in extracurricular activities, and cost-effectiveness; (iii) assess known barriers and facilitators of PA, particularly among children of various socioeconomic status and ethnicity and urban/rural location; (iv) conduct subgroup analysis (e.g. differences in PA by gender, age and ethnicity); (v) collect long-term follow-up impact data; (vi) national funding agencies need to prioritise research related to PA promotion, funding projects that span multiple years	Given a meta-analysis was not conducted, it is possible that the review team may have overestimated treatment effects when interpreting the results across studies
Flodmark *et al.* 2006 [92]	Inclusion criteria: studies that (i) address prevention of overweight or obesity; (ii) > 12 months follow-up; (iii) include a control group; (iv) relevant outcome measures, primarily the percentage of overweight or obese subjects, BMI or SFT; (v) address a normal population Exclusion criteria: Treatment interventions	Many studies do not demonstrate positive effects, suggesting that it is difficult to create an effective program based only on limited interventions in schools. No differences in the occurrence of positive effects were reported for low quality studies in comparison with high and medium quality studies. Positive effects were found in 41% of cases. Overall, the results suggest that it is possible to avoid overweight and obesity in children and adolescents by using preventive interventions	Practice: None stated Research: None stated	Unclear how papers were selected for review, how data were extracted, how study validity assessment was carried out and how the quality of studies was assessed. Study data were tabulated and outcomes summarised in terms of the overall positive or negative effect, rather than reporting individual numerical data, without outlining the differences between the studies. Conclusions contradict the findings that few interventions showed positive effects
Gao and Chen 2014 [93]	Inclusion criteria: (i) peer reviewed, data-based research articles; (ii) published in English; (iii) studied some type of exergames (e.g. DDR, Eyetoy, Wii, etc.) in relation to obesity-related outcomes; (iv)	The effects of field-based exergames on children's habitual PA and obesity-related outcomes remain unclear due to design problems, measurement issues and other methodology concerns	Practice: None stated Research: Future studies should: (i) investigate the effects of different exergame types (whole body vs. lower/upper body) and systems (e.g. Wii, Xbox, PS3) on children's health outcomes; (ii) quantify the role of exergame accumulated PA vs daily PA, and determine	Not reported

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	studied children and/or adolescents in field-based settings Exclusion criteria: Not reported		whether children use exergaming replace their screen times as opposed to traditional sports or PA; (iii) investigate the extent to which exergaming can promote children's learning and maintenance of new movement skills and cognitive skills; (iv) examine the long-term efficacy of exergame use in non-structured home settings, and the potential benefits of family/group play and potential barriers; (v) consider moderating variables, such as gender, age and socioeconomic status, when evaluating efficacy of exergames; (vi) enhance process evaluation of exergaming programmes; (vii) be conducted on younger children; (viii) seek to ascertain the effectiveness of using multiplayer mode in comparison to single player mode; (ix) establish a standard metric that allows statistical techniques for data analyses; (x) Meta-analysis is warranted	
Haynos and O'Donohue 2012 [94]	Inclusion criteria: Studies that (i) used randomization procedures and controls; (ii) obesity prevention programs.; (iii) reported outcomes on at least one weight- or adiposity-related variable, such as BMI or % BF Exclusion criteria: Interventions that specifically targeted particular high-risk groups based on variables such as sex, ethnicity, weight status, etc.	Of those programs identified to produce outcomes on weight and adiposity, results are generally modest and not uniform across prevention studies, possibly due to problems with intervention or research design	Practice: None stated Research: Need for (i) well-powered studies with greater effect sizes, and thus more clinically significant outcomes; (ii) replication of prevention programs found to positively affect obesity outcomes by independent research groups; (iii) improving the quality and effectiveness of the already modestly effective prevention programs available; (iv) developing better-designed, theory-based studies that are generalizable to the general population and which publish economic costs	Not reported
Holub *et al.* 2014 [95]	Inclusion criteria: interventions that (i) focused on obesity-related topics (eg, not general health promotion); (ii) sample included at least 50% Latino/Latin American participants or had results stratified by race/ethnicity; (iii) evaluated and included obesity-related outcome measures; (iv) controlled study; (v) was conducted in a community setting; (vi) and (vii) was published	Mixed results observed: while many studies received the highest marks in study design suitability, few had significant results related to obesity outcomes and effect sizes ranged considerably. Studies that were able to demonstrate a statistically significant reduction in weight or BMI z-scores also included strategies to improve behavioural skills (e.g. goal setting, self-monitoring) or an intensive, daily program. The strategies implemented in these studies provide promising directions for	Practice: The evidence around targeted interventions for overweight/obese children is more limited and strategies require greater intensity and tailoring compared with prevention interventions Research: Need for suitable study designs with control groups, and to apply methods and protocols that would reduce the potential for error (e.g. lack of measurement to gauge exposure, not correcting for potential biases or confounders, maintaining less than 80% of the sample at follow-up, and various selection biases)	Narrow focus on obesity-related measures as the outcome of interest, excluding interventions that target nutrition and physical activity as the primary outcome may also impact obesity; inability to compare effect sizes due to the variety in

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	in a format with viable information for abstraction and quality evaluation Exclusion criteria: interventions that (i) utilize prescribed medications or involve a non-representative sample; (ii) lab studies; (iii) focused on one-on-one health education, counselling, or advice in a health care setting	future research aimed at obesity prevention and treatment among Latino students in the United States		study designs and methodologies
Ickes *et al.* 2014 [96]	Inclusion criteria: (i) primary research; (ii) overweight or obesity prevention interventions; (iii) school-based; (iv) child-based interventions, which could include parents; and (v) reported outcome data Exclusion criteria: (i) preschool, early childcare, or after-school programs; (ii) not available in the English language; (iii) treatment interventions; (iv) articles reporting study design and/or process evaluation only; (v) non-primary research; (vi) intervention not conducted during regular school hours	Each of the global school-based interventions included in this review resulted in at least one positive, measurable outcome. Elementary schools appear to be an ideal setting for childhood obesity prevention interventions given the vast array of opportunities for promoting physical activity and nutrition education through practice, policy, and supportive environments. Targeting specific grades and classrooms within elementary schools may be easier when compared to targeting middle schools and high schools due to scheduling, built in opportunities for physical activity, and flexibility in the curriculum	Practice: A critical component of successful school-based obesity prevention interventions is tailoring the program to the targeted audience Research: Future research should (i) include theoretical frameworks; (ii) be tailored to target audience; (iii) Integrate a combination of nutrition and PA strategies; (iv) include parents; (v) consider environmental strategies; (vi) involve training of teachers; (vii) last longer than one year; (viii) incorporate multiple outcomes, including knowledge, attitudes, behaviours, related theoretical constructs, and anthropometric data; (ix) Implement follow-up measures to determine long-term efficacy	Possible publication bias: only peer-reviewed studies in English included; excluded studies that were conducted outside of regular school hours and studies published prior to 2002
Jaime and Lock 2009 [97]	Inclusion criteria: (i) food or nutrition policies (nutrition guidelines, regulation of food and beverage availability, price intervention) Exclusion criteria: (i) Not school-based nutrition policy; (ii) focus on education or behavioural interventions without changes in school food environment; (iii)	Nutrition guidelines and price interventions were effective in improving school food environments and dietary intake. Only one included study evaluated the impact of school food policies on BMI	Practice: None stated Research: Need for research to evaluate the effect of school nutrition policies on childhood obesity, with particular focus on which were most effective and cost-effective, and for emphasis on which school policies could tackle the influence of the food industry in school environments.	Possible publication bias: It was unclear whether the authors used language restrictions. Study abstracts were screened by only one reviewer and no details were provided on how data was extracted, with the possibility of reviewer error and bias in the review process. No

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	targeting students having a specific medical problem			assessment of study quality was carried out
Kaiser *et al.* 2013 [98]	Inclusion criteria: (i) human trials, (ii) 3 weeks duration;, (iii) random assignment to conditions differing only in consumption of SSBs; (iv) including a BWI outcome Exclusion criteria: Not reported	The currently available randomized evidence for the effects of reducing SSB intake on obesity is equivocal. Even if statistical significance is ignored, the point estimates of effects on BMI reduction are small, accounting for only 1.5% of the variance observed in those who were overweight at baseline. However, the lower limit of the confidence interval around the estimated effect of SSB reduction is very close to statistical significance	Practice: None stated Research: Additional, larger or otherwise stronger studies are needed to provide clear and convincing evidence that lowering SSB consumption will reduce obesity and obesity-related disease prevalence	Not reported
Kamath *et al.* 2008 [99]	Inclusion criteria: interventions that (i) are aimed at changing lifestyle behaviours to prevent obesity; (ii) simple or multimodal; (iii) delivered by a healthcare professional, community member or health authority in a home, school, clinic or community setting; (iv) reporting on self-reported or objective outcomes of interest Exclusion criteria: (i) participants with eating disorders; (ii) only obese participants; (iii) mostly adult participants; (iv) study targeted the consequences of obesity (e.g. cardiovascular risk factors)	Interventions caused small changes on their respective target behaviours and no significant effect on BMI compared with control. Further exploration found: (i) a lack of sex-treatment interaction; (ii) trials in children found larger reductions in sedentary activity than trials in adolescents; (iii) trials of long treatments > 6 months found larger reductions in sedentary activity and BMI than shorter trials, which were more effective in reducing unhealthy dietary behaviours; and (iv) trials measuring outcomes during treatment found larger reductions in sedentary activity and smaller reductions in BMI than trials that measured these outcomes after treatment. Behavioural interventions to prevent paediatric obesity had small beneficial effects on target behaviours and no significant effect on BMI	Practice: None stated Research: Need for studies of promising long term interventions for prevention of childhood obesity, with detailed definition and measurement of target behaviours, extended follow up and improved reporting of details of interventions. They suggested that systematic reviews in this area should be structured to permit comparison of intervention types across studies	Review was restricted to published studies and may be subject to publication bias; unclear whether there were language restrictions
Kanekar and Sharma 2008 [100]	Inclusion criteria: (i) English language peer-reviewed publication; (ii) USA or UK study; (iii) focus on general population; (iv). having an explicit school-based curriculum for prevention of	This review concluded that school-based childhood obesity interventions did not seem to modify BMI	Practice: None stated Research: The authors stated that it would be desirable to repeat the meta-analysis using different outcome measures, such as physical activity, fruit and vegetable intake, soft drink intake and sedentary behaviour	Possible publication and language bias. Quality assessment was limited and did not fully assess risk of bias. Methods used for study selection and

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	obesity; (v) report change in BMI as an outcome Exclusion criteria: Studies not meeting inclusion criteria			quality assessment were not reported; risk of reviewer errors as data extraction was performed by only one reviewer; Use of meta-analysis was probably inappropriate and the results may not be meaningful.
Katz *et al.* 2008 [101]	Inclusion criteria: (i) controlled studies; (ii) school setting; (iii) > 6 months follow up; (iv) reported on common weight-related outcomes (e.g. BMI) Exclusion criteria: (i) data presented in graphs or which were categorical; (ii) unknown sample size; (iii) poor methodological quality; (iv) lack of standard deviation	Meta-analysis indicated a significant weight reduction among intervention participants. Combination nutrition and PA interventions with a parent or family component were effective at achieving weight reduction in school settings. No single intervention, in school or elsewhere, is likely to be sufficient to reverse the childhood obesity trend	Practice: None stated Research: Interventions that modify school policies and the physical environment in ways that support improved dietary practices and regular physical activity but do not provide behavioural programs, and evaluation of these (preferably with anthropometric outcomes), are needed.	Quality criteria were not described in the review; poor reporting of validity criteria, and results of the validity assessment were not shown; Possible publication bias as only English language publications were sought. Statistical heterogeneity was present in most of the analyses, so pooling of results may not have been appropriate.
Kesten *et al*. 2011 [102]	Inclusion criteria: (i) > 3 months duration; (ii) Community, Family, School (or/and combination) setting; (iii) primary prevention Intervention modifying: PA behaviours, eating behaviours, attitudes and knowledge, BMI or other indices of fat mass; (iv) present results separately for girls Exclusion criteria: (i) treatment interventions; (ii) results presented for boys exclusively; (iii) participants exclusively <7 years of age or >12 years of age; (iv) systematic reviews, meta-analysis, editorials, cross-sectional studies	The majority of the interventions failed to produce medium to large effect sizes over the long term in a broad range of behavioural and physical measures. There was potential for interventions aimed at pre-adolescent girls to reduce the risk factors associated with childhood overweight and obesity. The sustainability of intervention effects was unclear	Practice: Although a simple recommendation for best practice is difficult, potentially successful interventions might have included reducing sedentary behaviours and modifying school food provision, with longer term follow up. Interventions should take account of cultural, age and gender characteristics across a broad range of social settings. Research: funding the follow-up of interventions is crucial in order to produce sustainable, effective interventions	Included studies show inconsistencies with the inclusion criteria in terms of participant age and outcomes; potential language and publication biases could not be excluded

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Knowlden and Sharma 2013 [103]	Inclusion criteria: interventions that (i) were aimed at preventing obesity or overweight; (ii) were conducted in the United States, (iii) targeted African American or Hispanic children, (iv) school settings, (v) incorporated at least one anthropometric outcome variable Exclusion criteria: interventions that (i) did not employ an experimental or quasi-experimental design; (ii) did not target African American or Hispanic children	Efficacy of school-based interventions targeting minorities can be enhanced through explicit operationalization of behavioural theories, incorporation of systematic process evaluation, long- term follow- up of intervention outcomes, and inclusion of the family and home environment.	Practice: Need to (i) culturally adapt interventions; (ii) include the family and home environment (e.g. targeting parents over summer and winter break periods to preserve or improve school- based intervention effects, newsletters, weekend programmes to recruit parents Research: Need to (i) create or adopt psychometrically valid and reliable instruments; (ii) before-after measures; (iii) include and improve implementation process evaluation; (iv) measure long- term intervention effects	Not reported
Kropski *et al.* 2008 [104]	Inclusion criteria: (i) experimental or quasi-experimental design, (ii) report primary or secondary outcomes in terms of BMI, a measure of body fat or obesity/overweight prevalence; (iii) report outcomes at least 6 months post-baseline; (iv) be curricular and/or environmental (as opposed to extracurricular) in design; (v) apply preventive interventions involving both overweight and normal-weight children Exclusion criteria: (i) extracurricular programs specifically targeting overweight children; (ii) lasting <6 months	Studies were grouped by type of intervention: dietary interventions alone, PA interventions alone, combination of diet and PA. Quantity and quality of evidence were deemed to be insufficient for firm conclusions. Twelve of 14 studies reported significant improvement in at least one measure of dietary intake, physical activity and/or sedentary behaviour. Girls may respond better to educational components while boys are more influenced by structural and environmental changes. Programs including younger children were generally not effective in reducing BMI or obesity prevalence. Studies demonstrating significant findings frequently involved subjects more overweight than peers. Cognitive and physiological developments likely influence impact of interventions	Practice: High-quality evaluation protocols are essential Research: Future studies require adequate power (sample sizes) and need to examine issues related to sustaining health behaviour climate and 'upstream factors'. Further research is needed to examine if novel or more aggressive approaches to address health behaviours at home through school-based programs are effective	No description of data extraction or data analysis plan. No description of selection process. Focus on quality of evidence instead of actual findings

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Lambogli a *et al.* 2013 [105]	Inclusion criteria: (i) focus on children and adolescents aging 6–15 years; (ii) cross-sectional and experimental study design; (iii) evaluate energy expenditure during exergaming; (iv) discuss the association between active games and health behaviour; (v) evaluate changes in the level of physical activity, body composition, musculoskeletal system, and cardiovascular system Exclusion criteria: (i) full text unavailable; (ii) exergaming used for rehabilitation or cognitive therapy; (iii) did not quantify outcome variables	Exergaming was found to increase physical activity levels, energy expenditure, maximal oxygen uptake, heart rate; and to reduce waist circumference and sedentary screen time. Thus, exergaming may be considered a highly relevant strategic tool for the adoption of an active and healthy lifestyle and may be useful in the fight against childhood obesity	Practice: None stated Research: None stated	Discussion limited to description of interventions; no recommendations made to enhance the effectiveness of exergaming as a strategy to prevent obesity
Lavelle *et al.* 2012 [106]	Inclusion criteria: (i) children aged <18 years; (ii) any intervention delivered in a school setting and aimed at decreasing BMI or weight; (iii) effect reported as the mean change in BMI, or this could be calculated from the pre- and post-intervention data provided; (iv) inclusion of a control group for which change in BMI was also reported or able to be calculated; (v) Non-randomized intervention studies were not excluded Exclusion criteria: Not reported	There is reasonably consistent evidence that school-based interventions can significantly reduce children's BMI, especially if they include a physical exercise component. The effect size did not vary by length of follow-up, suggesting that the benefits may be maintained over time, but only one study has followed-up participants for more than 4 years. Evidence of significant benefit is currently lacking for interventions that do not include a physical activity component. The absolute reduction in BMI was greater for interventions targeted at overweight and obese children, but studies delivered to all children nonetheless produced a small, significant reduction in overall BMI that is unlikely to be clinically significant at an individual level	Practice: Reduction in BMI was unlikely to be clinically significant at an individual level. Research: Further randomized studies are needed to determine duration of benefit and the ideal type of intervention. Studies should take not only efficacy but also cognisance and cost effectiveness into consideration.	Studies that used other measures were excluded; Possible publication bias (English language articles only); unclear whether appropriate steps to minimise error or bias were taken; unclear whether quality of the included trials was assessed; details on interventions were limited (no mention of dropout rates); Substantial statistical heterogeneity was found in the primary meta-analysis so pooling may not have been appropriate; It was unclear whether or not participants were included more than once in the meta-analyses

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LeBlanc *et al.* 2013 [107]	Inclusion criteria: (i) subjective or objective measure of time spent using active video games and a measure of at least one relevant health or behaviour indicator; (ii) published, peer-reviewed articles in English or French; (iii) mean age of study participants < 18 years Exclusion criteria: (i) evaluated only passive video games; (ii) risk of a confounding intervention (such as diet modification)	Although active video games could increase light-to-moderate physical activity, it was unclear if such games could lead to increase in habitual physical activity or decreases in sedentary behaviour	Practice: None stated Research: There is a need for better quality studies that involve larger sample sizes, use both direct and indirect measures of total active video game use, and involve follow-up measurements at longer time points. The authors advised comparing active video games with traditional physical exercise in addition to comparison with rest or sedentary behaviour.	Restrictions to published articles in English and French may have led to publication bias
Leung et al. 2012 [108]	Inclusion criteria: (i) intervention aimed at decreasing SB, separately or in combination with BMI or other anthropometric changes; (ii) children and adolescents aged 6 to 19 years; (iii) randomized trials, conducted in the community, school, home, or clinic setting; (iv) > 12 weeks duration; (v) strategies such as educational, health promotion, behavioural therapy, counselling, or management strategies at the individual and family levels; Exclusion criteria: (i) not published in English; (ii) controlled laboratory setting	Interventions aimed at reducing SB appear to be effective in decreasing SB and improvements in anthropometric measures of childhood obesity	Practice: Feasibility is an important consideration when implementing interventions in real-world settings Research: need for (i) more comprehensive study designs, which include post-intervention follow-up measures, to better understand the impact and potential sustainability of different strategies on outcomes measures related to SB and anthropometry; (ii) more valid and reliable measures of SB; (iii) Inequalities related to race/ethnicity, SES and gender should be incorporated into the design of future interventions (iv) Collection and provision of cost data	Not reported
Li *et al.* 2008 [109]	Inclusion criteria: interventions that (i) are population-based; (ii) lifestyle behavioural interventions for the prevention or control of overweight and obesity in children and adolescents in China; (iii) reporting on prevalence of overweight and obesity, weight and BMI, SFT, blood glucose and lipid profile, aerobic fitness and blood	All trials indicated at least one significant results for at least one outcome. Eighteen studies showed a significant difference ($p<0.05$) in body adiposity as measured by the prevalence of overweight and obesity, weight, BMI or SFT. The methodological shortcomings inherent in most of the included studies prevent any conclusions being drawn regarding the effectiveness of any of the interventions studied	Practice: None stated Research: There is a clear and urgent need for well-designed trials of interventions for the prevention and treatment of overweight and obesity among children and adolescents in China. Quantitative and qualitative research is required to identify important lifestyle behaviours and environmental risk factors, and to assess the needs and acceptance of health programmes in schools and among children and their parents	Possible publication bias: by including only studies published in English and Chinese some studies may have been missed; it was unclear whether appropriate methods were used when selecting studies for inclusion

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	pressure, and changes in knowledge and behaviour Exclusion criteria: clinical studies; (ii) pharmacotherapy treatment studies			
Liao *et al.* 2014 [110]	Inclusion criteria: (i) all study participants aged < 18 years; (ii) randomized controlled intervention with a no-treatment control; (iii) the intervention must have components to reduce sedentary behaviours Exclusion criteria: intervention used PA promotion as a method to reduce sedentary behaviours (rather than specifically designed to limit time spent in sedentary behaviours); (ii) no reporting of BMI before and after the intervention; (iii) study only reported adjusted BMI at post-intervention	Interventions that target to reduce sedentary behaviours among children are effective in reducing BMI, although the difference in BMI was not clinically significant. However it could be effective in reducing BMI at a population level for non-obese children. Adding a physical activity promotion and diet improvement component to the intervention program did not appear to have an additive effect. A comprehensive sedentary behaviour intervention that targets to reduce multiple sedentary activities may be as effective as multi-component programs in BMI reduction, and could be a promising way to prevent obesity in children.	Practice: Clinical health practitioners could consider focusing on limiting sedentary behaviour to reduce BMI in paediatric patients Research: None stated	The restriction to English-language publications means that relevant trials may have been missed. Unclear study selection was carried out by two researchers independently, so reviewer error and bias cannot be ruled out. Given the small effects, and limitations in the review methods and generalisability, the authors' conclusions seem overstated and may not be reliable
Lissau 2007 [111]	Inclusion criteria: (i) school setting with a main purpose of preventing overweight; (ii) control group present; (iii) at least one of the following outcome parameters: BMI, SFT, WC, %BF Exclusion criteria: Not reported	Of 14 included studies, half were successful and had an effect on either overweight or obesity. Studies differed in age group, type and length of intervention, the type and number of intervention components, and the measures used to evaluate the effect differed. Programmes that were theory based were not more successful than those not based on theory.	Practice: Barriers to school-based obesity programs include: (i) programs are considered a low priority; (ii) lack of support at the school; (iii) school staff are not motivated or are too burdened by workload; (iv) poor or lack of supervision of the school meals Research: More research is needed to understand how school-based obesity interventions may prevent obesity in different groups. Future studies need statistical power, and should use several measures of obesity in order to accurately detect a possible effect	No description of study selection, thus unclear why studies were excluded. No description of data extraction or data analysis plan. Did not critically appraise studies. Only provided aggregate study findings. Insufficient information on individual studies (e.g. no quantitative study results reported).

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Lobelo et al. 2013 [112]	Inclusion criteria: interventions that (i) focused on obesity; (ii) evaluated and included obesity-related objective outcome measures; (iii) controlled studies; (iv) reported in a format with viable information for abstraction and quality evaluation Exclusion criteria: interventions that (i) focused on general health promotion	This review found sufficient evidence to recommend school-based interventions to prevent overweight and obesity among children and adolescents in Latin America. Two studies also were identified showing significant improvements in obesity-related outcomes among overweight/obese youth, although this was not sufficient evidence to recommend obesity treatment interventions in school settings in LA. At least 3 interventions from different countries were identified with adequate design and execution that led to statistically (and clinically) sufficient improvements in obesity-related outcomes. The most successful interventions were characterized by their focus on prevention rather than treatment, by having longer follow-ups (>6months), involvement of teachers as well as allied health professionals, better study designs, and fewer limitations in execution	Practice: Future efforts should include continued replication and refinement of evidence-based, scalable prevention approaches in school settings as important components for integrated programs, policies, and monitoring frameworks aimed at reversing childhood obesity; there needs to be a strong collaboration between health and education authorities and other stakeholders for the implementation of obesity prevention activities in school settings Research: Alternative frameworks for gathering evidence may be useful to summarize the literature on behavioural interventions by allowing inclusion of data from promising and emerging interventions	The restriction to English, Portuguese and Spanish-language publications means that relevant trials may have been missed; the review was restricted to published studies, which may have increased the possibility of publication bias
Malik *et al.* 2013 [113]	Inclusion criteria: (i) original research; (ii) prospective cohort studies or clinical trials conducted in children or adults; (iii) reported multivariable-adjusted coefficients for the association between SSBs and body weight from prospective cohort studies or the difference in changes in body weight between intervention and control groups from clinical trials; (iv) did not combine SSBs with other beverages, foods, or lifestyle factors as a composite exposure; (v) had a control group and intervened for at least 2 weeks in clinical trials. Exclusion criteria: (i) non- English language articles; (ii) cross-sectional or ecologic studies	Results showed an overall positive association between consumption of SSBs and body weight gain in both children and adults with the exception of trials in children from the random-effects model. Trials in children were of 2 modalities, either reducing SSBs by substitution with non-caloric beverages or school-based education programs aimed at discouraging intake of SSBs. In sensitivity analysis, we showed that the substitution trials resulted in significantly less BMI gain compared with the education interventions. Eliminating SSBs from the diet could be an effective way to prevent age-related weight gain	Practice: Results suggest the need for targeted strategies to reduce SSB consumption among high-risk populations, particularly children who are already overweight to prevent further weight gain, and highlight the importance of sustained strategies Research: None stated	Possible publication bias: the restriction to English-language publications means that relevant trials may have been missed; the relatively high degree of unexplained heterogeneity observed in the analyses may limit the validity of summary estimates; the data transformations performed to obtain consistent units across studies may further limit the validity of estimates; the assumption of a 12-oz serving size for some studies may have introduced misclassification and

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				further attenuated summary estimates
Marsh *et al.* 2014 [114]	Inclusion criteria: (i) family based interventions (ii) reporting changes in sedentary time; (iii) active involvement of a parent with the intervention team (e.g. via telephone, counselling or group sessions, or use of a TV-monitoring device at home, which required parental monitoring and therefore participation) was required; (iv) no restrictions on body-weight status and intervention setting Exclusion criteria: (i) comparison group was actually an intervention (e.g. if a study compared the effects of increasing PA vs. decreasing sedentary activity); (ii) participation in family component was voluntary; (iii) no active parental involvement (e.g. newsletters or brochures sent to parents)	This review revealed inconsistent evidence with respect to improvements in sedentary time. Differences in the study population, level of family involvement, setting, study aim and intervention type warrant further consideration of specific study characteristics that may have contributed to differences. The review supports the need for interventions that focus on the family and, more specifically, interventions that involve a parent at more than just a supervisory or administrative level. There is also a need to consider child characteristics and the motivation of the parent, with interventions tailored accordingly.	Practice: A more difficult (though, as this review suggests, potentially more fruitful) approach is to involve the parent and family unit as a whole in efforts to reduce children's screen time. It seems unreasonable to expect children to restrict their level of exposure to a media saturated environment, while simultaneously dismissing the interest of parents in the health and well-being of their children by neglecting to address the role they play in creating a healthy family environment Research: more research is required to (i) address how food-related behaviours moderate the relationship between screen time and overweight in youth; (ii) assess whether interventions that target pre-school children are sustained over time; (iii) assess whether targeting of parents considered to be at high risk for low intervention compliance may help improve outcomes. More studies are also required that either primarily target the parent, or utilize a more intensive parent component.	Inadequate reporting on study quality by authors meant that the risk of bias for a number of domains (allocation concealment and random sequence generation) could not be established. Other limitations included reliance on studies with small sample sizes and short follow-up
Pérez-Morales *et al.* 2012 [115]	Inclusion criteria: interventions that (i) are published in English; (ii) are conducted in the USA; (iii) > 6 months follow-up; (iv) target low income Hispanic children; (iv) obesity prevention studies; (v) at least one indicator of adiposity (weight, BMI, z-BMI, % BF) Exclusion criteria: Not reported	Few interventions have been implemented in underserved populations. The overall quality rate of evidence with respect to reducing BMI or the prevalence of childhood obesity among Hispanic children was low. The overall findings were inconsistent improvements in BMI, z-BMI, and % BF	Practice: None stated Research: None stated	Not reported

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Peterson and Fox 2007 [116]	Inclusion criteria: (i) controlled studies; (ii) > 6 months follow up Exclusion criteria: Not reported	CDC's recommendations to foster healthy eating and physical activity behaviours in schools nationwide by utilizing a Coordinated School Health Program (CSHP) approach provides a good model for supporting schools. Adoption of evidence-based approaches to impact weight-related measures is a process that poses challenges in time, resources, and training, and may require school systems to make trade-offs among competing demands. School personnel need additional assistance in training and maintaining skills in delivering different intervention components, developing teams and collaborations with community organizations and providers, and in grant-making and support for networking.	Practice: school-based interventions should be multi-component in nature and address nutrition, PA and sedentary behaviours; Integrating nutrition and PA messages into core subjects might be a useful model for future interventions, which should target easily understood modifiable health behaviours such as fruit and vegetable consumption, or MPA. School environments and policies should support and promote healthy food choices and active lifestyles. Research-practice partnerships also will be useful in helping schools identify, monitor, and evaluate current and emerging best practices as well as novel approaches Research: None stated	Not reported
Reilly and McDowell 2003 [117]	Inclusion criteria: RCTs with: (i) > 12 months follow up; (ii) studies on prevention had to have included non-clinical groups of subjects; (iii) studies on obesity treatment were required to have objective criteria to classify children as obese; (iv) objective outcome measures of body weight, BMI or body composition Exclusion criteria: short term studies	The evidence on childhood obesity prevention is not encouraging, although promising targets for prevention are now clear, notably reduction in sedentary behaviour. There is stronger evidence that targeting activity and/or inactivity might be effective in paediatric obesity treatment, but doubts as to the generalisability of existing interventions, and the clinical relevance of the interventions is unclear	Practice: None stated Research: Recommendation for interventions to: (i) focus wholly on reducing inactivity; (ii) focus trial outcomes on more measurable variables such as activity or inactivity, while avoiding less measurable outcomes such as fruit and vegetable consumption; (iii) recognise that that inactivity is best considered as a distinct construct from activity; (iv) quantify potential harm	Short timeframe for search (2 years); quality rating of included RCTs unclear; no information on data extraction and search strategy

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Sbruzzi *et al.* 2013 [118]	Inclusion criteria: RCTs that (i) assessed the impact of educational interventions for prevention or treatment of childhood obesity; (ii) > 6 months duration; (iii) reported outcomes in BMI, BMI z-score, weight, WC, blood pressure levels, total cholesterol and high-density lipoprotein cholesterol; (iii) included euthrophic, overweight or obese school children 6-12 years old; (iv) were delivered in a school-based program and/or family-based programs; (v) there was a deliberate approach to increase physical activity, decrease participation in sedentary activities, improve dietary behaviours, decrease intake of dietary fat and sugar, or a combination of the above approaches Exclusion criteria: RCTs with: (i) < 6 month follow up; (ii) insufficient or no information regarding magnitude of the effect of the intervention; (iii) lacking an intervention component	Educational interventions to treat childhood obesity resulted in reduction of anthropometric measurements and diastolic blood pressure. However, it was not possible to show that educational interventions to prevent childhood obesity were effective in improving outcomes as compared with usual care or no intervention. No significant changes determined by education interventions to prevent childhood obesity in non-selected paediatric populations in anthropometric measurements, blood pressure and lipids, as compared to usual care or no intervention, were observed. In conclusion, educational interventions are effective in treating, but not preventing, childhood obesity and its consequences (specifically diastolic blood pressure).	Practice: None stated Research: It is necessary for authors to make available sufficient detail about their strategies, about the theoretical basis and components of interventions, and of the dose and intensity of the interventions to improve these results; new studies should be carried out with a larger number of participants	Low methodological quality of included studies
Sharma 2007 [119]	Inclusion criteria: (i) English language; (ii) conducted outside the United States (iii) focus on general population of children in school settings (including pre-school) for children between 3 and 18 years old Exclusion criteria: (i) non- English language publications; (ii) US studies; (iii) studies outside school settings; (iv) non-peer-reviewed; (v) focused solely on overweight/obese children or adolescents	Mixed results for overweight and adiposity indices (6 out of 14 trials had significant effects); other outcomes: significant effects in 16 out of 19 interventions. All interventions that documented parental involvement successfully influenced obesity indices. Most interventions targeting primary school children and focused on individual-level behaviour change approaches. Few are theory-based	Practice: Primary school settings are the most ideal settings for school-based interventions as obesity prevention behaviours are formed at these ages. School-based interventions directed towards addressing childhood obesity prevention should target improvement of physical activity, healthy nutrition and reduction of TV watching behaviours Research: need to base interventions on robust and culturally appropriate behavioural theories; need to supplement individual behaviour change strategies with policy and environmental changes	The restriction to English-language publications means that relevant trials may have been missed

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Shirley *et al.* 2014 [120]	Inclusion criteria: (i) were published in English; (ii) targeted children ages 6–12; (iii) were school-based and aimed to prevent obesity through school-based physical activity, education, and/or nutrition modification; (iv) were implemented in the US; (v) utilized an experimental or quasi-experimental study design with a control group Exclusion criteria: Studies: (i) of programs organized primarily by churches or other community groups; (ii) primarily aimed at preventing diabetes or other metabolic syndromes	Strategies involving a combination of PA, nutritional, and educational interventions are likely to yield better outcomes than single component strategies, although no nutrition-only studies were reviewed. When the use of all three interventions is not possible, schools should invest in nutritional interventions accompanied by some increase in physical activity. Research does not support the effectiveness of physical activity beyond mandated state physical education requirements as a single component strategy. Parental involvement may be a beneficial program addition, and schools should involve community stakeholders when feasible. The ideal length of obesity prevention programs remains undetermined	Practice: Schools should regularly monitor outcomes of interest (e.g., student BMI) when implementing an intervention to ensure effectiveness and inform modifications. There is some evidence that gains attenuate after interventions cease, so the systematic and continuous implementation of programs throughout the elementary school years is likely necessary to sustain effects Research: None reported	Study heterogeneity precluded the use of meta-analyses, which would have provided more definitive conclusions regarding effect sizes
Showell *et al*. 2013 [121]	Inclusion criteria: Studies conducted in high income countries that: (i) reported the effects of interventions to prevent obesity in children and adolescents aged 2 to 18 years old; (ii) were RCTs, quasi experimental studies, or natural experimental studies with at least 1 year follow-up; (iii) targeted children in their homes or included significant family involvement; (iv) involved a modification of diet, PA, sedentary behaviours, or a combination of these; (v) reported the effect(s) of the intervention on weight-related outcomes Exclusion criteria: focus on overweight or obese children or children with pre-existing medical conditions	Only a small number of studies examined childhood obesity prevention programs in the home setting. The strength of evidence is low, at best, to support the effectiveness of home-based programs on childhood obesity prevention	Practice: None stated Research: More research is needed to test home-based interventions with larger sample sizes, greater intervention duration and intensity, and adequate participant follow-up to improve statistical power of studies. Widespread integration of parenting strategies in home-based interventions should also be considered and additionally evaluated. Implementing and testing the effectiveness of home-based interventions that address important physical environmental influences on obesity-risk behaviours should be a research priority	Not reported

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Silveira *et al.* 2013 [122]	Inclusion criteria: RCTs of nutrition education interventions conducted in schools to reduce or prevent overweight in children and adolescents (5 to 18 years) Interventions had to be administered by health professionals or school teachers Exclusion criteria: (i) studies on children with eating disorders, dyslipidaemia, mental or physical disabilities, diabetes or anaemia; (ii) afterschool interventions were excluded.	School-based nutrition education interventions were effective in reducing the BMI of children and adolescents, particularly where the intervention duration was longer than one school year. Only two of the eight trials reported statistically significant reductions in BMI and some trials had wide confidence intervals. The overall effect size was small and its clinical significance is unclear.	Practice: None stated Research: There is a need for future research to identify the most effective approaches over medium and long term periods and consider theoretical framework and intervention components.	Only one reviewer extracted data so reviewer error and bias could not be ruled out; there was significant statistical heterogeneity for both overall and subgroup analyses and the reasons for this were not explored; few trial details were reported (e.g. participant characteristics)
Silveira *et al.* 2011 [123]	Inclusion criteria: RCTs that assessed the effectiveness of school-based behavioural lifestyle change interventions recommended by health professionals or school teachers in children aged five to 18 years and which reported absolute or standardised measures of BMI, SFT, WC and % BF or lean mass, or dietary outcomes Exclusion criteria: Trials that assessed: (i) children with illnesses; (ii) afterschool interventions; (iii) drugs or food supplements as components of interventions; (iv) addressed impacts of different follow-up periods	Evidence from RCTs show that school-based interventions were effective in reduced rates of overweight and obesity, and increased fruit and vegetable consumption. Characteristics of interventions that demonstrated effectiveness are: duration > 1 year, introduction into the regular activities of the school, parental involvement, introduction of nutrition education into the regular curriculum, and provision of fruits and vegetables by school food services	Practice: None stated Research: None stated	Only one reviewer performed the data extraction hence reviewer error and bias could not be ruled out

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Small *et al.* 2007 [124]	Inclusion criteria: Studies that compared prevention or early treatment programmes with a control or comparison programme, with children aged 4-7 years who were overweight, obese, or at risk of obesity Exclusion criteria: Not reported	Currently, there is a paucity of RCTs designed to test intervention strategies (e.g. prevention or treatment) with young children who are overweight/obesity or at risk for later-life obesity. Intervention strategies for which there is some evidence of effectiveness include: (i) a combination of nutritional and activity information; (ii) a cognitive-behavioural aspect to the intervention; (iii) parent-directed activities; (iv) limiting sedentary child behaviours; (v) positive approaches with children by parents and practitioners (e.g., emphasize positive rewards for healthy behaviours, encourage self-efficacy)	Practice: None stated Research: There is an urgent need for future research that develops and tests theory-based reproducible interventions with overweight/obese or at-risk young children and their parents.	Inclusion criteria unclear with regards to intervention type; possibility of publication bias: it is unclear whether language restrictions were applied; no reporting of methods used to asses validity and to extract data not described, hence unclear whether there was reviewer error and bias
Sobol-Goldberg *et al*. 2013 [125]	Inclusion criteria: Studies with at least an English language abstract; School-based intervention programs relative to control groups who did not receive any intervention Exclusion criteria: Trials that only included obese children, and those of interventions for eating disorders or other medical conditions, were excluded	Unlike earlier studies, more recent studies showed convincing evidence that school-based prevention interventions are at least mildly effective in reducing BMI in children, possibly because these newer studies tended to be longer (at least 1 year), more comprehensive and included parental support	Practice: None stated Research: Further research is required to develop and test school-based interventions to reduce BMI in teenagers. These trials should clearly identify the theoretical model guiding the intervention and compare various weight reduction programmes and other school-based health interventions that might result in weight loss	No efforts were made to locate unpublished data; it was unclear whether language restrictions were applied

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Stice *et al.* 2006 [126]	Inclusion criteria: primary obesity prevention programmes or other interventions that were expected to reduce weight gain or risk of obesity, such as physical activity programmes, eating disorder prevention programmes and psycho- educational interventions Exclusion criteria: Studies that only compared active interventions and studies described as obesity treatment programmes	Most interventions did not produce the hypothesised weight gain prevention effects. The overall intervention effect was small. Larger effects emerged for programs targeting children and adolescents (versus preadolescents) and females, programs that were relatively brief, programs solely targeting weight control versus other health behaviours (e.g., smoking), programs evaluated in pilot trials, and programs wherein participants must self-select into the intervention. Other factors, including mandated improvements in diet and exercise, sedentary behaviour reduction, delivery by trained interventionists, and parental involvement, were not associated with significantly larger effects	Practice: None stated Research: Future trials should follow up promising findings with improved methodology (randomisation, blinded outcome assessment, direct measures of body fat and attempts to minimise attrition), in particular the use of long-term follow-up post-intervention	Unclear whether appropriate methods were used when extracting data; no formal assessment of study validity was carried out
Towns *et al.* 2014 [127]	Inclusion criteria: Studies on prevention or community health addressing child, youth (ages 0 to 18 years), or family health Exclusion criteria: no description or evaluation of intervention; Articles focusing on clinical treatment and individual outcomes	None of the published evaluations reported significant reductions in obesity or overweight or sustained increases in PA, although some evaluations presented evidence of positive effects on children's diets or on nutrition knowledge or intentions. Two programs (SHARE-AP and KDSPP) combined participatory, community-based approaches and environmental supports for behaviour change with strong evaluation and measurement designs. Even for these interventions the evidence for intervention effectiveness was mixed. Only the KDSPP found some evidence of improvement in obesity, but this was not sustained. One explanation may be that aspects of the broader social and economic environment may limit the potential effectiveness of local interventions	Practice: Structural factors may limit the effectiveness of even community-based, multi-component intervention programs for reducing overweight or obesity among Aboriginal children. It may therefore be more appropriate for practitioners to focus on intermediate outcomes such as dietary knowledge or self-efficacy. Collaborative programs might also yield unmeasured benefits in community capacity and control, which may work to reduce structural barriers in the longer term Research: Future intervention research should focus on improvements made at community service provision and how they might lead to improved health outcomes in a range of Aboriginal community contexts	Not reported

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van Grieken *et al.* 2012 [128]	Inclusion criteria: controlled studies that (i) detailed an intervention, of any duration, that aimed to reduce the level of sedentary behaviour in children aged 0–18 years, or targeted sedentary behaviour with other behaviours, such as PA or dietary behaviours and explicitly stated the intervention elements aimed at sedentary behaviour; (ii) included a sedentary behaviour outcome (TV viewing, snacks during TV viewing) and/or a weight related outcome (e.g. BMI, BMI-z, percentage overweight children) Exclusion criteria: Studies that: (i) were performed in laboratory settings; (ii) had a pre-post test design; (iii) did not have a control group; (iv) cohort studies; (v) were aimed at high-risk (overweight or obese) populations; (vi) did not have sedentary behaviour elements in their intervention	Thirty-four controlled trials were included. Interventions aimed at preventing excessive sedentary behaviour significantly reduced sedentary behaviour by around 18 minutes per day (MD -17.95, 95% CI -26.61 to -9.28; 22 trials). There was some evidence of heterogeneity between study results. There was a mean difference in BMI of -0.25 (95% CI -0.40 to -0.09; 14 trials; I^2=0) favouring the intervention group. The change in BMI from baseline to after intervention mean difference was -0.14 (95% CI -0.23 to -0.05; 13 trials; I^2=33%) in favour of the intervention group. There were no significant differences in the effects on sedentary behaviour and BMI, between single and multiple health behaviour interventions. No moderating effects of age and intervention setting were found for either outcome. Interventions, at school or in the community, could help prevent excessive sedentary behaviour, preventing unfavourable health outcomes, for children and adolescents	Practice: None stated Research: Studies with long-term follow-up are needed to evaluate the sustainability of the intervention effects. These studies should provide details on the intervention, and the types of outcome measures, to explore effective intervention elements. This should include the health behaviours targeted and the alternatives provided for sedentary behaviour. Mediation analyses could explore the relationship between sedentary behaviours and weight-related outcomes	Unclear whether appropriate steps were taken to minimise reviewer error and bias during data extraction. The quality assessment raised notable concerns about selection, performance and detection biases, which could have overestimated the intervention effects
Vasques *et al.* 2014 [129]	Inclusion criteria: (i) School and after-school intervention; (ii) children < 19 years old (iii) RCTs or nRCTs with a control group; (iv) > 6 weeks duration; (v) reported the effect size of intervention or the pre- and post-intervention values on children's BMI, BMI z score, BMI d score, BMI percentile, percentile of overweight/ obesity, or body fat Exclusion criteria: Interventions that: (i) did not have a control group; (ii) intervened only in subjects' diets; (iii) involved children suffering from eating	Intervention programs had a positive effect in prevention and in decreasing the obesity in children, although this effect is of low magnitude (r = .068). The programs with older children seem to be more effective compared with those targeted at younger children. Girls achieved higher effect sizes than boys. Mixed gender intervention programs produced a greater effect than the intervention programs with girls only. After-school programs had a very similar effect to those interventions developed in school settings. The results of the current study also demonstrate that intervention programs of 1 year in length had a greater effect size than those with longer or shorter durations. The intervention programs that best contribute to the	Practice: easier access to and reduced price of healthier food, as well as the ability to pay sports activity fees, can make a difference in the effect of an obesity prevention program Research: Reviews should be conducted using several anthropometric measurements and evaluating their impact on the metabolic profile of children; further meta-analytical studies are needed to determine the effect size of high-intensity activity	Not reported

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	disorders or drug or alcohol problems; (iv) were only descriptive	prevention of obesity in children use a multifaceted approach including PA, nutrition and parental involvement		
Verstraeten *et al.* 2012 [130]	Inclusion criteria: studies (i) in a school setting in an lower middle income country; (ii) healthy children 6–18 years of age; (iii) controlled trial design; (iv) focus on primary prevention of overweight or obesity through dietary and/or PA behaviour; (v) baseline and post-intervention measurements of dietary and PA behaviour outcomes and/or anthropometric outcomes Exclusion criteria: (i) letters, book chapters, dissertations, conference proceedings, and abstracts; and (ii) secondary prevention interventions targeting only overweight, obese, or underweight subjects	Most interventions had a positive effect on dietary behaviour and physical activity behaviour (effect size ranged from 20.48 to 1.61). BMI decreased in 8 studies (effect size ranged from 20.7 to 0.0). Effective interventions targeted both diet and physical activity, involved multiple stakeholders, and integrated educational activities into the school curriculum. School-based interventions have the potential to improve dietary and physical activity behaviour and to prevent unhealthy body weights in low- and middle-income countries	Practice: None stated Research: future studies should consider (i) stronger evaluation designs; (ii) information on cost-effectiveness; (iii) use of WC as an outcome measure; (iv) use of accelerometers and the measurement of physical fitness; (v) a theoretical framework to develop their intervention, and need to carefully document the pathways through which the interventions have their effect in order to learn from program implementation and adoption to identify which intervention components are effective and feasible	A potential limitation of this review was the exclusion of studies based on language, and the exclusion of grey literature
Waters *et al*. 2011 [131]	Inclusion criteria: childhood obesity prevention studies that used a controlled study design with a minimum duration of 12 weeks, and if they evaluated interventions, policies or programs in place for twelve weeks or more. If studies were randomised at a cluster level, 6 clusters were required. Exclusion criteria: treatment interventions	Childhood obesity prevention may be effective at reducing adiposity in children. A meta-analysis of 37 studies with a combined sample of 27,946 children revealed that these interventions may be effective in reducing the magnitude of the change in BMI/zBMI from pre- to post-intervention by -0.15 units (95% confidence interval (CI): -0.21 to -0.09), relative to the change in the control group, which would correspond to a small but clinically important shift in population BMI if sustained over several years. Subgroup analysis revealed that the effectiveness of interventions in young children and adolescents is less clear. There was a high level of observed heterogeneity (I2=82%) in all three age groups that could not explained by randomisation status or the type, duration or setting of the intervention. Interventions did not appear to increase health inequalities	Practice: Interventions need to be developed that can be embedded into ongoing practice and operating systems; all studies should monitor the potential occurrence of unhealthy practices and adverse outcomes; The following activities have been included in beneficial programmes: (i) school curriculum that includes healthy eating, physical activity and body image; (ii) increased sessions for physical activity and the development of fundamental movement skills throughout the school week; (iii) improvements in nutritional quality of the food supply in schools · environments and cultural practices that support children eating healthier foods and being active throughout each day; (iv) support for teachers and other staff to implement health promotion strategies and activities (e.g. professional development, capacity building activities); (v) parent support and home activities that encourage children to be more active, eat more nutritious foods and spend less time in screen based activities	Substantial unexplained heterogeneity of effects and the likelihood of publication bias exist

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
			Research: Testing short-term, behaviourally focused school-based interventions for 6-12 year old children may no longer be warranted; More evidence is needed to determine effective interventions in young children, particularly those aged 0-3 years, and adolescents; there is a continued need to strengthen trial design, measurement instruments, and reporting of process, impact and outcomes; future trials should be larger, longer term and include assessments of costs, harm, equity impacts, implementation factors and sustainability; translational research is required to embed effective interventions into standard practice across children's settings.	
Williams *et al.* 2013 [132]	Inclusion criteria: Studies that: (i) addressed children undertaking primary education aged between 4 and 11 years; (ii) assessed diet or PA-related school policies either alone or as part of intervention programmes; (iii) assessed anthropometric outcomes; (iv) were of experimental or observational study design; (v) > 6 months follow up Exclusion criteria: studies where (i) policy components were insufficiently described to enable replication; (ii) outcomes assessed were change in diet, physical activity or knowledge; (iii) conducted in clinical settings; (iv) had less than 6 months follow up	The pooled effects of the PA, and other diet related policies on BMI-SDS were non-significant. The multifaceted interventions tended to include policy elements related to both diet and physical activity (combined cluster), and although these interventions were too varied to pool their results, significant reductions in weight-related outcomes were demonstrated. There is evidence to suggest that when implemented alone, school diet and physical activity related policies have little effect. However, they appear to have an effect when developed and implemented as part of a more extensive intervention programme, hence diet and physical activity related policies need to be located within more complex approaches focusing on multiple factors (e.g. diet, PA, sedentary behaviour, self-esteem) and at multiple levels of influence (e.g. home, school, neighbourhood)	Practice: Diet and physical activity related policies need to be located within more complex approaches to preventing childhood obesity which focus on multiple factors (e.g. diet, physical activity, sedentary behaviour, self-esteem) and at multiple levels of influence (e.g. home, school, neighbourhood) to be effective Research: natural experiments (e.g. controlled before and after studies, interrupted time series studies) could be used to evaluate new policies. Future studies should be comprehensively reported and have a duration of years rather than months	None reported
Wolfenden *et al.* 2014 [133]	Inclusion criteria: RCTs and quasi--experimental designs with (i) a parallel control group; (ii) examining the effects of any population-based, whole of community intervention seeking to prevent population weight gain; (iii)	The review suggests that populationbased, whole-of-community interventions could be effective in achieving modest reductions in population weight gain among children, albeit with very substantial heterogeneity between trials. Seven of the eight trials reported a positive intervention effect on at least one	Practice: None stated Research: Rigorous evaluation of population- based whole of community interventions is needed, particularly for adults	Language and publication restrictions raised the possibility that relevant studies were overlooked

Author	Inclusion and Exclusion criteria	Main findings of the SR	Implications for practice & research	Limitations of the SR
	targeting more than one determinant of weight gain; (iv) objectively measured indicators of adiposity, including weight, BMI, WC, % BF, SFT or population prevalence of overweight or obesity; (v) include community consultation or engagement to inform intervention development or delivery. Exclusion criteria: studies recruiting exclusively overweight or obese people, and studies of interventions primarily focusing on chronic disease reduction, or where obesity prevention was among other targeted risk factors	measure of adiposity and meta-analysis of six trials demonstrated a significant reduction in BMI z-score. No eligible interventions which sought to prevent excessive weight gain among adults were identified.		
Zenzen and Kridli 2009 [134]	Inclusion criteria: studies (i) published between 2000 and 2007; (ii) in the English language; (iii) involved children ages 4 to 18 years or in grades kindergarten through high school; (iv) school-based curriculum programs for obesity prevention; and (v) a manipulation of at least one of the variables of dietary habits, physical activity, healthy lifestyle education, and/or parental involvement Exclusion criteria: Not reported	Studies were grouped by duration of interventions, use of theoretical frameworks, level of evidence and whether interventions demonstrated a reduction in BMI or weight loss. Nine studies included parental involvement in the intervention. None of the studies found a significant lowering of BMI, and only one achieved a statistically significant difference between intervention group and control group. All studies included a healthy lifestyle education component which was associated with significant increases in knowledge. Dietary habit modification was associated with significant changes in fat intake and in food-related and health-related knowledge and behaviours, while studies which included a PA component found little change in PA patterns	Practice: The most effective school-based obesity intervention programs should be guided by behavioural theoretical frameworks Research: Future studies need to have longer interventions, include parental involvement as an interventional component and report long-term post-intervention follow-up of outcome measures. Studies should include an experimental research design that includes the intervention components of dietary habit modification, physical activity modification, healthy lifestyle education, and parental involvement. BMI should be one of the outcome measures	No description of study selection or data analysis. No summary of study findings and whether school-based programs are actually effective.

% BF (Percentage Body Fat), BMI (Body Mass Index), FFST (fat-free soft tissue), FMI (Fat Mass Index), MVPA (Moderate to Vigorous Physical Activity), PA (Physical Activity), RR (Relative Risk), SFT (Skin Fold Testing), SSB (Sugar Sweetened Beverages), TSF (Triceps Skin Fold), WC (Waist Circumference), WHR (Waist-to-Hip Ratio)

Appendix S5 – Methodological Quality of Systematic Reviews (AMSTAR) criteria

Citation	a priori design provided	duplicate study selection and data extraction carried out	comprehensive literature search performed	status of publication used as inclusion criterion	list of included and excluded studies provided	characteristics of included studies provided	quality of included studies assessed and documented	quality of included studies used appropriately in formulating conclusions	appropriate methods used to combine study findings	likelihood of publication bias assessed	conflict of interest included	Total score
Avery *et al.* 2015 [72]	0	0	1	0	0	1	1	0	0	0	0	**3**
Baker *et al.* 2011 [73]	1	1	1	1	1	1	1	1	1	1	1	**11**
Barr-Anderson *et al.* 2014 [74]	1	1	1	0	0	1	1	1	1	0	0	**7**
Beauchamp *et al.* 2014 [75]	0	1	1	1	0	1	1	1	0	0	0	**6**
Bleich *et al.* 2013 [76]	0	1	0	0	0	1	1	1	1	1	0	**6**
Brandt *et al.* 2010 [77]	0	0	0	0	0	1	0	0	0	0	0	**1**
Branscum and Sharma 2011 [78]	0	0	1	0	0	1	0	0	0	0	0	**2**
Brown and Summerbell 2009 [79]	1	0	0	1	0	1	0	0	0	0	0	**3**
Brown *et al.* 2015 [80]	1	1	1	1	0	1	1	1	1	1	1	**10**
Budd and Volpe 2006 [81]	0	0	1	1	0	1	0	0	0	0	0	**3**
Calancie *et al.* 2015 [82]	0	1	1	1	0	1	0	0	1	0	0	**5**
Campbell *et al.* 2002 [83]	1	1	1	1	1	1	1	1	1	0	0	**9**
Chen and Wilkosz 2014 [84]	1	0	1	0	0	1	1	1	1	0	0	**6**

Citation	a priori design provided	duplicate study selection and data extraction carried out	comprehensive literature search performed	status of publication used as inclusion criterion	list of included and excluded studies provided	characteristics of included studies provided	quality of included studies assessed and documented	quality of included studies used appropriately in formulating conclusions	appropriate methods used to combine study findings	likelihood of publication bias assessed	conflict of interest included	Total score
Chriqui 2013 [85]	1	0	0	0	0	0	0	0	0	0	1	**2**
Chriqui *et al.* 2014 [86]	1	1	1	0	0	0	0	0	1	0	0	**4**
Cole *et al.* 2006 [87]	0	0	0	0	0	1	0	0	0	0	0	**1**
Cook-Cottone *et al.* 2009 [88]	1	1	1	1	0	1	0	0	1	0	0	**6**
De Bourdeaudhuij *et al.* 2010 [89]	1	0	1	1	0	1	1	1	1	0	0	**7**
de Sa and Lock 2008 [90]	1	0	1	1	0	1	0	0	1	0	0	**5**
Dobbins *et al.* 2013 [91]	1	1	1	1	1	1	1	1	1	1	0	**10**
Flodmark *et al.* 2006 [92]	0	0	1	1	0	1	1	1	0	0	0	**5**
Gao and Chen 2014 [93]	0	0	1	1	0	1	1	1	1	0	0	**6**
Haynos and O'Donohue 2012 [94]	0	0	0	0	0	1	0	0	0	0	0	**1**
Holub *et al.* 2014 [95]	1	1	1	0	0	1	1	1	0	0	0	**6**
Ickes *et al.* 2014 [96]	1	1	0	0	0	1	0	0	0	1	0	**4**
Jaime and Lock 2009 [97]	1	0	1	1	0	1	0	1	1	0	0	**6**
Kaiser *et al.* 2013 [98]	1	1	1	1	0	1	1	1	1	1	0	**9**

Citation	a priori design provided	duplicate study selection and data extraction carried out	comprehensive literature search performed	status of publication used as inclusion criterion	list of included and excluded studies provided	characteristics of included studies provided	quality of included studies assessed and documented	quality of included studies used appropriately in formulating conclusions	appropriate methods used to combine study findings	likelihood of publication bias assessed	conflict of interest included	Total score
Kamath *et al.* 2008 [99]	1	1	1	1	0	1	1	1	1	0	0	**8**
Kanekar and Sharma 2008 [100]	1	0	1	0	0	1	0	1	0	0	0	**4**
Katz *et al.* 2008 [101]	1	1	1	1	0	1	0	0	0	0	0	**5**
Kesten *et al*. 2011 [102]	1	0	1	0	0	1	1	1	1	0	0	**6**
Knowlden and Sharma 2013 [103]	0	0	0	0	0	1	0	0	0	0	0	**1**
Kropski *et al.* 2008 [104]	0	0	1	1	0	1	1	1	1	0	0	**6**
Lamboglia *et al.* 2013 [105]	0	1	0	1	0	1	0	0	0	0	0	**3**
Lavelle *et al.* 2012 [106]	1	0	1	1	0	1	0	0	1	1	0	**6**
LeBlanc *et al.* 2013 [107]	1	1	0	1	0	1	1	1	1	0	0	**7**
Leung et al. 2012 [108]	0	0	0	0	0	1	0	0	0	0	0	**1**
Li *et al.* 2008 [109]	1	0	1	0	0	1	1	1	1	0	0	**6**
Liao *et al.* 2014 [110]	1	1	1	0	0	1	1	1	1	1	0	**8**
Lissau 2007 [111]	1	0	1	0	0	1	0	0	0	0	0	**3**
Lobelo *et al.* 2013 [112]	0	1	1	1	0	1	1	1	1	0	0	**7**

Citation	a priori design provided	duplicate study selection and data extraction carried out	comprehensive literature search performed	status of publication used as inclusion criterion	list of included and excluded studies provided	characteristics of included studies provided	quality of included studies assessed and documented	quality of included studies used appropriately in formulating conclusions	appropriate methods used to combine study findings	likelihood of publication bias assessed	conflict of interest included	Total score
Malik *et al.* 2013 [113]	0	0	1	0	0	1	1	1	1	1	0	**6**
Marsh *et al.* 2014 [114]	0	1	1	0	0	1	1	0	0	0	0	**4**
Pérez-Morales *et al.* 2012 [115]	0	0	0	0	0	1	0	0	0	0	0	**1**
Peterson and Fox 2007 [116]	1	1	0	0	0	1	0	0	0	0	0	**3**
Reilly and McDowell 2003 [117]	0	0	1	0	0	1	1	1	0	0	0	**4**
Sbruzzi *et al.* 2013 [118]	0	1	1	0	0	1	1	1	1	0	0	**6**
Sharma 2007 [119]	0	0	0	0	0	1	0	0	1	0	0	**2**
Shirley *et al.* 2014 [120]	1	1	1	1	0	1	0	0	1	0	0	**6**
Showell *et al*. 2013 [121]	1	1	1	1	0	1	1	1	1	0	0	**8**
Silveira *et al.* 2013 [122]	1	0	1	0	0	1	1	1	1	1	0	**7**
Silveira *et al.* 2011 [123]	1	0	1	0	0	1	1	1	1	0	0	**6**
Small *et al.* 2007 [124]	1	0	0	0	0	1	0	0	0	0	0	**2**
Sobol-Goldberg *et al*. 2013 [125]	1	1	1	0	0	1	1	1	1	1	0	**8**
Stice *et al.* 2006 [126]	1	0	1	1	0	1	0	0	1	0	0	**5**

Citation	a priori design provided	duplicate study selection and data extraction carried out	comprehensive literature search performed	status of publication used as inclusion criterion	list of included and excluded studies provided	characteristics of included studies provided	quality of included studies assessed and documented	quality of included studies used appropriately in formulating conclusions	appropriate methods used to combine study findings	likelihood of publication bias assessed	conflict of interest included	Total score
Towns *et al.* 2014 [127]	0	0	1	1	0	1	0	0	1	0	0	**4**
van Grieken *et al.* 2012 [128]	1	0	1	0	0	1	1	1	1	0	0	**6**
Vasques *et al.* 2014 [129]	1	0	1	0	0	1	0	1	1	1	0	**6**
Verstraeten *et al.* 2012 [130]	1	1	1	0	0	1	1	1	1	0	0	**7**
Waters *et al*. 2011 [131]	1	1	1	1	1	1	1	1	1	1	1	**11**
Williams *et al.* 2013 [132]	0	1	1	1	0	1	1	1	1	0	0	**7**
Wolfenden *et al.* 2014 [133]	0	1	1	1	0	1	1	1	1	0	0	**7**
Zenzen and Kridli 2009 [134]	0	0	0	0	0	1	1	0	0	0	0	**2**

*score of 1 = 'Yes' according to AMSTAR criteria; score of 0 = 'No' or 'Can't Answer' or 'Not Applicable' according to AMSTAR criteria. High methodological quality: 8-11 times a score of 1; medium methodological quality: 5-7 times a score of 1; low methodological quality: 0-4 times a score of 1.

Appendix S6. Characteristics of primary studies having an eligible environmental component

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Angelopoulos et al. 2009 [135]	Angelopoulos, P.D., et al., Changes in BMI and blood pressure after a school based intervention: the CHILDREN study. Eur J Public Health, 2009. 19(3): p. 319-25.	School	RCT	646	10 - 11	12 mo: educational component integrated in the existing school curriculum; playgrounds and school yards were made accessible for children to play in after the end of the curricular programme; school canteens were also obliged to have fresh fruit and freshly made juices throughout the whole intervention period; parental involvement and support in the home.	3	BMI, BMI z-score	BMI: -1.1 (CI: -1.2 to -0.9; P = 0.047); BMI z-score: -+0.46 (CI: -0.5 to -0.42; P = 0.074)	Significant	Yes	Not reported
Ask et al. 2006 [136]	Ask, A.S., et al., Changes in dietary pattern in 15 year old adolescents following a 4 month dietary intervention with school breakfast--a pilot study. Nutr J, 2006. 5: p. 33.	School	RCT	54	15	4 mo: a 'healthy' breakfast was served at the beginning of each school day. Students were also offered a food supplement	No follow up	BMI	Boys: -0.11 (P = <0.05); Girls: -0.2 (P = <0.05). No significant increase in BMI in the intervention group)	Significant	Yes	Møllers AS, Mills, TINE BA, COOP Lista and Young Enterprise, West-Agder provided food and the food supplements; the National Association for Nutrition and Health provided their Data program "Mat på data" for free to the school.
Ask et al. 2010 [137]	Ask, A.S., et al., Serving of free school lunch to secondary-school pupils - a pilot study with health implications. Public Health Nutr, 2010. 13(2): p. 238-44.	School	RCT	141	14 - 15	4 mo: a 'healthy' free lunch was introduced consisting of wholemeal bread, different kinds of cheese, cold cuts of lean meat, fish and jam, low-fat milk and fresh fruit and vegetables. Lunch was prepared by the students and eaten in class.	No follow up	BMI	BMI did not increase among the girls at the intervention school, but increased significantly among the boys at the intervention school and among the control school groups	Significant	Mixed	University of Agder, Kristiansand, Norway

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Barbeau et al. 2007 [138]	Barbeau, P., et al., Ten months of exercise improves general and visceral adiposity, bone, and fitness in black girls. Obesity (Silver Spring), 2007. 15(8): p. 2077-85.	School	RCT	278	8 - 12	10 mo: daily after-school intervention of 2hrs duration which included provision of a free healthy snack, and 80 minutes of PA (25 minutes of skills development; 35 minutes of MVPA, and 20 minutes of toning and stretching). Subjects wore heart rate monitors throughout.	No follow up	BMI, WC, % BF	BMI: -0.45 CI: (-0.79 to -0.12; P = 0.008); WC: -1.34 (CI: -2.78 to 0.09; P = 0.068); % BF: -2.01 (CI: -2.98 to -1.04; P = <0.0001)	Significant	Yes	NIH grant HL64972
Caballero et al. 2003 [139]	Caballero, B., et al., Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren. Am J Clin Nutr, 2003. 78(5): p. 1030-8.	School	RCT	1704	8 - 11	36 mo: Pathways Obesity Prevention Program involved: (i) nutrition education; (ii) skill building and practical tools meals for food service to reduce fat content in school meals to less than 30%; (iii) sessions of 30 minutes of MVPA weekly (based on SPARK curriculum); (iv) Take home family action packs and family events at schools; (v) Control schools—normal instruction	No follow up	BMI, % BF, SFT	BMI: -0.2 (CI: -0.5 to 0.15; P = 0.29); % BF: +0.2 (CI: -0.84 to 1.31; P = 0.66); SFT: +0.1 (CI: -0.67 to 0.70; P = 0.837)	Not significant	Yes	NHLBI grants U01 HL-508869, -50867, -50905, -50885, -50907
Chomitz et al. 2010 [140]	Chomitz, V.R., et al., Healthy Living Cambridge Kids: a community-based participatory effort to promote healthy weight and fitness. Obesity (Silver Spring), 2010. 18 Suppl 1: p. S45-53.	Community, School	Cohort	1858	8	36 mo: city policies, community awareness campaigns, physical education enhancements, food service reforms, farm-to-school-to-home programs, family outreach, BMI and fitness reports	No follow up	BMI, BMI z-score	BMI z-score: -0.04 (P = < 0.001)	Significant	Yes	Cambridge Public Health Department, School Health, Institute for Community Health, other
Coffield et al. 2011 [141]	Coffield, J.E., et al., A multivariate analysis of federally mandated school wellness policies on adolescent obesity. J Adolesc Health, 2011. 49(4): p. 363-70.	School	NE	40713	17 - 19	NA: School wellness policies mandated by the 2004 Child Nutrition and WIC Reauthorization Act, implemented by 2006	26	overweight and obesity prevalence	Each additional component included in a district's wellness policy was associated with a 3.2% lower odds in the prevalence of adolescent overweight (OR 0.968; CI: 0.941–0.997), 2.5% lower odds of obesity (OR: 0.975;CI: 0.952–0.997), and 3.4% lower odds of severe obesity (OR 0.966; CI: 0.938–0.995).	Significant	Yes	Institute of Public and International Affairs and the Vice President for Research, University of Utah

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Coleman et al. 2005 [142]	Coleman, K.J., et al., Prevention of the epidemic increase in child risk of overweight in low-income schools: the El Paso coordinated approach to child health. Arch Pediatr Adolesc Med, 2005. 159(3): p. 217-24.	School	Matched control	896	8 - 9	36mo: adaptation of the Child and Adolescent Trial for Cardiovascular Health (CATCH) involving (i) purchase of new PE equipment; (ii) staff training; (iii) CATCH events throughout the year	No follow up	BMI percentile (RR of > 85th percentile at year 3)	Girls: significantly lower rate of increase in risk of overweight compared to control (2% vs 13%); Boys: significantly lower rate of increase in risk of overweight compared to control (1% vs 9%) over 3 years	Significant	Yes	Patient Care and Outcomes Research Grant from the American Heart Association (9970182N)
Crespo et al. 2012 [143]	Crespo, N.C., et al., Results of a multi-level intervention to prevent and control childhood obesity among Latino children: the Aventuras Para Ninos Study. Ann Behav Med, 2012. 43(1): p. 84-100.	Community, School	RCT	808	4 - 7	36 mo: in the Aventuras para Niños (APN) study, school and community-based interventions targeted the home, school and community environments via social and physical changes. Measures in the home included having cut-up vegetables within a child's reach and moving a TV out of a child's bedroom, setting of rules and boundaries by parents, discipline methods etc. Measures in the community were designed to alter physical structures (e.g., improve playgrounds and introduce well-stocked salad bars), social structures and policies (e.g., teachers' discipline and classroom practices and public park maintenance), availability of protective or harmful products (e.g., physical education equipment and healthy children's menus in restaurants),	No follow up	BMI z-score	Unclear	Not significant	No	NHLBI grant 5R01HL073776, CDC grant 5U48DP000036, American Cancer Society grants RSGPB 113653 and PFT-04-156-01, NIDDK grant F31DK079345, NHLBI grant T32HL079891
de Ruyter et al. 2012 [144]	de Ruyter, J.C., et al., A trial of sugar-free or sugar-sweetened beverages and body weight in children. N Engl J Med, 2012. 367(15): p. 1397-406.	School	RCT	641	4 - 12	18 mo: children provided with 1 can per day of a noncaloric, artificially sweetened, noncarbonated beverage or a sugar-containing noncarbonated beverage. Daily intake confirmed by teachers.	No follow up	BMI z score, SFT, WC	BMI: -0.13 (CI: -0.21 to -0.05; P = 0.001); WC: -+0.66 (CI: -1.23 to -0.09; P = 0.02); SFT: -2.2 (CI: -4.0 to -0.4)	Significant	Yes	Netherlands Organization for Health Research and Development, DRINK ClinicalTrials.gov number, NCT00893529

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Donnelly et al. 1996 [145]	Donnelly, J.E., et al., Nutrition and physical activity program to attenuate obesity and promote physical and metabolic fitness in elementary school children. Obes Res, 1996. 4(3): p. 229-43.	School	CCT	108	8 - 11	24 mo: (i) Nutrition education (ii) Physical activity program: 3 weekly sessions 30-40 minutes, focused on individual, noncompetitive activities; (iii) ''Lunch Power!'' program to reduce energy, fat, and sodium in school lunches; (iv) Control group: existing lunch program, team sports activity program	No follow up	BMI	Body weight and body composition were similar between control and intervention schools both at baseline and at the end of the intervention	Not significant	No	National Livestock and Meat Board, Health Management Resources, and the Research Services Council, University of Nebraska
Dzewaltowski et al. 2010 [146]	Dzewaltowski, D.A., et al., HOP'N after-school project: an obesity prevention randomized controlled trial. Int J Behav Nutr Phys Act, 2010. 7: p. 90.	School	RCT	246	8-10	36 mo: Healthy Opportunities for Physical Activity and Nutrition (HOP'N): included an organised daily after- school PA session for at least 30 minutes, a daily healthful snack that included fruit and vegetables, and a weekly nutrition and PA education experience	?	BMI z-score	BMI z-score: -0.1 (P = 0.11)	Not significant	Yes	National Research Initiative grant 2005- 35215-15418 from the USDA National Institute of Food and Agriculture
Ebbeling et al. 2006 [147]	Ebbeling, C.B., et al., Effects of decreasing sugar-sweetened beverage consumption on body weight in adolescents: a randomized, controlled pilot study. Pediatrics, 2006. 117(3): p. 673-80.	Home	RCT	103	13 - 18	6 mo: four 12-oz servings of non-caloric beverages per day provided by weekly home deliveries; motivational phone calls; mailed fridge magnets with intervention messages	No follow up	BMI	BMI: Overall sample: -0.14 (CI: -0.54 to 0.26); Children in the upper tertile of BMI: -0.75 (P = 0.03)	Significant (for high-BMI children only)	Yes (for high-BMI children only)	NIDDK grants R01 DK63554 and K01 DK62237, the Charles H. Hood Foundation, NIH grant M01 RR02172
Economos et al. 2007 [148]	Economos, C.D., et al., A community intervention reduces BMI z-score in children: Shape Up Somerville first year results. Obesity (Silver Spring), 2007. 15(5): p. 1325-36.	Community, School, Home	nRCT	1178	7 years	8 mo: physical activity options and availability of healthy foods before, during and after school, improved school food service; new equipment; social marketing; walk to school campaign, family outreach and engagement,	36 (1st year results only)	BMI z-score	BMI z-score: -0.10 (CI: -0.12 to -0.086)	Significant	Yes	CDC grant R06/CCR121519-01

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Engels et al. 2005 [149]	Engels HJ, Gretebeck RJ, Gretebeck KA, Jiménez L. Promoting healthful diets and exercise: efficacy of a 12-week after-school program in urban African Americans. J Am Diet Assoc 2005; 105: 455–459	School	NRNCT	56	9 - 12	3 mo: Active involvement in design, implementation and evaluation of study: (i) 60–75 min sessions 4 d/week; (ii) Dance, sport games and other fitness activities; (iii) Pedometers provided; (iv) Targeted educational handouts on nutrition and fitness; (v) Recording of fruit and vegetable intake and step counts; (vi) Poster board displays in school	No follow up	BMI, % BF	BMI: +0.1 (P = 0.446); BF: -0.3 (P = 0.428)	Not significant	No	Aramark Service Master/Aramark Gourmet
Foster et al. 2008 [150]	Foster, G.D., et al., A policy-based school intervention to prevent overweight and obesity. Pediatrics, 2008. 121(4): p. e794-802.	School	RCT	1349	9 - 12	24 mo: multi-component school-based intervention involving the introduction of a School Nutrition Policy that banned all sodas, sweetened drinks and snacks that did not meet nutritional standards from vending machines and cafeteria line. In addition, there was a nutrition education component, parental involvement and social marketing.	No follow up	Incidence of overweight and obesity	Incidence of overweight and obesity combined: 15% lower for intervention group [OR 0.85 (CI: 0.74 to 0.99; P = <0.05)]	Significant	Yes	CDC grant R06/CCR321534-01 and the USDAFNS

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Foster et al. 2010 [151]	Foster, G.D., et al., A school-based intervention for diabetes risk reduction. N Engl J Med, 2010. 363(5): p. 443-53.	School	C-RCT	4603	11 - 12	36 mo: IG: intervention consisted of four integrated components: nutrition (improvement in nutritional quality of school food environment); physical activity (increase in time spent performing MVPA); behavioural knowledge and skills (classroom-based curricular changes); and communication/social marketing.	No follow up	BMI, WC	Odds of having BMI > 95th percentile: - 19% (OR 0.81; 95% CI: 0.66 to 1.00; P = 0.05); Odds of WC > 90th percentile: -20% (OR 0.80; 95% CI: 0.64–0.99; P = 0.04); reduction in prevalence of obesity occurred in both IG and CG after 2 years, but was greater in the intervention schools compared to control schools (OR 0.79; CI: 0.63 to 0.98; P = 0.04)	Significant	Yes	NIDDK grants U01-DK61230, U01-DK61249, U01-DK61231, and U01-DK61223, additional support from the American Diabetes Association

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Fotu et al. 2011 [152]	Fotu, K.F., et al., Outcome results for the Ma'alahi Youth Project, a Tongan community-based obesity prevention programme for adolescents. Obesity reviews : an official journal of the International Association for the Study of Obesity, 2011. 12 Suppl 2: p. 41-50.	Community, School	QE	2479	11 - 19	36 mo: Community consultation and engagement processes with government health and education departments and other community stakeholders were conducted to develop community actions plans. In addition to TV, radio and print media strategies a range of initiatives were implemented in schools, churches and villages including village walking groups, school and community vegetable gardens, school canteen and church nutrition policies, sports tournaments and the provision of healthy eating and physical activity information.	No follow up	BMI, BMI z-score, % BF, % overweight and obese	% BF: −1.46 (p = 0.01); BMI: −0.02 (p = 0.36); BMI z-score: −0.03 (p = 0.26); proportion of participants who are overweight or obese: −0.05 (p = 0.84).	Significant (for % BF only)	Yes	The Wellcome Trust (UK), the National Health and Medical Research Council (Australia) and the Health Research Council (New Zealand) through the International Collaborative Research Grant Scheme.
French et al. 2011 [153]	French, S.A., et al., Household obesity prevention: Take Action - a group-randomized trial. Obesity, 2011. 19(10): p. 2082-8.	Home	RCT	90	12 - 17	12 mo: intervention included both household environment and individual-level behavioural components such as placement of TV time-limiting devices, provision of guidelines about food availability, face-to-face group sessions, and monthly newsletters.	No follow up	BMI z-score,	BMI z-score: +0.0638 (P = 0.53)	Not significant	No	NIH grants 1U54CA116849 and R21CA137240
Gao and Xiang 2014 [154]	Gao, Z. and P. Xiang, Effects of exergaming based exercise on urban children's physical activity participation and body composition. J Phys Act Health, 2014. 11(5): p. 992-8.	School	PPT	185	8 - 12	9 mo: 4th grade children were assigned to the intervention group, particpating in 30-minute Dance Dance Revolution (DDR)-based exercise 3 times per week during recess periods; DDR is an active video game that combines real physical dancing requiring fast-foot movement with energetic music and visuals. Third and fifth grade children were in the comparison group.	No follow up	% BF	% BF: Chi square = 5.42, df = 3, P = 0.14	Not significant	No	Robert Wood Johnson Foundation: Award number 66347 and The University of Utah Interdisciplinary Seed Grant: Award number 19309

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Gombosi et al. 2007 [155]	Gombosi, R.L., R.M. Olasin, and J.L. Bittle, Tioga County Fit for Life: a primary obesity prevention project. Clin Pediatr (Phila), 2007. 46(7): p. 592-600.	Community, School, Home	PPT	4804	5 - 14	60 mo: school-based education initiative; community-based physical activity events; initiation of menu labeling in participating restaurants	No follow up	BMI	BMI increased less among children in intervention versus comparison community	Unclear	No	American Academy of Pediatrics (AAP); NIH Maternal and Child Health Bureau; Healthy Tomorrows Partnership for Children Program, Pennsylvania Department of Health, Bureau of Chronic Disease and Risk Reduction, Cardiovascular Risk Reduction grant; US Department of Health and Human Services Administration (HRSA)
Graves et al. 2010 [156]	Graves, L.E., et al., The effect of active video gaming on children's physical activity, behavior preferences and body composition. Pediatric exercise science, 2010. 22(4): p. 535-46.	Home	RCT	58	8 - 10	3 mo: a peripheral device (jOG), a step-powered video game, was given to children to encourage light-tomoderate intensity activity and reduce sedentary time.	No follow up	BMI, % BF	BMI: -0.2 (CI: -0.6–0.2); % BF: -0.1 (CI: -0.7–0.6)	Not significant	No	Not reported
Greening et al. 2011 [157]	Greening, L., et al., Efficacy of a school-based childhood obesity intervention program in a rural southern community: TEAM Mississippi Project. Obesity (Silver Spring), 2011. 19(6): p. 1213-9.	Community, School	RCT	450	6 - 10	9 mo: intervention program included monthly family events that alternated between nutrition and physical activities/contests; changes to the intervention school's food service including replacing the deep frying equipment with baking ovens	No follow up	WC, % BF	WC: +0.1 (P = 0.92); % BF: -0.96% (P = 0.02)	Significant (for % BF only)	Yes	University of California, San Francisco, National Center of Excellence in Women's Health and the Johnson & Johnson Company

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Gutin et al. 2008 [158]	Gutin, B., et al., Preliminary findings of the effect of a 3-year after-school physical activity intervention on fitness and body fat: the Medical College of Georgia Fitkid Project. Int J Pediatr Obes, 2008. 3 Suppl 1: p. 3-9.	School	C-RCT	206	8.5	36 mo: 2-hour after-school intervention sessions were offered 5 days/wk on school days. The programme included 40 min of academic enrichment activities, during which healthy snacks were provided (healthy snacks could be construed as a modest dietary intervention) followed by 80 min of moderate-to-vigorous PA (MVPA) including 40 min of vigorous PA. Control group received regular health screenings and diet/PA information	No follow up	% BF, FFST, BMI, WC	Over the six measurement points, the intervention group increased more than the control group in fat-free soft tissue ($p < 0.01$) and BMI ($p < 0.05$)	Significant (for BMI only)	No	Unclear
Haerens et al. 2006 [159]	Haerens, L., Deforche, B., Maes, L., Stevens, V., Cardon, G., & De Bourdeaudhuij, I. (2006). Body mass effects of a physical activity and healthy food intervention in middle schools. Obesity Research, 14(5), 847 – 854	School	C-RCT	2291	12 - 14	21 mo: IG: Schools were encouraged to: (i) create more opportunities to be physically active during breaks, at noon or after school hours (extra sports material/PE equipment provided); (ii) increase fruit consumption and reduce soft drink and increase water consumption (free or low-price water and fruit made available) (iii) education on nutrition and physical activity provided (iv) Parental education	No follow up	BMI z-score	Boys: No significant positive intervention effects found; Girls: significant lower increase in BMI ($F = 12.52$, $P = <0.05$) and BMI z-score ($F = 2.68$, $P = <0.05$)	Significant (for girls only)	Yes (among girls only)	Policy Research Centre for Sport, Physical Activity and Health
Heelan et al. 2009 [160]	Heelan, K.A., et al., Evaluation of a walking school bus for promoting physical activity in youth. J Phys Act Health, 2009. 6(5): p. 560-7.	Community	QE-PPT	324	3 - 10	24 mo: Walking school bus program. Neighborhood walk stops within 1-mile radius of the school. The WSB leader met children at stops and walked them to their school in the morning and back to the stop in the afternoon. Routes resulted in an average of 0.65 miles of walking each way	No follow up	BMI	BMI: No significant difference between groups on BMI or % BF.	Not significant	No	Unclear

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Ho et al. 2008 [161]	Ho, L.S., et al., An integrated multi-institutional diabetes prevention program improves knowledge and healthy food acquisition in northwestern Ontario First Nations. Health Educ Behav, 2008. 35(4): p. 561-73.	Community, School	QE-PPT	95	Whole population	9 mo: multicomponent intervention including nutrition education in schools; modification of school nutrition policies and meals; community mass media promotion and events; participation of stores in the community (stocking and promotion of healthier foods and drinks)	No follow up	BMI, % BF	BMI: -0.3 (P = 0.89); %BF: -0.1 (P = 0.74)	Not significant	Yes	American Diabetes Association Clinical Research Award No. 7-04-CR-15 and a US-Canada Fulbright Award
Hoelscher et al. 2010 [162]	Hoelscher, D.M., et al., Reductions in child obesity among disadvantaged school children with community involvement: the Travis County CATCH Trial. Obesity (Silver Spring), 2010. 18 Suppl 1: p. S36-44.	Community, School	Serial XS	1107	9 - 10	12 mo: CATCHBasicPlus program with a community involvement component. Intervention given to 4th-grade students via classroom curricula, PE program, child nutrition services component, and family involvement. Community was involved for larger partnerships to extend school programs to surrounding community.	No follow up	% overweight and obese	% overweight (>85th percentile): −7.0 (P = 0.051); % obese (>95th percentile): −1.7 (P = 0.33)	Significant (for obese only)	Yes	Flaghouse, Inc. and the Michael & Susan Dell Foundation
Hollar et al. 2010a [163]	Hollar, D., et al., Effective multi-level, multi-sector, school-based obesity prevention programming improves weight, blood pressure, and academic performance, especially among low-income, minority children. J Health Care Poor Underserved, 2010. 21(2 Suppl): p. 93-108.	School	RCT	3769	4 - 12	24 mo: Healthier options for public schoolchildren (HOPS): a multilevel (individual, community, and policy) and multi agency collaboration. Teachers were trained on curriculum and given technical assistance. Components included modified school meal menus, nutrition/lifestyle educational curricula, in-school PE, and wellness projects like growing gardens.	No follow up	BMI z-score	BMI z-score: -1.26 (P = 0.004)	Significant	Yes	W.K. Kellogg Foundation

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Hollar et al. 2010b [164]	Hollar, D., et al., Effect of a two-year obesity prevention intervention on percentile changes in body mass index and academic performance in low-income elementary school children. Am J Public Health, 2010. 100(4): p. 646-53.	School	QE	3769	4 - 12	24 mo: Description: Nutritious school meals; healthy nutrition and lifestyle curricula; school-based wellness activities	No follow up	BMI percentile	More children in the intervention group remained within the normal BMI percentile range (P = 0.02)	Significant	Yes	Agatston Research Foundation
Hollar et al. 2010c [165]	Hollar, D., et al., Healthier options for public schoolchildren program improves weight and blood pressure in 6- to 13-year-olds. J Am Diet Assoc, 2010. 110(2): p. 261-7.	School	QE	2494	6 - 13	24 mo: Healthier Options for Public Schoolchildren (HOPS) included: provision of nutritious ingredients and whole foods in school breakfasts, lunches, and extended day snacks; nutrition and PA education; and the implementation of other school-based wellness activities such as fruit and vegetable gardens	No follow up	BMI z-score	BMI z-score: Boys: -0.11 (P = 0.86); Girls: -0.03 (P = 0.0031)	Significant (for girls only)	Yes	Agatston Research Foundation
Howe et al. 2011 [166]	Howe, C.A., R.A. Harris, and B. Gutin, A 10-month physical activity intervention improves body composition in young black boys. J Obes, 2011. 2011: p. 358581.	School	RCT	106	8 - 12	10 mo: after school PA program for boys delivered by study personnel and school teachers. 80 min of PA after school every day, consisting of 25 min of skill development, 35 min of moderate-to- vigorous PA, and 20 min of stretching/toning. Boys wore heart rate monitors to record PA intensity and asked to maintain a heart rate of at least 150 bpm. Healthy snack provided.	No follow up	BMI, % BF, WC	For boys attending > 60% of program: % BF: -2.9 (P = 0.029); BMI: -0.6 (P = 0.009); WC: -0.9 (P = >0.05)	Significant	Yes	NIH grant HL69999
Jansen et al. 2011 [167]	Jansen, W., et al., Effectiveness of a primary school-based intervention to reduce overweight. Int J Pediatr Obes, 2011. 6(2-2): p. e70-7.	School	C-RCT	2622	6 - 12	12 mo: IG: Multi-component, school-based intervention program consisting of (i) implementation of an additional PE session weekly; (ii) organization of additional sports activities outside of school hours; (iii) classroom-based education; (iv) administration of a fitness test; (v) sports events. CG: usual curriculum	No follow up	BMI, WC, % overweight and obese	For ages 9 - 12 years: no effects; For ages 6 - 8 years: BMI: -0.10 (CI: -0.22 – -0.03; P = >0.05); % overweight children (OR 0.53; CI: 0.36 – 0.78); WC: -1.29 cm (CI: -2.16 to -0.42; P = < 0.05)	Significant (for younger children only)	Yes	Not reported

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Jordan et al. 2008 [168]	Jordan, K.C., et al., Evaluation of the Gold Medal Schools program. J Am Diet Assoc, 2008. 108(11): p. 1916-20.	School	CBA	577	8 - 11	12 mo: Gold Schools Program consisted of criterion-based implementation of multi-component policies with the goal of establishing policy and environmental supports that give students and staff more opportunities for nutritious food choices, regular physical activity, and tobacco prevention.	No follow up	BMI z-score	BMI z-score increased significantly in the comparison group (0.53 +/- 0.38; P = < 0.05), but not in the intervention group (0.21 +/-0.47; P = 0.484)	Not significant	Yes	Utah Department of Health and the Children's Health Research Center
Kain et al. 2004 [169]	Kain, J., et al., School-based obesity prevention in Chilean primary school children: methodology and evaluation of a controlled study. Int J Obes Relat Metab Disord, 2004. 28(4): p. 483-93.	School	Longitudinal controlled evaluation	3086	6 - 14	8 mo: IG: nutrition education to children, parents and school kiosk owners; physical activity intervention that included an additional PE lesson, purchase of PA equipment and playing music to encourage active play during recess. CG: standard curriculum	No follow up	BMI, BMI z-score,	Boys: BMI: -0.3 (P = <0.001); BMI z-score: -0.14 (P = <0.001); Girls: no change	Significant (for boys only)	Yes	Chilean Ministry of Education, Chile Deportes (Government Sports Promotion Agency) and an unrestricted grant from Corpora Tresmontes
Kremer et al. 2011 [170]	Kremer, P., et al., Reducing unhealthy weight gain in Fijian adolescents: results of the Healthy Youth Healthy Communities study. Obesity reviews: an official journal of the International Association for the Study of Obesity, 2011. 12 Suppl 2: p. 29-40.	Community	QE	2936	13 - 18	36 mo: Community consultation and engagement processes with school, parent and church representatives and other stakeholders. Community workshops were held to develop actions plans. In addition to small media strategies such as newspaper articles and pamphlets, a range of initiatives were implemented in schools, faith organisations and the community including walking groups, school food gardens, provision of water bottles and activity equipment, provision of training for school staff, poster displays, community events, and student aerobics clubs.	No follow up	BMI, BMI z-score, weight, % BF, % overweight or obese	% BF: −1.17 (p = < 0.01). No significant differences in weight (+0.05 kg; p = 0.81); BMI (+0.10; p = 0.13); BMI-z (+0.02; p = 0.33); or proportion of participants who are overweight or obese (+0.34%; p = 0.07).	Significant (for % BF only)	Yes	Ministry of Health, AusAID.

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Luepker et al. 1996 [171]	Luepker, R.V., et al., Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health. CATCH collaborative group. Jama, 1996. 275(10): p. 768-76.	School	RCT	5106	8 - 11	36 mo: The Child and Adolescent Trial for Cardiovascular Health (CATCH) involved (i) Diet and physical activity patterns classroom lessons; (ii) Physical activity intervention; (iii) Family involvement; (iv) School food service modification; (v) Control schools—usual PE, food service, and health education	No follow up	BMI, SFT	BMI: +0.06 (P = 0.32); SFT: +0.1 (P = 0.7)	Not significant	No	NHLBI Grants U01-HL-39880, U01-HL39906, U01-HL-39852, U01-HL-39927, and U01-HL39870
Maloney et al. 2008 [172]	Maloney, A.E., et al., A pilot of a video game (DDR) to promote physical activity and decrease sedentary screen time. Obesity (Silver Spring), 2008. 16(9): p. 2074-80.	Community	RCT	60	7 - 8	2.5 mo: families in the intervention group were provided with all equipment necessary to play DDR in the home (PlayStation2 game console, DDR MAX2 game, and two padded dance mats). Children were given a written physician prescription to play 120 minutes per week of DDR, preferably divided over four sessions.	4.5	BMI, BMI z-score	Across all groups, BMI z-scores were stable from baseline to week 10	Not significant	No	Gatorade Foundation via the UNC at Chapel Hill, School of Public Health. Research support was provided in part by the NIH grants T32-MH19011 and T32 HD 40127.
Marcus et al. 2009 [173]	Marcus, C., et al., A 4-year, cluster-randomized, controlled childhood obesity prevention study: STOPP. Int J Obes (Lond), 2009. 33(4): p. 408-17.	School	C-RCT	3135	6 - 10	46 mo: IG: modification of school meals; promotion of low fat dairy products and whole-grain bread; elimination of all sweets and sweetened drinks in intervention schools; restriction of sedentary behaviour during after school care time; increase of PA during school hours. CG: normal curriculum	No follow up	BMI SD, Overweight and obesity prevalence	O&O prevalence: -6% (-10.6% to -1.3%; P = <0.05); BMI SD: no change	Significant (for overweight and obesity prevalence only)	Yes	Stockholm County Council, Swedish Council for working life and social research, Swedish Research Council, Freemason's in Stockholm Foundation for Children's Welfare and Signhild Engkvist Foundation

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Martinez Vizcaino et al. 2008 [174]	Martinez Vizcaino, V., et al., Assessment of an after-school physical activity program to prevent obesity among 9- to 10-year-old children: a cluster randomized trial. Int J Obes (Lond), 2008. 32(1): p. 12-22.	School	C-RCT	1044	9 - 10	6 mo: IG: free PA sessions after school (three 90-min sessions per week). CG: usual curriculum	3	% overweight and obese, BMI, % BF, SFT	Boys: % overweight and obese: OR 0.72 (CI: 0.39 to 1.31; P = 0.28); BMI: -0.13 (CI: -0.41 to 0.16; P = 0.38); SFT: -1.87mm (CI: -3.43 to -0.32; P = 0.01); % BF -0.67 (CI: -1.32 to -0.01; P = 0.05)	Significant	Yes	La Consejería de Sanidad de Castilla-La Mancha (grant GC03060-00). Additional funding was obtained from the Ministerio de Sanidad y Consumo, Instituto de Salud Carlos III, Red de Investigacio´n en Actividades Preventivas y de Promocio´n de Salud (grant RD06/0018/0038)
Millar et al. 2011 [175]	Millar, L., et al., Reduction in overweight and obesity from a 3-year community-based intervention in Australia: the 'It's Your Move!' project. Obesity reviews : an official journal of the International Association for the Study of Obesity, 2011. 12 Suppl 2: p. 20-8.	Community	QE	3040	12 - 18	36 mo: Community consultation and engagement processes were conducted with school staff and students. In addition to media strategies, a range of initiatives were implemented, predominately in schools, including training for students and staff; water bottles; installation of drinking fountains; removal of soft drink from vending machines; lunch time physical activity opportunities, sports excursions and walking groups.	No follow up	BMI, BMI z-score, % BF, % overweight and obese	BMI z-score: −0.07 (p = 0.03); No-significant differences in proportion of participants who are overweight or obese (0.75 OR; p = 0.12), BMI (−0.22; p = 0.06) and % BF (−0.23, p = 0.58).	Significant (for BMI z-score only)	Yes	Victorian Department of Health, the National Health and Medical ResearchCouncil in conjunction with the Health Research Council (NZ) and the Wellcome Trust (UK) as partof the International Collaborative ResearchGrant Scheme, AusAID.

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Muckelbauer et al. 2009 [176]	Muckelbauer, R., Libuda, L., Clausen, K., Toschke, A.M., Reinehr, T. & Kersting, M. (2009) Promotion and provision of drinking water in schools for overweight prevention: randomized, controlled cluster trial. Pediatrics 123, E661– E667	School	RCT	2950	8	11 mo: Water fountains and water bottles provided in schools plus educational programme of four 45-min lessons on water	No follow up	BMI SD score	BMI SDS: -0.004 (-0.045 to 0.036; P = 0.829); risk of being overweight was reduced by 31% (P = 0.04) in the intervention group	Significant	Yes	Grant 05HS026 from the German Federal Ministry of Food, Agriculture and Consumer Protection; Intervention materials provided by the Association of German Gas and Water Industries.
Nader et al. 1999 [177]	Nader, P.R., et al., Three-year maintenance of improved diet and physical activity: the CATCH cohort. Child and Adolescent Trial for Cardiovascular Health. Arch Pediatr Adolesc Med, 1999. 153(7): p. 695-704.	School	RCT	3714	11 - 15	36mo: The Child and Adolescent Trial for Cardiovascular Health (CATCH) involved (i) Diet and physical activity patterns classroom lessons; (ii) Physical activity intervention; (iii) Family involvement; (iv) School food service modification; (v) Control schools—usual PE, food service, and health education	36	BMI, SFT	BMI at 36 mo: 0.0 (P = 0.88); SFT at 36mo: -0.1 (P = 0.83)	Not significant	No	NHLBI Grants U01-HL-39880, U01-HL39906, U01-HL-39852, U01-HL-39927, and U01-HL39870
Ni Mhurchu et al. 2008 [178]	Ni Mhurchu, C., et al., Couch potatoes to jumping beans: a pilot study of the effect of active video games on physical activity in children. Int J Behav Nutr Phys Act, 2008. 5: p. 8.	Community	RCT	20	12	3 mo: intervention group received an active video game upgrade package consisting of an EyeToy® camera, EyeToy® active games, and dance mat. Participants and their parents or guardians were instructed to substitute usual non-active video game play with active video games at home	No follow up	Weight, WC	Body weight: -0.13 kg (CI:. -1.97 to 1.7; P = 0.9); WC: -1.4 cm (CI: -2.68 to -0.04; P = 0.04)	Not significant (insufficient study power)	No	Health Research Council of New Zealand (05/228). Sony Computer Entertainment New Zealand provided the gaming software for the study

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Ni Mhurchu et al. 2009 [179]	Ni Mhurchu, C., et al., Effect of electronic time monitors on children's television watching: pilot trial of a home-based intervention. Prev Med, 2009. 49(5): p. 413-7.	Home	RCT	29	9 - 12	1.5 mo: Intervention group received an electronic TV time monitor (Time Machine) designed to reduce access to TV by controlling the TV signal, using tokens administered by parents which activate the TV for 30 min per token, and advice to restrict TV watching to 1 h per day or less. TV signal was interrupted after the allotted time period thus limiting further TV viewing. Parents received advice on how to manage time allotted by providing a weekly or daily 'allowance' with the tokens, such as by creating rules around household TV viewing (e.g. no TV during meal times, TV free days, and recording programmes to skip adverts) and moving the TV to a less accessible location. The control group was given verbal advice to restrict TV watching	No follow up	BMI	BMI: +0.05 (P = 0.83)	Not significant	No	Health Research Council of New Zealand (07/384) and the NewZealand National Heart Foundation (Grant 1303)
Owens et al. 2011 [180]	Owens, S.G., et al., Changes in physical activity and fitness after 3 months of home Wii Fit use. J Strength Cond Res, 2011. 25(11): p. 3191-7.	Community	PPT	21 (12 children)	8 - 13	3 mo: Four Wii Fit units were loaned to 8 families enrolled in the study in pairs such that 1 family from each pair was randomly selected and loaned a Wii Fit for use in the home during the first 3 months of the study, with the other family scheduled to use the Wii Fit during the second 3 months	3	BMI, % BF	No change in BMI or % BF	Not significant	No	School of Applied Sciences, the University of Mississippi

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Paradis et al. 2005 [181]	Paradis, G., et al., Impact of a diabetes prevention program on body size, physical activity, and diet among Kanien'keha:ka (Mohawk) children 6 to 11 years old: 8-year results from the Kahnawake Schools Diabetes Prevention Project. Pediatrics, 2005. 115(2): p. 333-9.	Community, school	nRCT	1622	6 - 12	96 mo: Health education curriculum involving diet and physical activity delivered in grades 1-6 in community's elementary schools. Establishment of a school nutrition policy and modification of school canteen. Community activities and creation of supportive environments including recreational pathways.	96	SFT, BMI	Some early positive effects on SFT but not BMI. Benefits not maintained at 8 years, as repeat cross-sectional measures from 1994 to 2002 showed increases in skinfold thickness and BMI.	Not significant	No	Health Canada through the National Health Research and Development Program (grants 6605-4188-ND and 6605-4187-ND) and the Canadian Institutes for Health Research, the Kahnawake community, and private foundations.
Pate et al. 2005 [182]	Pate, R.R., et al., Promotion of physical activity among high-school girls: a randomized controlled trial. Am J Public Health, 2005. 95(9): p. 1582-7.	School	RCT	2744	15 - 16	12 mo: LEAP approach including enhanced physical activity during school hours; environmental change to create a supportive environment included role modelling and promotion of PA by school staff, and family and community-based activities	No follow up	% overweight and obese	% ≥ 85th percentile: +1.1% (P = 0.5); % ≥95th percentile: +0.1% (P = 0.97)	Not significant	No	NHLBI Grant R01HL057775
Raczynski et al. 2009 [183]	Raczynski, J.M., et al., Arkansas Act 1220 of 2003 to reduce childhood obesity: its implementation and impact on child and adolescent body mass index. J Public Health Policy, 2009. 30 Suppl 1: p. S124-40.	State-wide	QE-PPT	Unclear	Whole population	48 mo: annual measurement of BMI for all children attending public schools and reporting of BMI and associated risks to parents; elimination of student access to vending machines in elementary schools; hiring of community health promotion specialists to work with schools and communities; public reporting of vending contracts	No follow up	% overweight and obese	% overweight: -3.7%; % obese: + 3.4%	Unclear	No	Robert Wood Johnson Foundation grants 051737, 60284, 30930
Ramirez-Lopez et al. 2005 [184]	Ramirez-Lopez, E., et al., [Effect of a School Breakfast Program on the prevalence of obesity and cardiovascular risk factors in children]. Salud Publica de Mexico, 2005. 47(2): p. 126-33.	School	QE-prospective	360	6 - 10	9 mo: the intervention group consisted of 254 children participating in a School Breakfast Program	No follow up	BMI	BMI: 0.0 (P = 0.05)	Not significant	No	Not reported

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Resnicow et al. 1992 [185]	Resnicow, K., et al., A three-year evaluation of the know your body program in inner-city schoolchildren. Health Educ Q, 1992. 19(4): p. 463-80.	School	Cohort	1209	5 - 12	31 mo: (i) 30-45 minute weekly health education curriculum; (ii) School food service intervention; (iii) Poster and essay contests, student aerobics, and special health lectures; (iv) Student health committees, peer leader training, and food-tasting parties; (v) Control schools—usual PE, food service, and health education	No follow up	BMI	BMI: -0.3 (P = > 0.05)	Not significant	No	The Ford Foundation and the Cancer Research Foundation of America
Robinson 1999 [186]	Robinson, T.N., Reducing children's television viewing to prevent obesity: a randomized controlled trial. Jama, 1999. 282(16): p. 1561-7.	School, Home	RCT	192	8 - 10	7 mo: IG: Intervention consisted of: (i) 18 sessions curricular education to teach students to ‘‘budget’’ television viewing time to 7 hours/week; (ii) challenge to watch no television for 10 days at the end of the curriculum; (iii) Electronic television time manager device placed in homes of intervention group students. CG: standard curriculum	No follow up	BMI, SFT, WC, WHR	BMI: -0.45 (CI: -0.73 to -0.17; P = 0.002); SFT: -1.47 (CI: -2.41 to -0.54; P = 0.002); WC: -2.3 (CI: -3.27 to -1.33; P = <0.001); WHR: -0.02 (CI: -0.03 to -0.01; P = <0.001)	Significant	Yes	American Heart Association; NHLBI (grant RO1 HL54102)
Robinson et al. 2003 [187]	Robinson, T.N., et al., Dance and reducing television viewing to prevent weight gain in African-American girls: the Stanford GEMS pilot study. Ethn Dis, 2003. 13(1 Suppl 1): p. S65-77.	Community, Home	RCT	61	8 - 10	3 mo: (i) After-school dance classes with healthy snack, homework period and discussion of increased physical activity (dance) and reduced TV screen time, (ii) family intervention, (iii) newsletters	No follow up	BMI, WC	BMI: -0.32 (CI: -0.77 to 0.12; P = 0.16); WC: -0.63 (CI: -1.92 to 0.67; P = 0.35)	Not significant	Yes	NHLBI (Cooperative agreement UO1 HL62663) and a Robert Wood Johnson Foundation Generalist Physician Faculty Scholar Award
Robinson et al. 2010 [188]	Robinson, T.N., et al., A randomized controlled trial of culturally tailored dance and reducing screen time to prevent weight gain in low-income African American girls: Stanford GEMS. Arch Pediatr Adolesc Med, 2010. 164(11): p. 995-1004.	Community, Home	RCT	284	8 - 10	24 mo: Community-based intervention including (i) provision of small snack, (ii) 45-60 minutes of dance, (iii) education component to reduce screen time (iv) health education component	No follow up	BMI	BMI: +0.04 (CI: -0.18 to 0.27)	Not significant	No	NHLBI (Cooperative agreement UO1 HL62663)

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Sahota et al. 2001 [189]	Sahota, P., et al., Randomised controlled trial of primary school based intervention to reduce risk factors for obesity. Bmj, 2001. 323(7320): p. 1029-32.	School	RCT	634	7 - 11	10 mo: Active Programme Promoting Lifestyle in Schools (APPLES): an intervention consisting of school lunch modifications and school action plans designed to promote healthy nutrition and physical activity	No follow up	BMI SD score	BMI SD score: 0.00 (CI: -0.1 to 0.1)	Not significant	No	Northern and Yorkshire Region Research and Development Unit
Saksvig et al. 2005 [190]	Saksvig, B.I., et al., A pilot school-based healthy eating and physical activity intervention improves diet, food knowledge, and self-efficacy for native Canadian children. J Nutr, 2005. 135(10): p. 2392-8.	School	PPT	122	8 - 12	9 mo: multicomponent intervention including nutrition education; students as role models; family component; implementation of a school-wide policy banning high-fat an high-sugar snack foods in schools; implementation of a healthy breakfast snack program	No follow up	BMI, % BF	BMI: +0.95 (P = <0.001); % BF: +1.18 (P = <0.001)	Significant	No	Health Canada, The Ontario Ministry of Health, Kraft Foods, Eli Lilly, and a Canada-U.S. Fulbright Scholarship
Salanave et al. 2009 [191]	Salanave, B., et al., Stabilization of overweight prevalence in French children between 2000 and 2007. Int J Pediatr Obes, 2009. 4(2): p. 66-72.	Community, School	Repeat XS	1582	7 - 9	96 mo (implemented in 2001 and ongoing as of article publication date): In schools, nutrition added to curriculum, healthy eating and activity encouraged, changes to nutritional environment; Food-based guides for general population; Annual mass media campaigns	No follow up	overweight and obesity prevalence	Non-significant decrease in overweight prevalence in each SEP category	Not significant	Unclear	Unclear
Sallis et al. 2003 [192]	Sallis, J.F., et al., Environmental interventions for eating and physical activity: a randomized controlled trial in middle schools. Am J Prev Med, 2003. 24(3): p. 209-17.	School	RCT	1678	11 - 14	24 mo: IG: PA component included environmental changes to increase physical activity before, during and after school (e.g. increased supervision, purchased PA and kitchen equipment, organized activities, increased accessibility of activity areas, promotion of PA outside of PE); Nutrition component included changes to school food service; reduced fat in school diet, student restaurants. CG: no change	No follow up	BMI	BMI: Girls: -0.09 (P = 0.77); Boys: -0.64 (P = 0.044)	Significant (for boys only)	Yes (among boys only)	NIH grant HL54564

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Sanchez-Vaznaugh et al. 2010 [193]	Sanchez-Vaznaugh, E.V., et al., 'Competitive' food and beverage policies: are they influencing childhood overweight trends? Health Aff (Millwood), 2010. 29(3): p. 436-46.	School	NE	5,389,819	10 - 12	NA: Implementation of new school policies in the state of California restricting sales of competitive foods and beverages and setting stricter nutrition standards for certain food and beverages sold to students (implementation started in 2004)	36	% overweight and obese	% change in the odds of overweight and obese per year after 2004: 5th grade girls: -53.9% (P = 0.111); 5th grade boys: -93.5% (P = 0.001); 7th grade girls: -87.5% (P=<0.001); 7th grade boys: -112.1% (P=<0.001)	Significant	Yes	Robert Wood Johnson Foundation's Healthy Eating Research, New Connections Program, and the W.K. Kellogg Health Scholars Program
Sanigorski et al. 2008 [194]	Sanigorski, A.M., et al., Reducing unhealthy weight gain in children through community capacity-building: results of a quasi-experimental intervention program, Be Active Eat Well. Int J Obes (Lond), 2008. 32(7): p. 1060-7.	School	QE-prospective		4 - 12	36 mo: IG: Nutrition strategies included improved school nutrition policies, canteen menu changes, healthy breakfast days, community garden and educational material. PA strategies included after-school activities, walking school buses, walk to school days and new equipment. CG: no change	No follow up	BMI z-score, WHR, WC	BMI z-score: -0.11 (CI: -0.21 to -0.01; P = 0.04); WHR: -0.02 (CI: -0.03 to -0.04; P = 0.01); WC: -3.4cm (CI: -5.07 to -1.22; P = 0.01)	Significant	Yes	Commonwealth Department of Health and Aging, Victorian Department of Human Services, VicHealth
Sichieri et al. 2009 [195]	Sichieri, R., et al., School randomised trial on prevention of excessive weight gain by discouraging students from drinking sodas. Public Health Nutr, 2009. 12(2): p. 197-202.	School	RCT	1140	9-12	7 mo: implementation of a healthy lifestyle education programme encouraging water consumption instead of SSB; banners hung promoting water consumption; water bottles with campaign logo were distributed	No follow up	BMI, overweight and obesity prevalence	BMI: +0.1 (CI: 0.06 to 0.10)	Not significant	No	Brazilian National Research Council (CNPq) Grant number: 500404/2003-8-CNPq

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Siegrist et al. 2013 [196]	Siegrist, M., et al., Effects of a physical education program on physical activity, fitness, and health in children: the JuvenTUM project. Scand J Med Sci Sports, 2013. 23(3): p. 323-30.	School	RCT	427	8.4 (mean)	12 mo: Multi-component JuvenTUM intervention was on directly educating and encouraging children, teachers, and parents to live active and healthy lifestyles. Additionally, school environmental settings were altered to promote more physical activity (classrooms, the halls and the playgrounds at school were modified so that more physical activity was encouraged). Measures were taken to improve the quality of food sold at school snack bars and/ or at school stores. These changes were designed to increase physical movement, promote healthier food availability and choices, and reduce media consumption.	No follow up	WC, BMI, BMI z-score	WC: -1.7 (CI: 1.2 to 2.3; P < 0.001)	Significant (for WC only)	Yes	Unclear
Simon et al. 2004 [197]; Simon et al. 2008 [198]	Simon, C., et al., Intervention centred on adolescents' physical activity and sedentary behaviour (ICAPS): concept and 6-month results. Int J Obes Relat Metab Disord, 2004. 28 Suppl 3: p. S96-S103. Simon, C., et al., Successful overweight prevention in adolescents by increasing physical activity: a 4-year randomized controlled intervention. Int J Obes (Lond), 2008. 32(10): p. 1489-98.	School	RCT	954	12	48 mo: IG: multilevel intervention involving (i) educational component; (ii) new opportunities for physical activity at lunchtime, during breaks and after-school hours; (iii) Sporting events, free transfers to PA areas and 'cycling to school' days were organized. CG: no change	No follow up	BMI, FMI, % overweight	BMI: -0.36 (CI: -0.6 to -0.11, P <0.001); FMI: -0.2 (CI: -0.39 to -0.01) at 4 years; 5.6% fewer children who were initially normal weight were overweight in the intervention schools (OR: 0.41; CI: 0.22 to 0.75)	Significant (in initially normal weight students only)	Yes	The Regional Health Insurance of Alsace-Moselle; National Program of Research in Human Nutrition (INSERM and INRA); French Public Authorities within the National Nutritional Health Program; Conseil General du Bas-Rhin; Municipalities of Drusenheim, Illkirch-Graffenstaden, Obernai and Schiltigheim and The International Longevity Centre

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Singh et al. 2007 [199], Singh et al. 2009 [200] (FU study)	Singh, A.S., et al., Short-term effects of school-based weight gain prevention among adolescents. Arch Pediatr Adolesc Med, 2007. 161(6): p. 565-71. (2007 article); Singh AS, Chin A Paw MJ, Brug J, van Mechelen W. Dutch obesity intervention in teenagers: effectiveness of a school-based program on body composition and behavior. Arch Pediatr Adolesc Med. 2009;163(4): 309–317 (2009 article)	Community, school	C-RCT	1108	12.7 (mean)	8 mo: education in biology and physical activity, environmental change options for schools (physical education classes, changes to school cafeteria)	20	BMI; SFT (sum)	**Girls:** BMI: +0.2 (CI: -0.1 to 0.5); SFT (sum): -2.0 (CI: -3.9 to -0.1); WC: +0.9 (CI: -1.1 to 0.6); Boys: BMI: +0.2 (CI: -0.1 to 0.4); SFT (sum): -1.1 (CI: -4.4 to 0.2); WC: +1.1 (CI: 0.1 to 2.0)	Significant (for sum of SFT only in girls and boys; undesirable effect on BMI and WC in both genders)	Unclear (undesirable effect on WC in boys)	Netherlands Research Programme for Weight Gain Prevention; Grant 2000Z002
Singhal et al. 2010 [201]	Singhal, N., et al., Effects of controlled school-based multi-component model of nutrition and lifestyle interventions on behavior modification, anthropometry and metabolic risk profile of urban Asian Indian adolescents in North India. Eur J Clin Nutr, 2010. 64(4): p. 364-73.	School	RCT	201	15 - 17	6 mo: IG: multi-component intervention including: (i) educational component (ii) policy-level changes in school such as modification of school canteen menu and banning the sale of soft drinks and high calorie foods (iii) parental involvement. CG: no change	No follow up	BMI, WC, WHR	BMI: -0.01 (CI: -0.18 to 0.34); WC: -1.2 (CI: -2.43 to −0.17; P = 0.02); WHR: -0.022 (CI: -0.03 to -0.004; P = 0.02)	Significant (for WC and WHR only)	Yes (for WC only)	World Diabetes Foundation, Denmark (WDF05-120)
Story et al. 2003 [202]	Story, M., et al., An after-school obesity prevention program for African-American girls: the Minnesota GEMS pilot study. Ethn Dis, 2003. 13(1 Suppl 1): p. S54-64.	School, Home	RCT	54	8 - 10	3 mo: after-school multi-component intervention with (i) PA programme offering a variety of activities (ii) club meetings with educational/behavioural themes (iii) weekly food packets sent to families	No follow up	BMI, WC	BMI: +0.2 (P = 0.35); WC: +1.4 (P = 0.08)	Significant (for WC only)	No	NHLBI Cooperative agreement UO1 HL62668-02

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Taber et al. 2012 [203]	Taber, D.R., et al., Weight status among adolescents in States that govern competitive food nutrition content. Pediatrics, 2012. 130(3): p. 437-44.	State-wide	NE	6300	10 - 15	36 mo: Introduction of food and beverage state laws in 40 states between 2003 and 2006	No follow up	BMI	BMI: -0.25 (CI: -0.54 to 0.03)	Significant (for strong laws)	Yes	Robert Wood Johnson Foundation grant number R01HL096664 from the NHLBI; and contracts HHSN261201000350P and HHSN261201100522P from the National Cancer Institute to the University of Illinois at Chicago
Taylor et al. 2007 [204], Taylor et al. 2008 [205] (FU study)	Taylor, R.W., et al., APPLE Project: 2-y findings of a community-based obesity prevention program in primary school age children. Am J Clin Nutr, 2007. 86(3): p. 735-42. (2007 article); Taylor, R.W., et al., Two-year follow-up of an obesity prevention initiative in children: the APPLE project. Am J Clin Nutr, 2008. 88(5): p. 1371-7. (2008 article)	Community, School	nRCT	730	5 - 12	24 mo: IG: APPLE components involved: (i) nutrition education; (ii) employment of activity coordinators to manage an activity program that focused on non-curricular lifestyle-based activities during and after school (e.g. community walks); (ii) some environmental modification including provision of cooled water filters, provision of free fruit for 6 months, and increased promotion and availability of sport and play equipment to enhance 'free play'. CG: No change	24	BMI z-score, RR of being overweight (overweight prevalence)	At end of intervention: BMI z-score: -0.30 (CI: -0.36 to -0.25); RR overweight : 0.70 (CI: 0.54 to 0.9); At 2 year follow-up: BMI z-score: -0.21 (CI: -0.29 to -0.14); RR overweight: 0.81 (CI: 0.69 to 0.94)	Significant	Yes	Health Research Council, the National Heart Foundation, The Community Trust of Otago, The University of Otago, the Otago Diabetes Research Trust
Tian et al. 2006 [206]	Tian, B., et al., Impact evaluation on obesity control among primary school students in 4 cities in China. Chin J School Health, 2006. 27: p. 869-871.	School	C-RCT	Unclear	8 - 11	12 mo: health education including dissemination through notice boards; Family involvement; improvement to school environment by providing sports facilities in intervention schools	No follow up	overweight and obesity prevalence	Prevalence of Overweight and obesity: -3.1% (P = <0.01)	Significant	Yes	Unclear

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Todd et al. 2008 [207]	Todd, M.K., et al., Effect of a family-based intervention on electronic media use and body composition among boys aged 8--11 years: a pilot study. J Child Health Care, 2008. 12(4): p. 344-58.	Home	RCT	22	8 - 11	5 mo: Children and parents attended family-centred interactive session designed to reduce TV-viewing time and increase awareness to minimize electronic media use. TV and computer-locking devices were installed to help monitoring and limiting children's TV and computer use.	No follow up	BMI	No significant change	Not significant	No	Unclear
Utter et al. 2011 [208]	Utter, J., et al., Evaluation of the Living 4 Life project: a youth-led, school-based obesity prevention study. Obesity reviews : an official journal of the International Association for the Study of Obesity, 2011. 12 Suppl 2: p. 51-60.	Community, School	QE with repeated XS	1634	12 - 18	36 mo: Community consultation and engagement processes were conducted with government health departments, school staff and students, local health providers, non-government organisations and other community stakeholders to develop community actions plans. A range of initiatives were implemented in schools, including breakfast clubs, lunch time activities, after school dance, improvements in school food quality, installation of water fountains, distribution of drink bottles, and provision of physical activity equipment.	No follow up	BMI, BMI z-score, % BF	BMI: +0.34 (P = 0.18); BMI z-score: +0.14 (P = 0.13); % BF: +1.07 (P = 0.16)	Not significant	No	The Wellcome Trust (UK), the NationalHealth and Medical Research Council (Australia) andthe Health Research Council (New Zealand) through the International Collaborative Research Grant Scheme
Wang et al. 2008 [209]	Wang, L.Y., et al., Cost-effectiveness of a school-based obesity prevention program. J Sch Health, 2008. 78(12): p. 619-24.	School	RCT	601	8.5	36 mo: IG: FitKid after-school program offered 2-hour after-school intervention sessions daily. Sessions started with a 40-min period during which the youths were provided with a healthy snack and academic enrichment activities, followed by 80 min of physical activity included a variety of activities designed to improve sport skills, aerobic fitness, strength, and flexibility (40 min were devoted to vigorous physical activity)	No follow up	% BF	% BF: -0.76 (CI: -1.42 to -0.09)	Significant	Yes	NIH DK63391

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Webber et al. 2008 [210]	Webber, L.S., et al., Promoting physical activity in middle school girls: Trial of Activity for Adolescent Girls. Am J Prev Med, 2008. 34(3): p. 173-84.	Community, School	RCT	8727	11 - 15	24 mo: intervention consisted of (a) cues, messages and incentives to be more physically active; (b) environmental and organizational changes supportive of PA were introduced, including lunch-time dance sessions, after-school step-aerobics classes, before-school open gym. Aimed at girls.	12	BMI, % BF	BMI: +0.1 (CI: -0.4 to 0.7); %BF: +0.2 (CI: -0.6 to 1.1)	Not significant	No	NHLBI grants U01 HL066855 (Tulane University); U01HL066845 (University of Minnesota); U01HL066852 (University of South Carolina); U01HL066853 (University of North Carolina at Chapel Hill); U01HL066856 (San Diego State University); U01HL066857 University of Maryland); U01HL066858 (University of Arizona)
Williamson et al. 2007 [211]	Williamson, D.A., et al., Wise Mind project: a school-based environmental approach for preventing weight gain in children. Obesity (Silver Spring), 2007. 15(4): p. 906-17.	School	RCT	586	7 - 12	18 mo: Wise Mind Project: an environmental intervention focusing on changing the school ecology through policy and physical changes including cafeteria menu modification, poster and boards promoting healthy eating, purchase of equipment to encourage PA, staff development etc., and educational components	No follow up	BMI z-score	BMI z-score: -0.03 (P = 0.55)	Not significant	Yes	NIH Grant R01DK063453-01
Williamson et al. 2012 [212]	Williamson, D.A., et al., Effect of an environmental school-based obesity prevention program on changes in body fat and body weight: a randomized trial. Obesity (Silver Spring), 2012. 20(8): p. 1653-61.	School	C-RCT	325	9 - 11	28 mo: Multi-component intervention: PP + SP—the PP program modified the school environment to promote healthy nutrition and physical activity with three primary objectives: modify environmental cues related to healthy eating and activity, modify the cafeteria food service program, and modify the physical education programs. The SP program employed a classroom instruction component combined with an internet-based approach	No follow up	% BF, BMI	Environmental modification decreased% BF for boys compared to control (-1.7% ± 0.38% versus −0.14% ± 0.69%) and attenuated fat gain for girls (2.9% ± 0.22% versus 3.93% ± 0.37%), but standardized effect sizes were relatively small (< 0.30)	Not significant	Yes	National Institute for Child Health and Human Development grant R01 HD048483, the U.S. Department of Agriculture grant 58-6435-4-90, the NORC Center grant #1P30 DK072476 and NIH grant K23 DK068052

Author date	URL	Setting	Study design*	Sample size	Age range (years)	Intervention Time: Elements included in intervention	Follow up period from end of intervention (months)	Anthropometric outcome **	Difference in change from baseline for intervention vs control (95% CI)	Significance	Desirable Effect	Funding
Yin et al. 2006 [213]	Yin, Z., et al., An environmental approach to obesity prevention in children: Medical College of Georgia FitKid Project year 1 results. Obesity Research, 2005. 13(12): p. 2153-61.	School	RCT	601	8 - 9	8 mo: a 2 hour after-school programme consisting of 40 minutes of academic activity, a healthy snack, followed by an 80-minute period of PA that provided 20 minutes of warm-up and skills instruction, 40 minutes of continuous MVPA, and 10 minutes of calisthenics and cool-down, delivered by professionals.	No follow up	BMI, % BF, WC	BMI: -0.16 (CI: -0.40 to -0.07; P = 0.18); % BF: -0.76 (CI: -1.42 to -0.09; P = 0.027); WC: -0.4 (CI: -1.1 to 0.4; P = 0.32)	Significant (for % BF only)	Yes (for % BF only)	NIH grant RO1 DK63391

* Study design: CT (Controlled Trial, with or without randomisation), CCT (Controlled Clinical Trial), RCT (Randomized controlled trial), nRCT (non-RCT), Q-RCT (Quasi-RCT); Q-nRCT (Quasi-experimental nRCT), NRNCT (Non-Randomised Non-Controlled Trials) C-RCT (Cluster RCT), CBA (Controlled before-and-after study), PCS (Prospective cohort study), RCS (Retrospective cohort study), PCCS (Prospective controlled cohort studies), HCT (Historically controlled trial), NCC (Nested case-control study), CC (Case-control study), XS (Cross-sectional study), CR/CS (Case report/Case series), ITS (Interrupted Time Series), NE (Natural experiments), QE (Quasi-experimental study), PPT (Pre- and Post-test repeated measures design), QE-PPT (Quasi-experimental Pre- and Post-test evaluation), PA (Physical activity)
** % BF (Percentage Body Fat), BMI (Body Mass Index), FFST (fat-free soft tissue), FMI (Fat Mass Index) RR (Relative Risk), SFT (Skin Fold Testing), TSF (Triceps Skin Fold), WC (Waist Circumference), WHR (Waist-to-Hip Ratio)

Appendix S7. Overlap of primary studies across systematic reviews

SRs * → / Primary Studies	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Angelopoulos 2009 [135]																				x			x												x															
Ask 2006 [136]								x																																										
Ask 2010 [137]																																																		
Barbeau 2007 [138]			x																	x															x															x
Caballero 2003 [139]						x		x		x							x				x							x	x	x			x			x					x						x		
Chomitz 2010 [140]				x	x																			x							x																		
Coffield 2011 [141]															x																																			
Coleman 2005 [142]						x	x			x														x							x	x	x							x			x						
Crespo 2012 [143]																																													x					
De Ruyter 2012 [144]	x																										x																x						
Donnelly 1996 [145]						x		x		x		x																					x								x								
Dzewaltowski 2010 [146]																																																x		
Ebbeling 2006 [147]																																														x			
Economos 2007 [148]					x												x														x																	
Engels 2005 [149]			x																						x																								
Foster 2008 [150]																									x										x												x		x
Foster 2010 [151]																								x																										
Fotu 2011 [152]																																																		
French 2011 [153]																																										x				x				
Gao and Xiang 2014 [154]																						x																												
Gombosi 2007 [155]											x																																							
Graves 2010 [156]																																										x								
Greening 2011 [157]																																x															x		x
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SRs → / Primary Studies	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Heelan 2006 [160]																																																	x
Ho 2008 [161]											x																																					
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Kain 2004 [169]						x		x									x												x								x								x	
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Marcus 2009 [173]						x																									x																
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Muckelbauer 2009 [176]	x					x																			x																				x		
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Raczynski 2009 [183]											x																																				
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Robinson 1999 [186]						x		x		x		x				x	x			x			x					x		x				x		x							x		x		
Robinson 2003 [187]			x																									x			x						x								

SRs → / Primary Studies	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Robinson 2010 [188]			x																																														
Sahota 2001 [189]						x		x				x					x	x					x			x		x					x								x					x		x	
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Williamson 2012 [212]																																										x					
Yin 2006 [213]																																									x						

*SRs→ the top row of this table contains numbered references to eligible systematic reviews that have been included in this overview

SRs → / Primary Studies	121	122	123	124	125	126	127	128	129	130	131	132	133	134
Angelopoulos 2009 [135]					x				x					
Ask 2006 [136]			x		x									
Ask 2010 [137]		x	x		x									
Barbeau 2007 [138]									x					
Caballero 2003 [139]									x		x			x
Chomitz 2010 [140]												x		
Coffield 2011 [141]														
Coleman 2005 [142]											x			x
Crespo 2012 [143]														
De Ruyter 2012 [144]														
Donnelly 1996 [145]						x								
Dzewaltowski 2010 [146]									x					
Ebbeling 2006 [147]											x			
Economos 2007 [148]									x				x	
Engels 2005 [149]														
Foster 2008 [150]		x	x		x				x		x	x		
Foster 2010 [151]					x									
Fotu 2011 [152]													x	
French 2011 [153]	x													
Gao and Xiang 2014 [154]														
Gombosi 2007 [155]														
Graves 2010 [156]								x						
Greening 2011 [157]														
Gutin 2008 [158]											x			
Haerens 2006 [159]					x				x		x			
Heelan 2006 [160]												x		

SRs → Primary Studies	121	122	123	124	125	126	127	128	129	130	131	132	133	134
Ho 2006 [161]														
Hoelscher 2010 [162]														
Hollar 2010a [163]														
Hollar 2010b [164]														
Hollar 2010c [165]														
Howe 2011 [166]														
Jansen 2011 [167]					x									
Jordan 2008 [168]												x		
Kain 2004 [169]						x			x	x	x			x
Kremer 2011 [170]													x	
Luepker 1996 [171]						x								
Maloney 2008 [172]								x						
Marcus 2009 [173]											x			
Martinez Vizcaino 2008 [174]									x		x			
Millar 2011 [175]													x	
Muckelbauer 2009 [176]		x	x		x									
Nader 1999 [177]														
Ni Mhurchu 2008 [178]								x						
Ni Mhurchu 2009 [179]								x						
Owens 2011 [180]														
Paradis 2005 [181]							x							
Pate 2005 [182]											x			
Raczynski 2009 [183]														
Ramirez-Lopez 2005 [184]										x		x		
Resnicow 1992 [185]						x								
Robinson 1999 [186]						x		x						
Robinson 2003 [187]						x					x			
Robinson 2010 [188]														

SRs → Primary Studies	121	122	123	124	125	126	127	128	129	130	131	132	133	134
Sahota 2001 [189]														
Saksvig 2005 [190]							x							
Salanave 2009 [191]														
Sallis 2003 [192]														
Sanchez-Vaznaugh 2010 [193]														
Sanigorski 2008 [194]											x		x	
Sichieri 2009 [195]		x	x		x					x	x			
Siegrist 2013 [196]														
Simon 2004 [197]														
Simon 2008 [198]					x			x			x			
Singh 2007 [199]					x				x					
Singh 2009 [200]					x			x			x			
Singhal 2010 [201]										x				
Story 2003 [202]						x			x		x			
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Taylor 2007 [204]									x		x		x	
Taylor 2008 [205]											x			
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Todd 2008 [207]														
Utter 2011 [208]													x	
Wang 2008 [209]														
Webber 2008 [210]					x						x			
Williamson 2007 [211]									x					
Williamson 2012 [212]														
Yin 2006 [213]									x					

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