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Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity (Review)

Flodgren G, Gonçalves-Bradley DC, Summerbell CD

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[Intervention Review]

Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

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ABSTRACT

Background

The prevalence of overweight and obesity is increasing globally, an increase which has major implications for both population health and costs to health services. This is an update of a Cochrane Review.

Objectives

To assess the effects of strategies to change the behaviour of health professionals or the organisation of care compared to standard care, to promote weight reduction in children and adults with overweight or obesity.

Search methods

We searched the following databases for primary studies up to September 2016: CENTRAL, MEDLINE, Embase, CINAHL, DARE and PsycINFO. We searched the reference lists of included studies and two trial registries.

Selection criteria

We considered randomised trials that compared routine provision of care with interventions aimed either at changing the behaviour of healthcare professionals or the organisation of care to promote weight reduction in children and adults with overweight or obesity.

Data collection and analysis

We used standard methodological procedures expected by Cochrane when conducting this review. We report the results for the professional interventions and the organisational interventions in seven 'Summary of findings' tables.

Main results

We identified 12 studies for inclusion in this review, seven of which evaluated interventions targeting healthcare professional and five targeting the organisation of care. Eight studies recruited adults with overweight or obesity and four recruited children with obesity. Eight studies had an overall high risk of bias, and four had a low risk of bias. In total, 139 practices provided care to 89,754 people, with a median follow-up of 12 months.

Professional interventions

Educational interventions aimed at general practitioners (GPs), may slightly reduce the weight of participants (mean difference (MD) -1.24 kg, 95% confidence interval (CI) -2.84 to 0.37; 3 studies, N = 1017 adults; low-certainty evidence).

Tailoring interventions to improve GPs' compliance with obesity guidelines probably leads to little or no difference in weight loss (MD 0.05 (kg), 95% CI -0.32 to 0.41; 1 study, N = 49,807 adults; moderate-certainty evidence).

It is uncertain if providing doctors with reminders results in a greater weight reduction than standard care (men: MD -11.20 kg, 95% CI -20.66 kg to -1.74 kg, and women: MD -1.30 kg, 95% CI [-7.34, 4.74] kg; 1 study, N = 90 adults; very low-certainty evidence).

Providing clinicians with a clinical decision support (CDS) tool to assist with obesity management at the point of care leads to little or no difference in the body mass index (BMI) z-score of children (MD -0.08, 95% CI -0.15 to -0.01 in 378 children; moderate-certainty evidence), CDS tools may lead to little or no difference in weight loss in adults: MD -0.095 kg (-0.21 lbs), P = 0.47; 1 study, N = 35,665; low-certainty evidence.

Organisational interventions

Adults with overweight or obesity may lose more weight if the care was provided by a dietitian (by -5.60 kg, 95% CI -4.83 kg to -6.37 kg) or by a doctor-dietitian team (by -6.70 kg, 95% CI -7.52 kg to -5.88 kg; 1 study, N = 270 adults; low-certainty evidence). Shared care leads to little or no difference in the BMI z-score of children with obesity (adjusted MD -0.05, 95% CI -0.14 to 0.03; 1 study, N = 105 children; low-certainty evidence).

Organisational restructuring of the delivery of primary care (i.e. introducing the chronic care model) may result in a slightly lower increase in the BMI of children who received care at intervention clinics (BMI change: adjusted MD -0.21, 95% CI -0.50 to 0.07; 1 study, unadjusted MD -0.18, 95% CI -0.20 to -0.16; N=473 participants; moderate-certainty evidence).

Mail and phone interventions probably lead to little or no difference in weight loss in adults (mean weight change (kg) using mail: -0.36, 95% CI -1.18 to 0.46; phone: -0.44, 95% CI -1.26 to 0.38; 1 study, N = 1801 adults; moderate-certainty evidence). Care delivered by a nurse at a primary care clinic may lead to little or no difference in the BMI z-score in children (MD -0.02, 95% CI -0.16 to 0.12; 1 study, N = 52 children; very low-certainty evidence).

Two studies reported data on cost effectiveness: one study favoured mail and standard care over telephone consultations, and the other study achieved weight loss at a modest cost in both intervention groups (doctor and doctor-dietitian). One study of shared care reported similar adverse effects in both groups.

Authors' conclusions

We found little convincing evidence for a clinically-important effect on participants' weight or BMI of any of the evaluated interventions. While pooled results from three studies indicate that educational interventions targeting healthcare professionals may lead to a slight weight reduction in adults, the certainty of these results is low. Two trials evaluating CDS tools (unpooled results) for improved weight management suggest little or no effect on weight or BMI change in adults or children with overweight or obesity. Evidence for all the other interventions evaluated came mostly from single studies. The certainty of the included evidence varied from moderate to very low for the main outcomes (weight and BMI). All of the evaluated interventions would need further investigation to ascertain their strengths and limitations as effective strategies to change the behaviour of healthcare professionals or the organisation of care. As only two studies reported on cost, we know little about cost effectiveness across the evaluated interventions.

PLAIN LANGUAGE SUMMARY

Can strategies intended to improve how care is organised or delivered to people with overweight or obesity lead to greater weight reduction?

What is the aim of this review?

To assess the effectiveness of strategies to change the behaviour of health professionals and the organisation of care to promote weight reduction in people with overweight and obesity. This is an update of a Cochrane Review.

Key messages

We found little evidence for a clinically important intervention effect on weight loss, or on body mass index (BMI) change. The results suggest that a brief educational intervention provided to healthcare professionals may lead to a slight decrease in weight for their adult patients, but the results of the studies were not consistent. Evidence for all the other interventions we looked at came mostly from single studies, which is why these interventions need further investigation.

What was studied in the review?

The number of people with overweight or obesity is increasing around the world. Excessive weight is associated with many chronic diseases.

We searched the literature for studies that evaluated the effects of interventions aimed at changing the behaviour of health professionals or the way care is organised for improved weight management and weight loss.

What are the main results of this review?

We included 12 studies, eight in adults and four in children. One hundred and thirty-nine family practices were included, providing care to 89,754 people who were followed for 12 months. Seven studies evaluated the effects of various interventions directed at healthcare professionals (i.e. education, reminders, and decision support tools), and the other five evaluated different organisational interventions (i.e. changes in who delivers the health care, how and where it is delivered, etc.). The comparison intervention was standard care, or the opportunity to seek it. The main outcomes assessed were weight or weight change for adults, and how their weight compared with their peers for children.

Professional interventions

Brief education of primary care physicians in weight management may slightly decrease the weight of their patients, .

Tailoring the education to the healthcare professional to improve how closely they follow guidelines probably led to little or no difference in obesity management or weight loss at study end.

We are uncertain whether issuing doctors with printed reminders about weight management strategies helped to reduce their patients' weight, compared to standard care.

Two studies reported that providing doctors with a clinical decision support tool within the practice may lead to little or no difference in the BMI of children with obesity or in the weight of adults with overweight or obesity, compared to patients receiving standard care.

Organisational interventions

Two studies assessed the effect of multidisciplinary teams. Weight-loss programmes led by a dietitian or by a doctor plus a dietitian may lead to greater weight loss in adult patients than standard care. Shared care (between family practice and hospital doctors and dietitians) probably leads to little or no difference in the BMI of children with obesity, compared to standard care.

Organisational restructuring of the delivery of family practice care (i.e. introducing the chronic care model: training of the whole practice team, enhanced electronic medical record system, the paediatric nurse practitioners playing a key role in delivering the intervention) led to a slightly lower increase in the BMI of children with obesity at intervention clinics, compared to standard care.

Two studies assessed changes in the setting of service delivery. The use of both mail and phone interventions to promote weight loss probably led to little or no difference in weight loss of adults with overweight or obesity, compared to standard care. Family practice weight management programmes conducted by nurses may lead to little or no difference in BMI in children with obesity, as compared to specialist obesity hospital clinics run by consultants.

How up-to-date is this review?

The review authors searched for studies up to September 2016.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON *[Explanation]*

Intervention targeting health professionals - Educational interventions compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Adults with overweight or obesity
Setting: General practices (n = 47), UK (one study) and USA (2 studies)
Intervention: Intervention targeting health professionals (general practitioners and practice nurses) - Educational interventions
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Intervention targeting health professionals - Educational interventions				
Body weight (kg) at longest follow-up, median 12 months	The mean body weight (kg) at longest follow-up ranged from 93.0 to 103.2 kg	MD 1.24 kg lower (2.84 lower to 0.37 higher)	-	1017 (3 RCTs)	⊕⊕◯◯ LOW [a,b]	No studies recruited children.
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **MD**: mean difference

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]We downgraded the certainty of evidence by one level due to high risk of bias in all three studies providing data for this comparison.

[b]We downgraded the certainty of evidence by one level due to inconsistency (I^2 = 41%).

BACKGROUND

In the obesity research field, most journals, societies and guidelines use person-first language (e.g. people with obesity, rather than obese people). To further avoid labelling people as 'overweight', it has become accepted practice to use 'overweight' as a noun, i.e. 'people with overweight', rather than 'overweight people'. We have used person-first language in this review.

Description of the condition

The prevalence of obesity in children and adults is increasing in high-, middle- and low-income countries, and this has significant implications for population health and for health service expenditure in coming decades (WHO 2004; WHO 2013: WHO 2016a; WHO 2016b; WHO 2017). According to recent figures from the World Health Organization (WHO), in 2014 more than 1.9 billion adults and 41 million children (under five years) worldwide had overweight or obesity (WHO 2016a). The effectiveness of interventions in research trials for weight loss and maintenance of weight loss has been systematically reviewed for adults with obesity (Avenell 2004; Jolly 2011; Colquitt 2014; Dombrowski 2014; Peirson 2014; Samdal 2017), and in children with obesity (Colquitt 2016; Al-Khudairy 2017; Mead 2017). Clinically important benefits of weight loss for adults with obesity have been reported with 5% to 10% weight loss (NICE 2006).

Description of the intervention

Information on the effectiveness of clinical interventions to promote weight loss in children and adults is available (e.g. Avenell 2004; Colquitt 2014; Dombrowski 2014; Al-Khudairy 2017). Although there are gaps in the evidence, a number of potentially effective weight loss interventions have been identified: diet, exercise, and behavioural strategies for adults, in combination where possible; the use of maintenance strategies such as continued therapist contact; selected use of pharmaceutical interventions in conjunction with strategies to change lifestyle; and surgery for selected, people with morbid obesity. Results from a recent systematic review of effective behaviour change techniques for increased physical activity and healthy eating suggest that effective counselling methods should be person-centred and autonomy-supportive, and should encourage adults with overweight or obesity to use goal-setting and self-monitoring of behaviour for a behavioural change that is maintained over time (Samdal 2017). For treatment of childhood obesity, similar weight management approaches (e.g. dietary or other lifestyle changes, such as increasing physical activity or behaviour therapy) have been identified as potentially effective. Effective counselling methods for children need to involve the family, and particularly their primary carers.

How the intervention might work

The extent to which health professionals deliver such interventions within routine health care is uncertain. In the past, health professionals' application of effective weight loss strategies may have been limited because of an abundance of research of variable quality with no consistent or clear conclusions, other than an apparent pessimism about the long-term effectiveness of treatments overall. Even with the availability of systematic review evidence of the effectiveness of participant interventions from randomised trials, health professionals may be inconsistent in their application of such guidelines in routine care (e.g. Jensen 2013), often citing barriers such as lack of time, lack of appropriate support services, lack of access to the guidelines, or lack of confidence in the guidelines' conclusions and their relevance to their clinical practice (Cabana 1999). Another potential barrier to the effective management of obesity may include a lack of motivation to work with this patient group due to negative perceptions (stigma) of people with overweight and obesity, or of the efficacy of treatments (Puhl 2009; Sikorsky 2013; Phelan 2015). Phelan 2015 found that many healthcare providers hold strong negative attitudes and stereotypes about people with obesity, and that there is considerable evidence that such attitudes influence person-perceptions, judgement, interpersonal behaviour and decision-making. Phelan argues that these attitudes may impact the care they provide and that experiences or expectations of poor treatment may cause stress and avoidance of care, mistrust of doctors and poor adherence among people with obesity. Phelan 2015 describes several potential intervention strategies that may reduce the impact of obesity stigma on quality of care. Such stigma among healthcare professionals may help explain the relatively low level of detection and counselling rates (Kushner 2012).

Interventions aimed at improving the way healthcare professionals work to reduce the weight of people with overweight or obesity can be divided into those targeting the healthcare professionals themselves and those targeting the organisation of care. Interventions that target the individual healthcare professional are, for example, delivery of educational materials, workshops, tailoring, reminders and point-of-care clinical decision support (CDS) tools. Examples of organisational interventions are multidisciplinary teams, shared care, or changing the setting of care (e.g. from specialist clinics to primary care), which may improve access to care, and other organisational changes.

Why it is important to do this review

Obesity is a global problem on the rise (WHO 2016a), and a major risk factor for a number of chronic diseases like diabetes, cardiovascular disease and cancer (WHO 2016a), with major implications both for population health and for costs to health services. Among high-income countries, the USA and the UK have the highest obesity prevalence. In the USA more than one-third

(36.5%) of adults have obesity, with the highest prevalence in non-Hispanic blacks, (48.1%), Hispanics (42.5 %), and the lowest in non-Hispanic Asians (11.7%) (Ogden 2015). In addition, around 17% of all youth in the USA have obesity. In England, the obesity prevalence is 25% in adults and 20% in year-six children, which is the highest in Western Europe (FAO 2013; NHS 2017). In many low- and middle-income countries, prevalence of obesity is approaching that of high-income countries; this is especially the case in the Middle East, North Africa, Latin America and in the Caribbean (Popkin 2013). According to statistics from the WHO, the number of children in Africa with overweight or obesity has shown a dramatic increase from 5.4 million in 1990 to 10.6 million in 2014 (WHO 2016a).

To stop this obesity pandemic, it is essential to develop and implement effective strategies to prevent and treat obesity at the level of the individual, the family, the healthcare provider and the organisation of care, as well as in the social environment (Foresight 2007; Academy of Medical Royal Colleges 2013). The purpose of this review is to evaluate the effectiveness of interventions at the provider and the organisational level, thus including both interventions directly targeting healthcare professionals, or the organisation of care, or both.

If a person with obesity consumes fewer calories, no matter which diet they follow, they will lose weight (del Corral 2009; Varady 2011). The reason why some people with obesity struggle to lose weight, or to maintain weight which they have recently lost, is that their compliance with the diet diminishes over time del Corral 2009; Varady 2011. The art of successful weight loss is finding an approach to dieting which is acceptable and feasible for people with obesity. This requires skill on the part of the practitioner, involving behaviour change techniques and dietary management (Samdal 2017). It is therefore important to assess the effectiveness of interventions aimed at improving the skill and approach of practitioner(s) in maximising the compliance of people with obesity with weight loss advice given.

This is the third update of a review originally published as Harvey 2001 and updated as Flodgren 2010.

OBJECTIVES

To assess the effects of strategies to change the behaviour of health professionals or the organisation of care compared to standard care, to promote weight reduction in children and adults with overweight or obesity.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised trials, including cluster-randomised trials.

Types of participants

Health professionals

We considered fully-qualified health professionals, working with adults and children with overweight or obesity, within a healthcare setting. We excluded medical students, nursing students, and other health science students, who were not fully qualified.

People with overweight or obesity

Due to variability in the classification of 'overweight' and 'obesity' in primary studies, we have included all trials enrolling adults described as having overweight or obesity. We used definitions based on body mass index (BMI - in kilogramme/metre^2). Being overweight in adults was defined as a BMI over 25 but less than 30, and obesity as a BMI of 30 or over (EHCB 1997; NHLBI 1998).

We also included trials that enrolled children or adolescents described as having overweight or obesity. A child is considered to have overweight if his or her BMI is above the 85th percentile but below the 95th age- and sex-specific percentile, and obesity if his or her weight is equal to or greater than the 95th age- and sex-specific percentile (CDS 2015).

We included studies if a reduction in weight was specified as an objective of the intervention and outcome weight data were provided for the overweight or obese subpopulations within these groups. Thus, all participants in an included study had to be overweight or obese, or results from the overweight or obese subpopulation had to be provided separately. All participants in an included study had to be recruited in the context of a healthcare setting, defined as organisations that had health care as their primary objective.

Types of interventions

We included any intervention directed at the healthcare professional or the organisation of care to help implement weight reduction interventions in children and adults with overweight or obesity. Using the 2002 version of the Effective Practice and Organisation of Care (EPOC) taxonomy (Appendix 1), we used the following categories to classify interventions:

i. Interventions targeting health professionals

Interventions aimed at improving the effectiveness of health professionals working to reduce the weight of people with overweight or obesity. This category includes strategies such as:

1. education (e.g. providing information, education or training on appropriate practice);
2. tailoring (determinants of practice are identified and strategies to address them are devised to improve adherence to guidelines);
3. reminders (e.g. reminders can be printed, electronic and/or imbedded in electronic medical records for improved and timely care delivery)
4. clinical decision support tools (point-of-care health information technology embedded in the medical health record for improved quality of care and use of evidence).

ii. Interventions targeting the organisation of care

Interventions aimed at changing the organisation of care directed at reducing the weight of people with overweight or obesity. This category includes interventions that were predominantly about changes in organisational systems, such as:

1. the introduction of multidisciplinary teams, including:
   i) care delivered by dietitians,or both doctor and dietitian
   ii) shared care (e.g. between primary care and tertiary care specialist obesity clinics);
2. changes in skill mix, including:
   i) reorganisation of the delivery of primary car (i.e. introducing the chronic care model, which involves a system that creates practical, supportive, evidence-based interactions between an informed, active patient and a prepared, proactive primary care practice team);
3. changes in the setting of service delivery, including:
   i) method of service delivery (e.g. mail or telephone)
   ii) nurse at primary care clinic.

Comparators

We included only studies that had standard care as the comparator arm of the study.

We planned the following comparisons.

1. Interventions targeting health professionals versus standard care.
2. Interventions targeting the organisation of care versus standard organisation of care.

The standard care comparator groups had to meet either of these two criteria:

1. study participants receiving routine weight management service(s) in the context of their normal healthcare provision and setting
2. study participants being informed of the availability of routine weight management service(s) in the context of their normal healthcare provision and setting.

Excluded studies

We excluded the following types of studies:

1. Studies that varied the clinical content or intensity of care, or both, of the intervention aimed at reducing weight, without a normal-care control group. We therefore excluded studies comparing the effectiveness of different durations of follow-up, intervention, or frequency of consultation with people with overweight or obesity.
2. Studies that reported neither participants' weight nor BMI (adults), and studies of children that reported neither change in BMI z-score nor BMI.
3. Studies that reported only knowledge or attitudes of health professionals or participant satisfaction, with no objective measure of professional performance or participant outcomes.

Types of outcome measures

We included any objective measure of provider performance consistent with EPOC guidelines or participant outcomes (EPOC 2013). We also planned to report any available cost data.

Main outcomes

1. Body weight (adults)
2. Body mass index (BMI) or BMI standard deviation score (SDS), also called z-score (children).

A BMI z-score, or SDS, indicates how many units (of the standard deviation - SD) a child's BMI is above or below the average BMI value for their age group and sex (Dinsdale 2011).

We excluded all studies of adults that did not report weight or weight change, and studies of children that did not report either BMI or BMI z-score.

Other outcomes

1. Participant outcomes
   i) Satisfaction with provider practice or healthcare provision
   ii) Psychological outcomes (e.g. self-esteem, quality of life)
   iii) Morbidity (i.e. measures of disease status and sick leave)
   iv) Measures of body fat (e.g. waist circumference, fat mass assessed with dual energy x-ray absorptiometry (DEXA), or skin callipers)
   v) Effects on risk factors (e.g. differences in blood pressure, cholesterol, blood glucose and new diagnoses of type 2 diabetes)
   vi) Participant behaviour (e.g. attendance levels at weight management or physical exercise programmes)
   vii) Number of withdrawals from treatment
   viii) Adverse effects (e.g. low self-esteem, stress, depression, dietary restraint)
2. Health professional outcomes

i) Measures of health practitioners' behaviour, knowledge, attitudes, or satisfaction.

3. Costs

Search methods for identification of studies

We excluded children from the original review (Harvey 2001). We searched for studies that might have been excluded at the screening stage of the previous review by using a search filter for studies in children published up to 2009, the date of the search in the previous version of this review.

For this update, we amended the search strategies for all databases to increase precision. We evaluated the included studies from the Flodgren 2010 review, and selected search terms on the basis of the characteristics of those studies. All included studies either looked at a health professional or a health service setting (as a new intervention or usual-care comparator). We therefore amended the search to focus on these areas.

Electronic searches

We searched the following electronic databases from inception up to September 2016:

- Cochrane Central Register of Controlled Trials (CENTRAL; 2016, Issue 8) in the Cochrane Library (searched 5 September 2016).
- Ovid MEDLINE (Epub Ahead of Print, In-Process & Other Non-Indexed Citations) 1946 to 5 September 2016.
- Ovid Embase 1974 to 2 September 2015.
- CINAHL EbscoHost 1981 to 5 September 2016.
- PsycINFO Ovid 1967 to July Week 4 2016.

We translated the MEDLINE search strategy into the other databases using the appropriate controlled vocabulary as applicable. We identified further potentially relevant studies from the reference lists of included studies. We did not place any language or date restrictions on the search strategy.

Searching other resources

We searched the following trial registers.

1. International Clinical trials Registry platform (ICTRP): World health Organization (WHO) (www.who/int/ictrp/en/).
2. Clinical Trials Gov: US National Institute of health (NIH) (clinicaltrials.gov).

We also searched reference lists of included studies.

We conducted a citation search for all previous versions of the review and all included studies using Web of Science.

We include full search strategies for all databases in Appendix 2.

Data collection and analysis

Selection of studies

We searched for randomised trials (including cluster-randomised trials) that compared routine provision of care to interventions aimed at changing the behaviour of health professionals or the organisation of care, or both, to promote weight reduction in children and adults who had overweight or obesity. We conducted dual independent screening (GF, DGB, CS) of the remaining references. We excluded those studies which clearly did not meet the inclusion criteria and obtained copies of the full text of the remaining references. Two review authors (from GF, DGB, CS) independently assessed the eligibility of these papers, resolving disagreements by discussion within the group of review authors. We documented reasons for exclusion in the Characteristics of excluded studies table and recorded the selection process in sufficient detail to complete a PRISMA flow diagram (Liberati 2009).

Data extraction and management

Two review authors (from GF, DGB, and CS) independently extracted data on study design, participant characteristics, interventions and outcomes to a form specially designed for the review (Appendix 3). We noted the length of follow-up for outcome measurement because short-term studies may be misleading, given that participants do not always maintain their initial weight losses (EHCB 1997). We resolved disagreements by discussion.

Assessment of risk of bias in included studies

Two review authors (from DGB, GF and CS) assessed the risks of bias of the included studies, using the Cochrane 'Risk of bias' tool for six standard domains (Higgins 2011): adequate sequence generation, concealment of allocation, blinded assessment of objective and subjective outcome(s), adequately addressed incomplete outcome data, free from selective reporting, and free of other potential risks of bias. We used three additional criteria specified by EPOC (EPOC 2016a): similar baseline characteristics, reliable primary outcome measures, and adequate protection against contamination. We assigned an overall assessment of the risk of bias (high, moderate or low risk of bias) to each of the included studies, using the approach suggested in Chapter 8 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). We assessed studies with low risk of bias for all key domains or where it seems unlikely for bias to seriously alter the results to have a low risk of bias. We considered studies unclear where risk of bias in at least one domain was unclear or judged to have some bias that could plausibly raise doubts about the conclusions. However, if a study had an unclear risk of bias for several key domains (i.e. adequate sequence generation, concealment of allocation, and incomplete outcome data), we assessed it as being at high risk of bias. For studies with a high risk of bias in at least one domain or judged to

have serious bias that decreased the certainty of the conclusions, we rated them at high risk of bias.

Measures of treatment effect

Where possible, we extracted the mean weight of adult participants in each arm at the end of the study and the standard deviation (SD) of this mean. We calculated the difference between the intervention and control arms in the final mean weight of participants, and its 95% confidence interval (CI), to summarise the effect of treatment. If studies presented the overall treatment effect and its standard error, but not the final weight in each arm, we used these reported treatment effects directly.

If final mean weights in each arm and their SDs (or the difference in final mean weight and its SE) were not reported, we extracted the mean change in weight between baseline and the end of the study in each arm, and its SD; hence we calculated the difference between the intervention and control arms in the mean change in weight of participants, and its 95% CI, to summarise the effect of treatment.

For one study (Rogers 1982), study authors reported the average amount of weight above normal weight instead of final weight, so we used this as the primary outcome.

For studies in which the participants were children, we extracted BMI z-score (also known as the BMI SDS) or the BMI or BMI change, or both. If the BMI z-score, which is an adjusted score, was reported in the paper, we retrieved this information and did not report any other measures of weight or weight change.

If results were presented at more than one time point, we used the results for the longest duration of follow-up in our primary meta-analysis.

Unit of analysis issues

We noted whether studies randomised patients or healthcare providers (e.g. GPs or GP practices). If the analysis did not allow for clustering of patients within healthcare providers, we recorded a unit of analysis error, as such analyses tend to overestimate the precision of the effect of treatment*(*Goldstein 2003).

If we had identified eligible cross-over trials, we would only have included the first comparison in the sequence (i.e. the analysis made before the cross-over), to avoid any carry-over effect.

If we identified trials with multiple intervention arms, we included any professional/organisational intervention arm (s) (and the standard care arm), but did not include intervention arms consisting of clinical interventions targeting the patients or their carers, or arms combining a professional or organisational intervention with a clinical intervention, if one arm consisted of the professional intervention only. We did this in order to separate out the effect of the professional/organisational intervention.

Dealing with missing data

If primary outcome data were missing, or only imputed data were reported, we contacted trial authors to request data on the outcomes among participants who were assessed. We also contacted study authors whenever key study characteristics were missing.

Assessment of heterogeneity

We assessed heterogeneity between studies by visual inspection of forest plots, by estimation of the percentage of heterogeneity between trials which could not be ascribed to sampling variation (Higgins 2003), by a formal statistical test of the significance of the heterogeneity (Deeks 2001), and when possible by subgroup analyses (see below). If there was evidence of substantial heterogeneity, we investigated and reported the possible reasons for this.

Assessment of reporting biases

We had planned to examine funnel plots corresponding to meta-analysis of the primary outcome in order to assess the potential for small-study effects such as publication bias. However, as we only found 12 included studies, three of which had data suitable for meta-analysis, we did not produce funnel plots.

Data synthesis

We reported the outcome data extracted from papers in Table 1 and Table 2. The mean differences (MDs) between the participant's weight (or weight change) in the intervention and standard-care arms at the end of the each trial are presented in separate forest plots for educational interventions (Cohen 1991; Martin 2006; Moore 2003), reminders (Rogers 1982), and organisational interventions involving adult participants (Pritchard 1999; Sherwood 2006). For both educational interventions and organisational interventions, we used the generic inverse variance function of Review Manager 5 (Review Manager 2014), because the trials of Moore 2003 and Pritchard 1999 reported the final weight (or change in weight) in the intervention arms *relative to* the standard care arm, rather than the final weight (or change in weight) in both intervention and standard-care arms.

For the three trials that considered educational interventions (Cohen 1991; Moore 2003; Martin 2006), we pooled results in a meta-analysis using the MD method (Higgins 2011). We used a random-effects model with inverse variance weighting and results at the longest follow-up available (DerSimonian 1986): six, 12, and 18 months (Analysis 1.1). The random-effects model that we used assumes that the pooled studies differ, for example in the type of population studied, or in the intervention assessed, or in the outcome measured, but that although the effect of the intervention therefore differs between studies, these effects are similar and cluster around a mean (Higgins 2009).

For the interventions involving children (nurse-delivered primary care (Banks 2012), organisational restructuring of the delivery of

primary care (Taveras 2011), CDS tool (Taveras 2015), and shared care (Wake 2013)), we present the results for the main outcome in separate forest plots.

'Summary of findings' tables

Two review authors independently assessed the certainty of the evidence for the main weight outcomes (weight for adults, and BMI for children), adverse events and costs as high, moderate, low, and very low, using the five GRADE considerations (risk of bias, consistency of effect, imprecision, indirectness, and publication bias) (Guyatt 2008; Schünemann 2011). We used methods and recommendations described in Section 8.5 and Chapter 12 of the *Cochrane Handbook for Systematic Reviews of interventions* (Higgins 2011), resolving disagreements on certainty ratings by discussion among the review authors. We provided justification for decisions to down- or upgrade the ratings using footnotes in the table. We produced two summary tables which include comments on the certainty of the evidence: one for interventions targeting the healthcare professional (Table 3) and one for interventions targeting the organisation of care (Table 4). We also produced seven 'Summary of findings' tables, for different interventions: Educational (Summary of findings for the main comparison); Tailoring (Summary of findings 2); Reminders (Summary of findings 3); Clinical decision support tools (Summary of findings 4); Multidisciplinary teams (Summary of findings 5); Skill mix (Summary of findings 6); Service delivery setting (Summary of findings 7).

Subgroup analysis and investigation of heterogeneity

We had planned and performed subgroup analyses (for educational interventions only) based on whether trials reported final values of participants' weight at the end of study, or the change in weight between baseline and the end of the study, as recommended in the *Cochrane Handbook* (Higgins 2011).

We had planned to perform subgroup analyses by comparing participants defined as overweight and those defined as obese, as they may have different implications for health and treatment, but this was not possible because the included studies did not distinguish between such participants.

We considered factors such as the type of intervention, whether it was evidence-based, and the length of follow-up in interpretation of any heterogeneity.

Sensitivity analysis

We examined results after one year's follow-up (or as close as possible to one year), as well as for adults and children, in sensitivity analyses.

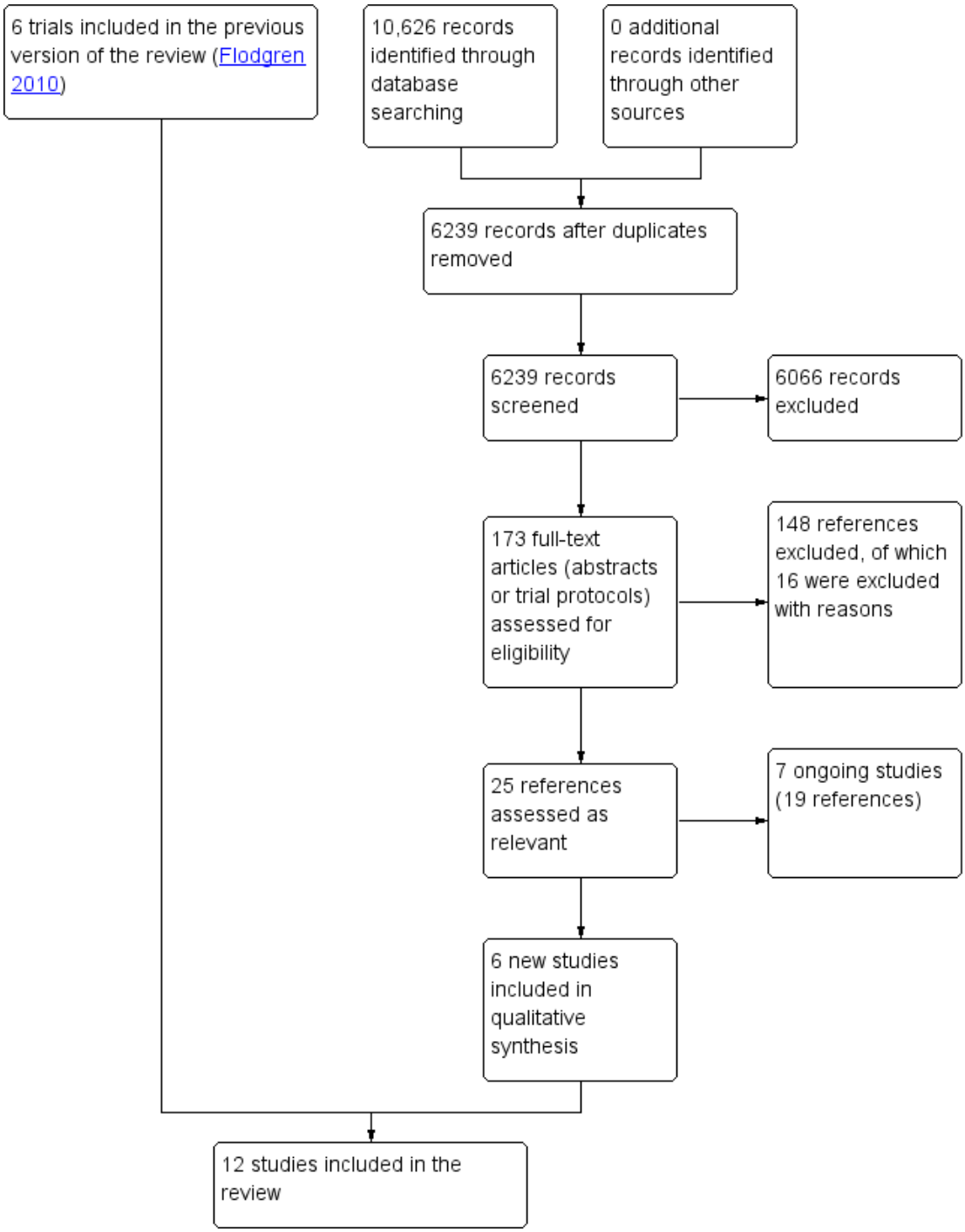
RESULTS

Description of studies

Results of the search

See study flow chart Figure 1.

Figure 1. Study flow diagram.



The electronic and additional searches yielded 6239 records when we removed duplicates. We screened the titles and abstracts of these records and excluded 6066 irrelevant studies. We retrieved and scrutinised the full text of 173 studies, of which we excluded 148 (16 with reasons) and judged six to be eligible for inclusion in the review (Taveras 2011; Banks 2012; Wake 2013; Taveras 2015; Baer 2016; Goodfellow 2016). We also found seven ongoing trials (19 references). We tried to contact these authors. (See Characteristics of ongoing studies).

For this update, we have added six studies to the six originally included in the previous version of the review (Flodgren 2010). We report the reasons for exclusion in the Characteristics of excluded studies table.

Included studies

See: Characteristics of included studies.

Study design and participant characteristics

Twelve studies met the inclusion criteria, of which seven were cluster-randomised trials (Cohen 1991; Moore 2003; Martin 2006; Taveras 2011; Taveras 2015; Baer 2016; Goodfellow 2016), and five were randomised trials (Rogers 1982; Pritchard 1999; Sherwood 2006; Banks 2012; Wake 2013), conducted in 139 practices. Eight studies recruited adult participants with overweight or obesity and the remaining four recruited children with obesity. Studies differed in the extent of overweight or obesity in the adult participants, and often the proportion of participants in each category or the baseline BMI were not reported.The mean age of the adult participants ranged from 41.8 to 59.5 years, and the mean age of children ranged from 4.9 to 11.5 years. Most studies were conducted in primary care, and all were conducted in high-income countries, mainly the USA.

Interventions

Seven of the included studies evaluated professional interventions (Rogers 1982; Cohen 1991; Moore 2003; Martin 2006; Taveras 2015; Baer 2016; Goodfellow 2016) and five different organisational interventions (Pritchard 1999; Sherwood 2006; Taveras 2011; Banks 2012; Wake 2013). The comparison groups received routine care, or were informed about the opportunity to seek care with their usual healthcare provider. The median follow-up was 12 months (range six to 24 months).

The clinical content of the interventions was explicitly based on research evidence in four studies (Moore 2003; Taveras 2011; Wake 2013; Taveras 2015). Two studies included consultation with the health professionals who were targeted (Rogers 1982; Goodfellow 2016), but none of the studies included any consumer (patient) involvement.

Professional interventions

Interventions targeting healthcare professional (n = 7) included: education (Cohen 1991; Martin 2006; Moore 2003), a tailored intervention (Goodfellow 2016), computerised reminders (Rogers 1982), and two studies of clinical decision support (CDS) tools targeting general practitioners (GPs) (adults with obesity) and paediatricians (children with obesity) respectively (Baer 2016; Taveras 2015). The full results of Baer 2016 are not yet published.

Organisational interventions

Interventions targeting the organisational level (n = 5) included: introducing multidisciplinary teams (Pritchard 1999; Wake 2013): care delivered by doctor-dietitian teams or dietitians alone (Pritchard 1999), and shared care (primary and secondary care clinics) providing care to children with obesity (Wake 2013). One study (Taveras 2011) assessed the effects of changes in skill mix through organisational restructuring of primary care (i.e. introducing the chronic care model) to improve care for children with obesity.Two studies assessed the effects of changes in the setting of service delivery: one of them (Banks 2012) compared care delivered by nurses at primary care clinics with care delivery by consultants at secondary care specialised children's obesity clinics, and the other (Sherwood 2006) assessed weight loss advice delivered by mail or phone compared with standard care.

Outcomes

All but one study involving adults with overweight or obesity reported some measure of body weight. One study (Rogers 1982) reported pounds overweight. All studies that involved children reported either BMI z-score or change in BMI z-score/BMI SDS score, BMI or BMI change. One study (Wake 2013) reported a number of obesity-related outcomes, i.e. body fat percentage, lean body mass and waist circumference, and harms/adverse effects (i.e. health-related quality of life, self-esteem, body dissatisfaction). Wake 2013 also reported acceptability and feasibility of the intervention. Three studies reported cardiovascular risk factors (Cohen 1991; Pritchard 1999; Sherwood 2006), which included changes in blood pressure and in the number of medications. Two studies reported the quality of life of children (Banks 2012; Taveras 2015), and satisfaction with healthcare provision (Banks 2012). Five studies reported health professional behaviour change (Rogers 1982; Moore 2003; Taveras 2015; Baer 2016; Goodfellow 2016). Two studies provided information about costs (Pritchard 1999; Sherwood 2006).

Excluded studies

In this update we excluded 16 studies (43, in total with the studies previously excluded) with reasons after obtaining and scrutinising full-text copies of the papers. The reasons for exclusion are provided in the Characteristics of excluded studies table. The main reason for exclusion was that the comparison was not usual care, followed by participants being recruited in settings other than healthcare (e.g. schools) and no weight data reported.

Risk of bias in included studies

We describe the risk of bias in included studies in the 'Risk of bias' tables within the Characteristics of included studies table, and summarise the risk of bias assessments in Figure 2 and Figure 3.

Figure 2. Risk of bias graph: review authors' assessment of each risk of bias domain presented as percentages across all included studies.The blank spaces represent studies in which no secondary outcomes were reported/evaluated.

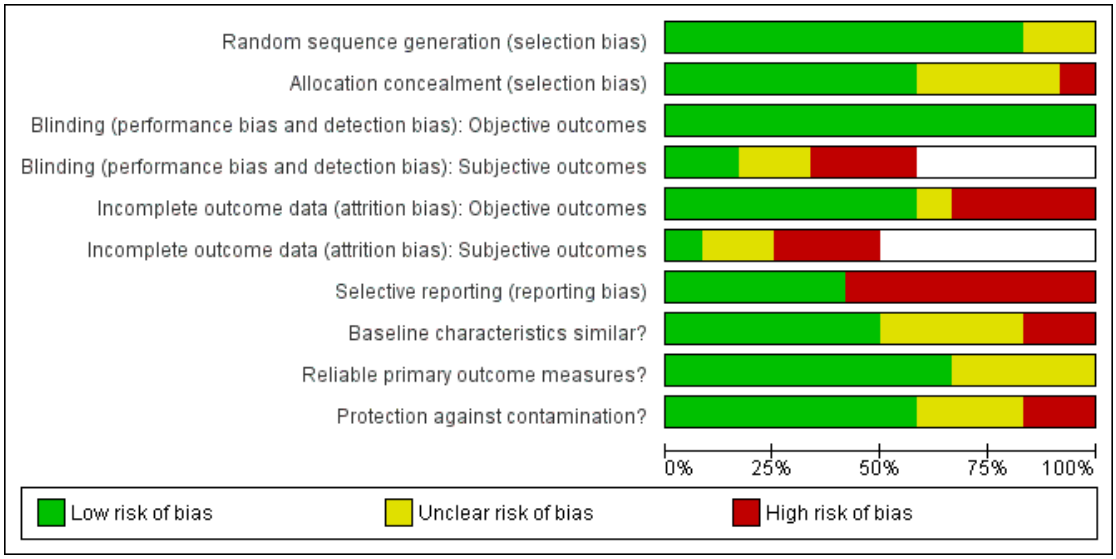
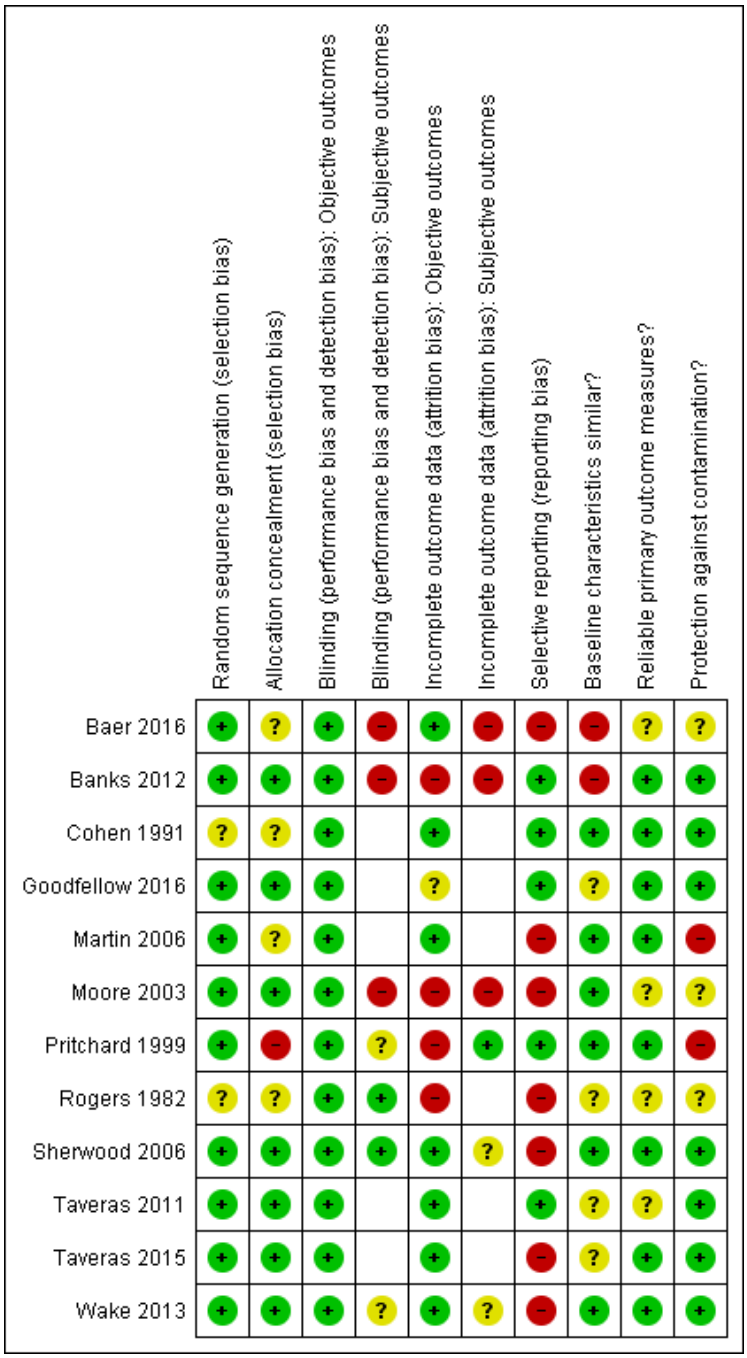


Figure 3. Risk of bias summary: review authors' assessment of the risk of bias of the individual domains for each included study.The blank cells represent studies in which no secondary outcomes were reported/assessed..



Seven of the 12 included studies had an overall high risk of bias (Rogers 1982; Cohen 1991; Pritchard 1999; Moore 2003; Martin 2006; Banks 2012; Baer 2016). One study had a moderate risk of bias (Taveras 2011), and four studies were at low risk of bias (Sherwood 2006; Wake 2013; Taveras 2015; Goodfellow 2016).

Allocation

In 10 studies the sequence generation was adequate (Pritchard 1999; Moore 2003; Martin 2006; Sherwood 2006; Taveras 2011; Banks 2012; Wake 2013; Taveras 2015; Baer 2016; Goodfellow 2016), in two of these studies it was unclear if the allocation concealment was adequate (Martin 2006; Baer 2016) and in one study allocation was not adequate (Pritchard 1999). In two studies both the sequence generation and the allocation concealment were at unclear risk of bias (Rogers 1982; Cohen 1991).

Blinding

All studies were at low risk of performance and detection bias for the primary outcome of this review (weight and BMI/BMI z-score), as all the weight outcomes are objective. Five of the 12 included studies also reported subjective outcomes: four of these were at high risk of bias due to non-blinding (Pritchard 1999; Moore 2003; Banks 2012; Baer 2016), and one was at low risk of bias (Sherwood 2006).

Incomplete outcome data

Seven studies either did not have incomplete outcome data, had a very low dropout rate, or appropriately managed incomplete data from the primary outcomes (Cohen 1991; Martin 2006; Sherwood 2006; Taveras 2011; Wake 2013; Taveras 2015; Baer 2016), and therefore had a low risk of attrition bias. One study lost two of 14 practices in the intervention group, due to lack of time (with no losses from the control group) (Goodfellow 2016). In one study (Pritchard 1999), the dropout rate was 45% in the dietitian arm and 29% in both the doctor/dietitian and standard care arms; analysis was by intention-to-treat, but with the last measurement imputed, which may have biased the results as the dropout rate differed between the groups, and people tend to gain weight after a while. Three other studies were also at high risk of attrition bias for the primary outcome (Rogers 1982; Moore 2003; Banks 2012); in Banks 2012 43% (29/68) of those starting treatment withdrew, with analysis by intention-to-treat. In Moore 2003 38% of participants in the intervention practices and 36% of participants in control practices were lost to follow-up, with analysis by intention-to-treat when possible. In Rogers 1982 33% of participants from the intervention group, and 45% from the control group were lost at 24-month follow-up. Furthermore, dropout information (Table 1/ Page 66) did not cover all of the dropouts by baseline.There was no mention of intention-to-treat analysis having been used.

Selective reporting

Five studies reported results for all of the prespecified outcomes (Cohen 1991; Pritchard 1999; Taveras 2011; Banks 2012; Goodfellow 2016). Six studies were at high risk of selective outcome reporting (Rogers 1982; Moore 2003; Martin 2006; Sherwood 2006; Wake 2013; Taveras 2015), as they did not report results for all predefined outcomes, and in the case of Baer 2016 did not report a measure of dispersion for the main outcome.

Other potential sources of bias

Baseline characteristics similar

Six studies provided baseline data, demonstrating that the intervention and control groups had similar baseline characteristics (Cohen 1991; Pritchard 1999; Moore 2003; Martin 2006; Sherwood 2006; Wake 2013). In four studies it was unclear if the baseline characteristics were similar (Rogers 1982; Taveras 2011; Taveras 2015; Goodfellow 2016), and in two studies they were not (Banks 2012; Baer 2016).

Reliable baseline outcome measures

Nine studies provided reliable baseline outcome measures, while in one study no baseline measures of outcome were reported (Moore 2003). Weight was measured in a reliable manner (by a health professional in a clinical setting) in six studies (Rogers 1982; Cohen 1991; Pritchard 1999; Martin 2006; Sherwood 2006; Banks 2012), but in one of theses studies baseline weight was reported only as pounds overweight (Rogers 1982). In Taveras 2011, the BMI differed between groups at baseline (53% of intervention children had a BMI in the 95th percentile or higher versus 60% of the children in the standard care group). In one study there was no table with this information (Baer 2016).

Protection against contamination

Seven studies were either cluster-randomised trials and thereby protected or took steps to ensure that the control group was not contaminated by knowledge or change in practice from the intervention groups (Cohen 1991; Sherwood 2006; Taveras 2011; Banks 2012; Wake 2013; Taveras 2015; Goodfellow 2016). Three studies were at unclear risk of contamination (Rogers 1982; Moore 2003; Baer 2016), and two studies were at high risk of contamination (Pritchard 1999; Martin 2006).

Unit of analysis errors

One study (Cohen 1991) did not allow for clustering of participants within healthcare providers in the analysis, and the authors provided no information about whether or not they had adjusted for this, whereas the other six cluster-randomised trials did (Moore 2003; Martin 2006; Taveras 2011; Taveras 2015; Baer 2016; Goodfellow 2016). In one study (Rogers 1982) it was unclear whether clustering had been taken into account in the analysis.

Effects of interventions

See: **Summary of findings for the main comparison** Intervention targeting health professionals - Educational interventions; **Summary of findings 2** Interventions targeting health professionals - Tailoring; **Summary of findings 3** Interventions targeting health professionals - Reminders; **Summary of findings 4** Interventions targeting health professionals - Clinical decision support tools; **Summary of findings 5** Interventions targeting the organisation of care - Introduction of multidisciplinary teams; **Summary of findings 6** Interventions targeting the organisation of care - Changes in skill mix; **Summary of findings 7** Interventions targeting the organisation of care - Changes in the setting of service delivery

An overview of the effects of professional interventions and organisational interventions are reported in Table 3 and Table 4. Additional results data including both health professionals' behaviour and participants' outcomes are reported in Table 1 and Table 2.

1. Interventions targeting health professionals versus standard care

For an overview of professional interventions, see Table 1 and Table 3.

1.1 Educational interventions

See Summary of findings for the main comparison.

Three included studies (n = 1017 adults) evaluated brief educational interventions targeting GPs for improved obesity management and weight loss (Cohen 1991; Moore 2003; Martin 2006).

Body weight

Pooled results from the three trials (Cohen 1991; Moore 2003; Martin 2006), suggest that educational interventions aimed at primary care physicians, compared to standard care, may slightly reduce the weight of their patients at 12 months by 1.24 kg, 95% confidence interval (CI) -2.84 to 0.37; low certainty of evidence; downgraded by two levels due to high risk of bias and inconsistency (Analysis 1.1). The findings of the three studies showed moderate heterogeneity (I^2 = 41%, P = 0.19), largely because Moore 2003 found the intervention had little effect, whereas the two other studies found that it helped participants to lose weight. Sensitivity analysis which pooled results after one year's follow-up (or as close as possible to one year) obtained similar results (Analysis 1.2).

Cohen 1991 reported that the hypertensive participants with obesity in the intervention group lost more weight on average than those in the control group (mean difference (MD) -2.4 kg at six months and -2.2 kg at 12 months, P < 0.05). They also reported little or no difference in blood pressure between groups at 12 months. However, the small number of included participants (N = 30), combined with a potential unit of analysis error, means that the results of this study should be interpreted with caution.

Martin 2006 reported that participants in the intervention group (N = 71) lost more weight on average,than those in the control group (N = 73) at six months (MD 1.69 kg, P < 0.01). The total dropout rate from the study was 20% (19 intervention participants and eight standard-care participants dropped out).

Moore 2003 found little or no difference between the intervention and control groups in weight (1 kg, 95% CI -1.9 to 3.9) at 12 months follow-up.

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

Cohen 1991 reported no difference between groups for change in mean arterial blood pressure from baseline to 12 months (intervention: +3.0, SD 14.2; control: -0.7, SD 11.3, P > 0.10). None of the studies reported adverse effects.

Health professional outcomes: measures of health practitioners' behaviour, knowledge, attitudes, or satisfaction

Moore 2003 found evidence of a change in GPs' and practice nurses' behaviours: those receiving the educational intervention were more likely to discuss weight, record weight, record a target weight, and have a dietary target than those in the control group. Moore 2003 also reported that GPs' and practice nurses' knowledge of obesity management had improved. Nevertheless, for about half the participants recruited to the trial, medical records showed no indication that the participants were counselled about their weight at 12-month follow-up. The other two studies did not report any outcomes related to the behaviour or knowledge of healthcare professionals.

Costs

We did not find any studies of educational interventions that reported costs or cost effectiveness.

1.2 Tailoring intervention

See Summary of findings 2.

One study (n = 15,553 adults) evaluated the effectiveness of a tailoring intervention for improved obesity management and weight loss (Goodfellow 2016).

Body weight

Results from one large trial from the UK suggest that tailoring (using determinants of practice), with the aim of improving GPs' compliance with obesity guidelines (Goodfellow 2016), probably leads to little or no difference in obesity management or in the weight (kg) of the adult participants (adjusted for baseline weight) at nine months' follow-up: mean difference (MD) 2.20, 95% CI 2.13 to 2.27; (see Analysis 2.1), and adjusted for baseline weight: MD: 0.05, 95% CI -0.32 to 0.41, P = 0.81; moderate certainty of evidence; downgraded one level due to imprecision). The study also reported little or no difference between groups in the proportion of participants with a weight loss of at least 1 kg (intervention: 41.65%; control: 42.2%; odds ratio (OR) 0.98, 95% CI 0.87 to 1.09).

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

None reported (including no adverse effects).

Health professional outcomes: measures of health practitioners' behaviour, knowledge, attitudes, or satisfaction

Goodfellow 2016 reported little or no difference for any of the weight management/professional outcomes between groups: proportion of participants offered a weight loss intervention (intervention: 13.19%; control: 15.08 %; OR 1.17, 95% CI 0.72 to 1.89); BMI/waist circumference measurement recorded (intervention: 39.56%; control: 42.71%; OR 1.15, 95% CI 0.89 to 1.48), referral to weight loss services (intervention: 3.67%; control: 5.10%; OR 1.45, 95% CI 0.81 to 2.63), weight management in the practice (intervention: 8.73%; control: 9.59%; OR 1.09, 95% CI 0.55 to 2.15), and lifestyle assessment (intervention: 23.86%; control: 23.05%; OR 0.98, 95% CI 0.76 to 1.26). GPs reported that the intervention increased their confidence in managing obesity and provided them with practical resources (Goodfellow 2016).

Costs

We did not find any studies of tailored interventions that reported costs or cost effectiveness.

1.3 Reminders

See Summary of findings 3.

One study (n = 90 adults) assessed the use of reminders to change the behaviour of physicians to promote weight reduction (Rogers 1982).

Body weight

Men comprised about a quarter of the participants and men and women were analysed separately. Rogers 1982 reported that at 10 to 15 month follow-up, men and women in the intervention group had lost 5.3 kg and 1.4 kg more weight respectively than those receiving standard care. At 22 to 24 months, men in the intervention group had a net loss of 11.2 kg (95% CI -20.66 to -1.74) compared to standard care, whereas women had a net loss of 1.3 kg (95% CI -7.34 to 4.76) (Analysis 3.1). It is, however, uncertain if providing doctors with reminders results in a greater weight reduction than standard care, as the certainty of evidence was very low (downgraded three levels due to high risk of bias and severe imprecision).

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

None reported (included no adverse effects).

Health professional outcomes: measures of health practitioners' behaviour, knowledge, attitudes, or satisfaction

Rogers 1982 reported that reminders led to more diet advice (13.5%) being given or diets being reviewed over two years. In addition Rogers 1982 reported that physicians in the intervention group less often failed to review diet or provide advice to their patients with obesity during the 2-year study period (No of diets not reviewed (%); intervention: 14 (20.6); control: 38 (40.1).

Costs

We did not find any studies of reminders that reported costs or cost effectiveness.

1.4 Clinical decision support (CDS) tools

See Summary of findings 4.

Two studies assessed the use of clinical decision support tools, one recruiting children with obesity (Taveras 2015; n = 378), and the other adults with overweight and obesity (Baer 2016; n = 36,665),

Body weight

Baer 2016, which evaluated the effects of providing GPs with an electronic health record (EHR) enhanced with decision support aimed at improving obesity management, reported that there was little or no difference in weight change between the groups (mean six-month weight change: intervention: -0.11 kg; control: -0.06 kg; and mean 12-month weight change: intervention: -0.43 kg; control: -0.33 kg, P = 0.47); low certainty of evidence, downgraded two levels due to high risk of bias and imprecision. The mean weight change over 12 months was -0.38% for adults in the intervention group and -0.37% for adults in the control group (P = 0.89). Since the authors did not provide a measure of dispersion for the weight outcomes, these results are not included in the analysis section, nor do we present them in a separate 'Summary of findings' table.

BMI SDS/z-score

Taveras 2015, which evaluated the effects of providing paediatric clinicians with a CDS tool for improved obesity management, reported increased BMI z-scores of children (six to 12 years) in both arms, but a slightly lower increase in the CDS arm at 12 months compared to the standard care arm (MD -0.08, 95% CI -0.15 to -0.01; moderate certainty of evidence, downgraded one level due to imprecision) (Analysis 4.1).

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

Neither study reported adverse effects.

Health professional outcomes: measures of health practitioners' behaviour, knowledge, attitudes, or satisfaction

In Baer 2016 the diagnosis of obesity or being overweight on the problem list increased from 37% to 71% in the intervention group, but decreased from 16% to 8% for participants in the control group (P < 0.001). Among participants with BMI ≥ 27 kg/m^2, there were no differences between groups in changes in the percentages who had a nutrition counselling visit or were prescribed weight loss medication. Baer 2016 reported that healthcare providers' attitudes on management of participants with obesity or overweight were similar between groups (assessed through a web-based survey; 40% response rate), but intervention professionals reported having higher confidence to counsel patients about weight loss (from 68.1% to 81.6%), compared to health professionals in the control group (from 72.2% to 73.0%). Baer 2016 also reported that the GPs in the intervention group found some of the EHR features helpful (reminders to measure weight and height, an alert about putting obesity on the problem list, reminders with tailored management recommendations and other tools to help with obesity management), but that almost half of the responders said that the tool disrupted workflow and was cumbersome to use. See Table 1.

Taveras 2015 reported on paediatric clinicians' performance, which was assessed with the Healthcare Evaluation Data Information Set (HEDIS) (www.ncqa.org/hedis-quality-measurement). One measure, 'BMI percentile documentation', was similar in both groups after the intervention, but higher in the control group than in the intervention group at baseline. Another measure, 'nutrition or physical activity counselling documentation', increased by 45% in the CDS group, while remaining the same (0%) in the control group (see Table 1).

Costs

We did not find any studies of CDS tools that reported costs or cost effectiveness.

2. Interventions targeting the organisation of care

For an overview of organisational interventions see Table 2 and Table 4.

2.1 Introduction of multidisciplinary teams: 2.1.1 Doctor-dietitian team or dietitian alone delivering care

See Summary of findings 5.

One study (n = 270 adults) assessed the effect of a doctor-dietitian team, or a dietitian alone, delivering care, compared to usual care i.e. a doctor delivering care (Pritchard 1999).

Body weight

Pritchard 1999 compared clinical interventions delivered by GPs and dietitians to participants with obesity (n = 270). The authors reported that after one year participants who received an intervention delivered by a doctor-dietitian team may lose more weight (-6.7 kg, 95% CI -7.52 to -5.88 kg) than participants in the standard care group; those who received an intervention delivered by a dietitian alone lost 5.6 kg (95% CI -6.37 to -4.83 kg) more weight than participants in the standard care group (Analysis 5.1 and Analysis 5.2; low certainty of evidence; downgraded two levels due to high risk of bias and imprecision). However, 34% of randomised participants dropped out of the study and these results were based on an assumption that participants' weight remained unchanged after they had dropped out.

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

None reported (including no adverse effects).

Costs

For participants in the doctor-dietitian and dietitian-only groups, the cost of each additional kilogram lost over and above the weight change in the control group was USD 9.76 and USD 7.30 respectively (USD 1993/94; Pritchard 1999). The cost per participant was USD 88.61 for doctor-dietitian and USD 64.21 for dietitian-only groups, which is USD 65.49 and USD 41.09 higher respectively than the USD 23.12 cost for each participant allocated to the control group. The dropout rates from the weight loss programme were 20% lower in the doctor/dietitian group and in the standard care group than in the dietitian-only group.

2.1 Introduction of multi-disciplinary teams: 2.1.2 Shared care

See Summary of findings 5.

One study (Wake 2013) involving children with obesity (n = 105) assessed the effect of shared care.

BMI or BMI z-score

Wake 2013 evaluated whether general practice surveillance for childhood obesity, followed by shared care obesity management across primary and tertiary care settings, could improve BMI and BMI z-score in children with obesity (aged three to 10 years). The results of the study suggest that shared care leads to little or no difference in BMI z-scores (MD 0.0, 95% CI -0.17 to 0.17) at 15 months follow-up (low-certainty of evidence, downgraded due to severe imprecision) (Analysis 6.1). All children who remained in the study at follow-up (92%) had attended the tertiary appointment and their general practitioner for at least one consultation (mean 3.5, SD 2.5, range 1 to 11). The recommended number of visits was five to 12.

Participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

Wake 2013 reported little or no difference between groups for any of the other obesity-related outcomes (i.e. body fat percentage, waist circumference (see Analysis 6.2; Analysis 6.3), or health-related quality of life, or body dissatisfaction (see Analysis 6.4; Analysis 6.5) and physical appearance/self-worth. The latter three are considered to be adverse effects. See Table 2.

Costs

We did not find any studies of shared care that reported costs or cost effectiveness.

2.2 Changes in skill mix: organisational restructuring of primary care

See Summary of findings 6.

One study (Taveras 2011) involving children with obesity (n = 475) assessed the effect of changes in skill mix.

BMI z-score

Taveras 2011 evaluated whether organisational restructuring of the delivery of primary care (i.e. introducing the chronic care model, involving for example training of the healthcare team, and decision support, etc.) could improve the management of children with overweight and obesity and subsequently improve their BMI. The authors reported a slightly smaller increase in the BMI of intervention participants compared to children receiving standard care (BMI change: MD -0.18, 95% CI -0.20 to -0.16; moderate-certainty evidence, downgraded due to imprecision) (Analysis 7.1). In a follow-up study (see Rifas-Shima 2016 under Taveras 2011), intervention participants had similar changes in BMI z-scores as control participants after two years (MD -0.04 units, 95% CI -0.14 to 0.06). Of the originally-recruited 475 participants, 445 participated in the follow-up study.

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

We did not find any studies of organisational restructuring of primary care (skill mix changes) that reported participants outcomes other than weight or BMI or both (including adverse effects).

Costs

We did not find any studies of organisational restructuring that reported costs or cost effectiveness.

2.3 Changes in the setting of service of delivery: 2.3.1 Method of delivery of care (mail or telephone)

See Summary of findings 7.

One study (Sherwood 2006) assessed the effect of method of delivery of care (mail or phone) for weight loss in overweight adults (n = 1801).

Body weight

Sherwood 2006 assessed the method of delivery of a counselling intervention (by mail or phone) to encourage weight loss in overweight adults .The results suggest that mail and phone interventions probably lead to little or no difference in weight loss at 12 months in adults with obesity or overweight, compared to standard care (MD -0.14, 95% CI -0.91 to 0.63; MD -0.34, 95% CI -1.11 to 0.43, respectively; moderate certainty of evidence, downgraded by one level due to imprecision (Analysis 8.1; Analysis 8.2)). The study reported that although mail interventions were more successful in encouraging overweight participants to start on a weight loss programme, phone interventions were more successful in encouraging them to stay on the programme and to complete it. This may have been partly because a high proportion of participants did not start the 10-session weight-reduction programme (phone 35%; mail 55%), and partly because although 44% of randomised participants did not have their weight measured at the end of the study, the analysis assumed no weight loss among these participants.

Other participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

We did not find any studies of changes in how care was delivered that reported participant outcomes other than weight or BMI or both (including adverse effects).

Costs

Phone counselling was less cost-effective than mail counselling or standard care, with an additional cost of USD 60/kilogram of weight loss (Sherwood 2006). Total cost per person was USD 127.39 in the phone group and USD 50.45 in the mail group, compared to USD 71.5 in the control group.

2.3 Changes in the setting of service of delivery: 2.3.2 Nurse at primary care clinic

See Summary of findings 7.

One study (Banks 2012) (n = 68 children with obesity) assessed the effect of having different healthcare professionals delivering the intervention.

BMI z-score

Banks 2012 compared the effects of interventions delivered by nurses in primary care clinics with interventions delivered by consultants at specialised Childrens Obesity Hospital Clinics (standard care). Forty-five families (30%) declined to participate. The results of the study indicate that obesity care delivered by a nurse at a primary care clinic to children (five to 16 years old), may lead to little or no difference in BMI SDS in children at 12 months (MD -0.17, 95% CI -0.27 to -0.07), compared to consultant-led specialist care (MD -0.15, 95% CI -0.26 to -0.05; very low certainty of evidence; downgraded due to high risk of bias and severe imprecision, see Analysis 9.1). The difference in means was -0.02 (95% CI -0.16 to 0.12), indicating that nurse-delivered care in a primary care clinic was not inferior to consultant-delivered care at a specialised children's obesity hospital clinic.

Participant outcomes: measures of satisfaction with provider practice or healthcare provision, psychological outcomes, morbidity, measures of body fat, effects on risk factors, participant behaviour, number of withdrawals from treatment

Quality-of-life ratings were similar in both groups, with the satisfaction ratings slightly higher in the intervention group (Banks 2012; see Table 2). Nearly half of those starting treatment withdrew (29/68, 43%), and withdrawals were higher in primary care clinics (19/42, 45%) compared with Bristol Royal Hospital for Children (10/26, 38%). The overall 'did not attend' rate (total 'did not attend'/total appointments offered) was 23%, which was similar in both arms (Bristol Royal Hospital for Children = 24%; primary care clinics = 22%). We did not find any studies of changes in care delivery that reported adverse effects.

Costs

We did not find any studies of changes in care delivery hat reported costs or cost effectiveness.

ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Interventions targeting health professionals - Tailoring compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Adults with overweight or obesity
Setting: Primary care practices (n = 28), UK
Intervention: Interventions targeting health professionals (practice nurses and consultants) - Tailoring
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Interventions targeting health professionals - Tailoring				
Body weight (kg) at the end of study	The mean body weight (kg) at the end of study was 85.3 kg	MD 2.2 kg higher (2.13 higher to 2.27 higher)	-	15,553 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	No studies recruited children.
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **MD**: mean difference

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]We downgraded the certainty of evidence by one level due to imprecision. Only one study provided data for this comparison.

Interventions targeting health professionals - Reminders compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Adults with overweight or obesity
Setting: Cardiac, pulmonary, and renal university clinics (n = 1 hospital), USA
Intervention: Interventions targeting health professionals (physicians) - Reminders
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Interventions targeting health professionals - Reminders				
Body weight (amount overweight (kg). Follow-up: mean 24 months	The mean amount overweight (kg) - 24.3 kg in women and 26.4 kg in men	MD 1.3 kg lower (7.34 lower to 4.74 higher) in women; MD 11.2 kg lower (20.66 lower to 1.74 lower) in men	-	70 women; 20 men (1 RCT)	⊕◯◯◯ VERY LOW [a,b,c]	No studies recruited children.
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a] We downgraded the certainty of evidence by one level due to high risk of bias associated with incomplete outcome data and unclear sequence generation and allocation concealment.

[b] We downgraded the certainty of evidence by one level due to imprecision. One study only.

[c] We downgraded the certainty of evidence by one more level due to imprecision. Very few participants.

Interventions targeting health professionals - Clinical decision support tools compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Children with obesity
Setting: Paediatric clinics (n = 9), USA
Intervention: Interventions targeting health professionals (paediatric clinicians) - Clinical decision support tools
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Interventions targeting health professionals - Clinical decision support tools				
BMI z-score [a] follow-up: mean 12 months	The mean BMI z-score was 2.01	MD: 0.08 lower (0.15 lower to 0.01 lower)	-	378 (1 RCT)	⊕⊕⊕◯ MODERATE[b]	One study Baer 2016 recruited adults, but did not report a measure of dispersion, and could therefore not be included in the analysis. This study reported no effect of CDS on weight loss
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).
CI: Confidence interval; **MD**: mean difference
*A reduction (or difference) of $\geq$ 0.5 in BMI z-score is considered a clinically meaningful change (i.e. that equates to definite reductions in fat mass and quantifiable improvements in risk factors for heart disease and diabetes (CDS 2015).

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]The BMI z-score was also adjusted for neighbourhood socioeconomic disadvantage score.
[b]We downgraded the certainty of evidence by one level due to imprecision, as only one study provided data.

Interventions targeting the organisation of care - Introduction of multidisciplinary teams compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Adults or children with overweight or obesity
Setting: University-based practices (n = 9), Australia; Primary care practices (n = 22) and one tertiary children's weight management service, Australia
Intervention: Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians and shared care)
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care (doctors)	Risk with Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians)				
Doctor/dietitian vs standard care (doctor only)						
Body weight (kg) at 12 months follow-up (or closest timepoint available) - Doctor/dietitian versus standard care	The mean body weight (kg) at 12 months follow-up (or closest timepoint available) - Doctor/dietitian versus standard care was 89.7 kg	MD 6.7 kg lower (7.52 lower to 5.88 lower)	-	182 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost per participant - Doctor dietitian versus standard care	Cost per participant in the Doctor-dietitian group was USD 88.61 (1993/94). This was USD 65.49 higher than for a control group participant (USD 23.12)		-	182 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-

Dietitian vs standard care (doctor only)						
Body weight (kg) at 12 months follow-up (or closest timepoint available) - Dietitian versus standard care	The mean body weight (kg) at 12 months follow-up (or closest timepoint available) - Dietitian versus standard care was 89.7 kg	MD 5.6 kg lower (6.37 lower to 4.83 lower)	-	178 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost per participant - Dietitian versus standard care	Cost per participant in the dietitian group was USD 64.21. This was USD 41.09 higher than for a control group patient USD 23.12)	-	-	178 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-
Shared care vs standard care						
BMI z-score follow-up: mean 15 months	The mean BMI z-score was 2.0	MD 0.0 (0.17 lower to 0.17 higher)	-	105 (1 RCT)	⊕⊕◯◯ LOW [c]	-
Adverse effects: Health-related quality of life- child report follow-up: mean 15 months	The mean adverse effects - Health-related quality of life - child report was 75.2	MD 2.2 lower (8.11 lower to 3.71 higher)	-	96 (1 RCT)	⊕⊕◯◯ LOW[c]	-
Adverse effects: Physical appearance/self-worth, % positive responses [d] follow-up: mean 15	The mean adverse effects - Physical appearance/self-worth, % positive responses was 57.0	OR (95% CI) 1.0 (0.6 to 1.7)	-	96 (1 RCT)	⊕⊕◯◯ LOW [c]	-

months						
Adverse effects - Body dissatisfaction (Child Picture Scale 1 - 7) follow-up: mean 15 months	The mean adverse effects - Body dissatisfaction was 1.6	MD 0.3 lower (0.78 lower to 0.18 higher)	-	96 (1 RCT)	⊕⊕◯◯ LOW [c]	-
Cost	-	-	-	-	-	No data available for this outcome

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a] We downgraded the certainty of evidence as there was only one study, and small sample size.
[b] We downgraded the certainty of evidence as there was high risk of bias due to inadequate allocation concealment and risk of contamination.
[c] We downgraded the certainty of evidence by two levels due to imprecision. Only one very small study provided data for this comparison, and CIs cross the line of no effect for all outcomes.
[d] Six responses analysed as single outcome (% positive responses and population averaged odds ratio of positive response)

Interventions targeting the organisation of care - Changes in skill mix (organisational restructuring i.e. introducing the chronic care model) compared to standard care for the management of adults or children with overweight or obesity

Patient or population: Children with obesity
Setting: Paediatric clinics (n = 10), USA
Intervention: Interventions targeting the organisation of care - Changes in skill mix (organisational restructuring, i.e. introducing the chronic care model)
Comparison: Standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Interventions targeting the organisation of care - Changes in skill mix (organisational restructuring i.e. introducing the chronic care model)				
BMI change follow-up: mean 12 months	The mean BMI change was 0.49	MD 0.18 lower (0.2 lower to 0.16 lower)	-	473 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	No studies recruited adults.
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;**MD**: mean difference

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]We downgraded the certainty of evidence by one level due to imprecision, as only one study provided data for this comparison.

Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone) compared to standard care for the management of adults or children with overweight or obesity

Patient or population: children and adults with overweight or obesity
Setting: One managed care organisation, USA; Primary care practices (n=2), secondary care (n=1 children's specialist hospital clinic), UK
Intervention: Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone)
Comparison: standard care

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with standard care	Risk with Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone)				
Mail vs standard care						
Mean body weight (kg) change at longest follow-up	The mean body weight (kg) change at longest follow-up - Mail intervention versus standard care was -0.59 kg	MD 0.14 kg lower (0.91 lower to 0.63 higher)	-	1200 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	-
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	Total cost per participant was USD 50.45 in the mail group, and USD 42.18 in the control group. The cost-effectiveness ratio: cost per weight loss of 1 kg was USD 72.08 in the mail group. For usual care this cost was USD 71.50		-	1200 (1 RCT)	⊕⊕⊕◯ MODERATE [a]	-
Telephone vs standard care						

Mean body weight (kg) change at longest follow-up	The mean body weight (kg) change at longest follow-up - Telephone intervention versus standard care was -0.59 kg	MD 0.34 kg lower (1.11 lower to 0.43 higher)	-	1201 (1 RCT)	⊕⊕⊕○ MODERATE [a]	-
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	The total cost per participant was USD 127.39 in the telephone group, and USD 42.18 in the control group. The cost-effectiveness ratio: cost per weight loss of 1 kg was USD 132.70 in the telephone group. For usual care this cost was USD 71.50	-	-	1201 (1 RCT)	⊕⊕⊕○ MODERATE [a]	-
Nurse at primary care clinic vs specialist clinic						
Change in BMI z-score follow-up: mean 12 months	The mean change in BMI z-score was -0.15	MD 0.02 lower (0.16 lower to 0.12 higher)	-	52 (1 RCT)	⊕○○○ VERY LOW [b,c]	-
Adverse effects	-	-	-	-	-	No data available for this outcome
Cost	-	-	-	-	-	No data available for this outcome

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).
CI: Confidence interval; **MD:** mean difference

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a]We downgraded the certainty of evidence by one level due to imprecision. Only one study provided data for this comparison.
[b]We downgraded the certainty of evidence by one level due to high risk of bias (high unexplained attrition).
[c]We downgraded the certainty of evidence by one level due to imprecision. Only one study, and very small sample size.

DISCUSSION

Summary of main results

Twelve randomised trials met our inclusion criteria. Seven studies evaluated interventions that targeted general practitioners, i.e. educational interventions (Cohen 1991; Martin 2006; Moore 2003), tailoring (Goodfellow 2016), reminders (Rogers 1982), and CDS tools (Baer 2016; Taveras 2015). Five studies evaluated organisational interventions, i.e. introduction of multidisciplinary teams (Pritchard 1999; Wake 2013), changes in skill mix (Taveras 2011), or changing the setting of care (Banks 2012; Sherwood 2006). Four of twelve studies recruited children (Banks 2012; Taveras 2011; Taveras 2015; Wake 2013) and the remaining eight recruited adults.

The certainty of the evidence from the included studies ranged from moderate to very low for the main outcome (weight or BMI). None of the studies provided any convincing evidence for a clinically important weight loss or BMI change for any of the evaluated interventions, even if educational interventions show a small effect on weight. It should be noted that one study which evaluated the feasibility of nurse-led primary care clinics for children with obesity, compared with hospital-based specialist care, was not powered to detect differences between groups (Banks 2012), and therefore warrants further investigation.

Despite the increased confidence in weight counselling reported in the one study of a tailored intervention, this was not reflected in changes in clinical practice or weight outcomes (Goodfellow 2016). Nor did the improved clinical practice reported in two other studies (Baer 2016; Taveras 2015) coincide with a beneficial effect on weight outcomes. Only one study reported both improved practice and weight outcomes (Rogers 1982), but the certainty of evidence for the results from this study was very low.

Adverse effects were only reported in one study (shared care), with little or no difference between intervention and control groups. Cost data were reported only in two of the 12 studies, and therefore the evidence for cost effectiveness across the evaluated intervention is very limited.

Overall completeness and applicability of evidence

All twelve included studies were randomised controlled trials, which generally constitute the best available evidence of effectiveness (Higgins 2011). This updated review includes a wider variety of evaluated interventions than the previous version (Flodgren 2010). However, it is still the case that only single studies predominantly provide evidence for each intervention, making it difficult to draw firm conclusions about their effectiveness. The exceptions are three studies that evaluate the effects of educational interventions, and two studies of CDS tools. In addition, each intervention is only evaluated in one specific population, i.e. either adults with overweight or obesity or children with obesity. The exception is the evaluation of CDS tools; one study recruited adults and the other children. This is a limitation of the generalisability of the evidence, since evidence from a study involving children with obesity may not be directly applicable to an adult population with overweight or obesity, and vice versa.

There was little evidence from the included studies on costs, cost effectiveness of interventions and participant satisfaction with care. The studies included in this review were limited to those conducted in high-income countries (USA, UK and Australia), although low- and middle-income countries are also heavily affected by the obesity epidemic (WHO 2016a). The applicability of these findings to healthcare settings in low- and middle-income countries may be questionable.

Low levels of implementation; negative attitudes, or lack of dedicated time?

Despite the fact that clear anti-fat attitudes and discrimination against overweight people have been documented in the healthcare sector (Puhl 2001: Puhl 2009; Phelan 2015), only one of the included studies assessed the attitudes of the healthcare professionals targeted by the intervention (Baer 2016), and only 49% responded to the survey. Negative attitudes in health professionals may not only result in low levels of implementation in weight loss interventions, but also in people with obesity failing to seek health care (Brownell 2003).

Importantly, none of the included studies evaluated specific strategies to change health professionals' attitudes towards people with overweight and obesity, towards weight loss counselling, or their beliefs about treatment efficacy. The low level of implementation of interventions found in Moore 2003 may reflect health professionals' negative attitudes.These attitudes may constitute important barriers to improving the effectiveness of weight reduction programmes (Price 1987; Frank 1993; HEA 1995; Summerbell 1998; Puhl 2001; Puhl 2009). Omission of the health professionals' attitudes towards people with overweight or obesity is a limitation of the studies included in this review. Other reasons for low implementation may be lack of time, or perceived disturbances in the workflow of an intervention (for example, CDS tools in Goodfellow 2016). Goodfellow 2016 suggests that additional staff time dedicated to obesity management could be a solution, as GPs are already pressed for time. None of the included studies provided any information on managerial support for the intervention, organisational culture, readiness to change, or resources made available for the healthcare professionals to provide weight counselling, which are all factors that may impact on the implementation of an intervention.

Healthcare professionals' skill and knowledge to improve compliance

The art of successful weight loss counselling is finding an approach to dieting which is acceptable and feasible for the person with obesity. This requires skill on the part of the practitioner, involving behaviour change techniques and dietary management.The skill and knowledge level of the practitioner required to best match the treatment approach to the individual should not be underestimated. It is therefore surprising that relatively few studies (as reported in this review) have been conducted to assess the effectiveness of interventions aimed at improving the skill and approach of practitioner(s) in securing the compliance of participants with obesity with the weight loss advice given. In two of the included studies (Taveras 2011; Taveras 2015), the healthcare professionals in the intervention group received training in Motivational Interviewing (MI) techniques. MI is a communication technique that has been described as "a collaborative person-centred form of guiding to elicit and strengthen motivation for change" (Miller 2001). A limitation of these studies is that the authors provided no information about the duration and frequency of training sessions, or by whom the training was delivered. Furthermore, treatment fidelity was not reported in either study. However, a recent systematic review suggests that MI may be an effective tool for healthcare professionals to use to help primary care patients to lose weight, even if not all studies show an effect on weight loss (Barnes 2015)
.

Evaluations of 'up-and-coming' interventions

Considering the repertoire of interventions that may be used to improve practice or the organisation of care (EPOC 2016b), only a relatively small number of these interventions have been rigorously evaluated. For example, only brief face-to-face educational interventions were evaluated, while none of the included studies evaluated e-learning interventions for improved weight management, e.g. interactive online courses that healthcare professionals could access at their own convenience, at flexible locations, and at low cost. An ongoing Cochrane Review will hopefully provide more information about whether on not e-learning is an effective tool to improve the weight management skills and attitudes of fully-qualified healthcare professionals (Vaona 2015).

None of the included studies evaluated the effects of e-health to deliver weight loss interventions to people with overweight and obesity. E-health would enable not only more frequent contacts with people with overweight or obesity (and more frequent contact with the parents in the case of children), but also a closer follow-up of diet, physical activity and weight change. Since most people today own a phone, even in low- and middle-income countries there is a great opportunity for mobile phone-based interventions (i.e. m-health) to overcome geographical barriers and provide care to people living in remote areas (Lewis 2012; Khokhar 2014). However, full-scale evaluations of e-health/m-health weight-loss interventions are needed (Lewis 2012).

Taking into consideration gender and ethnicity

Men and women are generally equally affected by the obesity epidemic (NIDDK 2012). In the UK, USA and Australia, where the interventions were conducted, the prevalence of obesity is similar among men and women (Rennie 2005; Ogden 2006; Australian Bureau of Statistics 2009). In the studies identified for this update, the proportion of men and women was equal, while in all the older included studies samples were dominated by women (62% to 100%), which may represent selection bias. If the imbalance was due to men's reluctance to seek health care or to their unwillingness to participate, it is possible that only highly-motivated men were included. This may explain the greater effects on weight loss among men in Rogers 1982. However, the participants' motivation to lose weight and their readiness to change behaviour is unknown, not only in Rogers 1982, but in all the included studies. Goodfellow 2016 provided some evidence for performance bias among the healthcare professionals: they reported that participants were almost 30% more likely to have their BMI or waist circumference measured if they were women , but that men were 9.3% more likely to be referred to weight loss services.

Whilst African-Americans are almost 1½ times more likely to have obesity than white people (The State of Obesity 2014), one study from the USA recruited 91% white people, three studies recruited people with different ethnicity (Taveras 2011; Taveras 2015; Goodfellow 2016), and one USA study recruited predominantly African-American low-income women with obesity (Martin 2006). None of other USA studies reported the ethnicity of their participants. Neither did any of the Australian studies (Pritchard 1999; Wake 2013), and therefore the proportion of indigenous people, who are known to have a higher obesity prevalence than the non-indigenous population, remains unknown (ANPHA 2014).

Goodfellow 2016 reported that people with mixed ethnicity were 28.9% less likely than white people to be offered a weight loss programme or to be referred to weight loss services.

Evidence-base of interventions

It is difficult to determine the extent to which the weight-change strategies used in the included studies reflect what is currently known about good practice. Studies that are not based on good evidence run the risk of implementing changes that are not effective. Good evidence about interventions for adults (Avenell 2004; Jolly 2011; Colquitt 2014; Dombrowski 2014; Peirson 2014; Samdal 2017) and children (Colquitt 2016; Al-Khudairy 2017; Mead 2017). was not available when some of the studies in this review were published. However, of the seven studies conducted and published after 2003 (Moore 2003; Martin 2006; Sherwood 2006: Taveras 2011; Banks 2012; Wake 2013; Taveras 2015), only three were explicitly evidence-based (Moore 2003; Wake 2013; Taveras 2015).

Consumer involvement

Two of the included studies developed the intervention in consultation with the health professionals involved (Goodfellow 2016; Rogers 1982).This has the potential to improve uptake, as professionals 'buy in' to the guidelines. None of the included studies were developed in consultation with consumers (patients), which may have affected not only the focus of the intervention but potentially also the acceptability of the intervention, as well as the dropout rate. In one of the included studies (Banks 2012) one-third of children and parents declined to participate. In Wake 2013, in which uptake and retention were high, the participating children with obesity only visited the clinic on average 3½ times over 15 months, while the recommended number of weight management visits to the GP was five to 11. It is possible that involving participants and families of the children with obesity in the trial development could increase not only their willingness to participate, but also their attendance (i.e. fidelity to the intervention). We do not know whether those who participated in the included studies were satisfied with the care they received, as very few of the studies assessed participant satisfaction with the intervention.

Risk factor reduction and clinically important weight loss

Part of the clinical reasoning behind encouraging people with overweight and obesity to lose weight is that weight loss may reduce the risk factors for cardiovascular disease (for example, high blood pressure, high lipid and blood glucose levels, and new diagnoses of type 2 diabetes), and thereby decrease mortality (Wing 2011). The benefits of weight loss for children and adults with overweight or obesity may be measured by reductions in these risk factors. However, only two of the included studies evaluated the effects of weight loss on risk-factor reduction (i.e. blood pressure in Cohen 1991; Pritchard 1999) and only one of these (Pritchard 1999) found a reduction in blood pressure which was associated with a clinically-meaningful weight loss. None of the studies included in this review evaluated the effects of interventions on other important risk factors.

A weight loss of 5% to 10% in adults with obesity is reported to positively affect health outcomes, and is therefore considered clinically important (NICE 2006). In most studies included in this review, the effect of the intervention on mean weight loss, if any, was modest (less than 2%), with the exception of Pritchard 1999 and Rogers 1982 (only for the men in the intervention group), in which the mean weight loss exceeded the 5% or five-kilogramme limit. Some studies (Pritchard 1999; Martin 2006; Sherwood 2006) reported not only mean weight loss but also the percentage of participants who lost more than 5% or 10% of body weight, which may be a good indicator of the success of an intervention from a clinical point of view.

There is some evidence from cohort studies suggesting that weight loss below the 5% threshold may also carry health benefits at a population level. This is supported by data showing the impact of small amounts of weight loss on blood pressure and other risk factors (Aucott 2005; Zorner 2016). Two other studies suggest greater risk reductions from greater weight loss (more than 10%) (Wing 2011; Brown 2016).

For studies involving children, a difference of 0.5 or more in the BMI z-score is considered clinically meaningful, i.e. a difference that equates to definite reductions in fat mass and quantifiable improvements in risk factors for heart disease and diabetes (CDS 2015). None of the studies of children (Taveras 2011; Banks 2012; Wake 2013; Taveras 2015) reported a difference in BMI or BMI z-score of 0.5 or more, i.e. none of the studies showed a clinically important effect of the intervention.

It should be noted that different ethnic groups may have different physiological responses to fat storage, and that South-Asian populations have been recommended to revise their BMI thresholds, since they are at risk of chronic diseases and mortality at lower BMI levels than the European population (National Obesity Observatory 2011). Both factors need to be taken into consideration when measuring obesity (using waist circumference and BMI) and when evaluating risk reduction. These differences were not discussed in any of the included studies that covered participants of South-Asian origin.

Ongoing trials

Among the ongoing trials is the 5As trial, a large study being conducted in Canada (Campbell-Scherer 2014), and repeated in Germany (DRKS00009241). The 5As intervention consists of the biweekly participation of multidisciplinary teams in learning collaborative sessions supported by internal and external practice facilitation, and the use of evidence-based shared decision-making tools. The trial targets provider-identified barriers to effective obesity management in primary care, and has so far published a number of papers, but without any weight outcomes. The TeenChat is an ongoing trial which aims to teach primary-care physicians effective ways to counsel adolescents with overweight or obesity to attain a healthy weight (NCT01040975). The GLOWING trial aims to test the delivery of midwife-training sessions to support clinical practice for weight management during pregnancy (ISRCTN46869894).One trial evaluate the use eHealth methods to achieve weight loss in obese people (NCT01827800), and another trial evaluates the use of online learning program targeting GPs for improved weight management in patients with severe obesity (DRKS00009241).

Certainty of the evidence

Seven of the 12 included studies were at high risk of bias (Rogers 1982; Cohen 1991; Pritchard 1999; Moore 2003; Martin 2006; Banks 2012; Baer 2016). One study (Taveras 2011) had a moderate risk of bias, and four studies were at low risk of bias (Sherwood

2006; Wake 2013; Taveras 2015; Goodfellow 2016). The certainty of evidence from these studies varied from moderate to very low. Pooling of results for the main outcome was only possible for educational interventions (three studies), but the certainty of these results was low. Two studies provided moderate to low certainty of evidence for little or no effect of CDS tools for improved weight management, but the results of these studies could not be pooled (one study reported no means and SDs, and the populations were heterogenous). Only single studies provided evidence for all other interventions evaluated, which makes the applicability of the evidence to other settings and populations uncertain. The heterogeneity of interventions, small sample sizes, high dropout rates among participants, and sometimes low levels of implementation make it difficult to draw firm conclusions on how the management of weight loss in people with obesity might be improved.

Including a dietitian in the primary care team appeared to be beneficial for weigh loss of adults in Pritchard 1999, but not in one of the more recently published studies of shared care, in which a dietitian was part of the team providing care for children with obesity (Wake 2013). The reason for this discrepancy may be due to the fact that Pritchard 1999 imputed the weight of participants who dropped out, assuming that their weight remained unchanged after they left the study. Since the dropout rates varied substantially between the intervention groups (28.4% in the doctor group, 29.3% in the doctor-dietitian group and 45% in the dietitian group), the analyses may have yielded erroneously positive results for weight loss, since previous studies of long-term weight changes (12 months or longer) have shown that participants tend to regain their former weight after initial weight loss (EHCB 1997).The analysis in Banks 2012, in which the dropout rate was 38% to 45%, was by intention-to-treat, which may have misrepresented the findings.

In two of the included studies the level of implementation was very low (Goodfellow 2016; Moore 2003); in the former only 13% of intervention participants had been offered a weight loss intervention, and in the latter only half of the participants were counselled about their weight.

The results of the education intervention meta-analysis must be interpreted with some caution. Firstly, the fact that the three included studies all had different end points (six, 12, and 18 months) could have biased the results due to the short-term character of weight loss. The clinically-meaningful effect reported at six months in Martin 2006 might have vanished if the intervention had continued for another six months. Secondly, the allocation and randomisation processes were unclear in both studies that reported a clinically-important weight loss, which may have resulted in an upward bias in the effectiveness (Schulz 1995; Moher 1998; Egger 2003). Thirdly, lack of clarity in allocation is problematic because, while interventions were aimed at the providers, characteristics of the providers were not compared at baseline, so we cannot tell if randomisation was effective at the provider level. Finally, even if the three studies were relatively similar (short educational intervention targeting GPs), the intervention provided in Martin 2006 was somewhat different, since it also included an individualised intervention for participants.

In Cohen 1991 the analysis did not allow for clustering of participants within healthcare providers, which is likely to overestimate the precision of the effect of treatment(Goldstein 2003), and hence give the study undue weight in a meta-analysis. However, even if this study were given much less weight, the results of the meta-analysis of the two studies of educational interventions would be little changed, as Cohen's findings were consistent with those of the larger study of Martin 2006.

Potential biases in the review process

Although we conducted a comprehensive search: searching five databases (those that were most likely to contain any relevant studies), trials registers, reference lists of included studies, and performed a citation search for all previous versions of the review and all included studies using Web of Science. we cannot rule out the possibility of having missed relevant studies. Duplicate screening of possible relevant studies, duplicate independent data extraction, quality assessment and grading of the evidence also helped to minimise the bias in the review process. There is the additional threat of publication bias: studies reporting a beneficial effect of the intervention or a larger effect size may be published, while a similar amount of data pointing in the other direction may remain unpublished (Hopewell 2009). Unfortunately, we were unable to assess publication bias in this review because of the small number of included studies and the heterogeneity of the interventions assessed.

Agreements and disagreements with other studies or reviews

We are not aware of any other reviews of the evidence for interventions to change professional behaviour or the organisation of delivery of care for adults or children with overweight or obesity. We therefore compare the results of this review with other reviews of specific interventions, but not necessarily targeting healthcare professional behaviour related to overweight and obesity management.

The small beneficial effect on weight loss from brief educational interventions targeting GPs (Cohen 1991; Moore 2003; Martin 2006) found in our review is in general agreement with results from a Cochrane Review (O'Brien 2007) which found a small to moderate effect on participant outcomes (and professional practice) of educational outreach visits. Furthermore O'Brien 2007 states that the effect varied and that the variation could not be explained.

Our findings of little or no effect of CDS tools on weight outcomes (Taveras 2015; Baer 2016) are in agreement with the results of an

Overview of Reviews (Jaspers 2011), which reported little evidence for any benefits of CDS tools in general.

For the remaining interventions, only single studies provided data for each comparison. While we find it uncertain whether printed computer reminders improve practice or weigh outcomes in a primary care setting (Rogers 1982), evidence from a systematic review suggests that printed computer reminders probably slightly improves quality of care, in terms of compliance with preventive guidelines and with disease management guidelines (Arditi 2017).

While our findings suggest little or no effect on professional practice or weight loss of a tailored intervention (Goodfellow 2016), results from a recent Cochrane Review (Baker 2015) suggest that tailored interventions can be effective in changing practice, but that the effects vary, and that it is not clear how best to tailor interventions for optimal results.

Our review found little evidence for an effect of shared care on BMI change in children (Wake 2013), which is in line with the results of a Cochrane Review (Smith 2017) suggesting that there is insufficient evidence to demonstrate significant benefits from shared care on most patient outcomes, apart from depression.

In addition, the low level of implementation of the weight loss intervention found in two of the studies (Moore 2003; Goodfellow 2016) is in accordance with studies showing that health professionals quite often fail to recommend or give advice on weight loss (Galuska 1999; Wadden 2000; Moghre 2016),

AUTHORS' CONCLUSIONS

Implications for practice

Health professionals, particularly in primary care, have the potential to influence large numbers of patients. We currently have little evidence about how clinical practice or the organisation of care might be improved to help children or adults with overweight or obesity to achieve weight loss. While pooled results from three studies indicate that educational interventions may lead to a slight weight reduction, the certainty of these results was low. Two trials, both evaluating CDS tools (unpooled results) for improved obesity management, suggest little or no effect on the weight of adults or the BMI of children with obesity. All the other interventions were evaluated by single studies, either in adults or children; all these interventions therefore need further investigation. As only two studies reported on cost, we know very little about cost effectiveness across the evaluated interventions.

It is also important to note that the resources available for healthcare services and to the health professional who treats people with obesity, vary between countries. The level of resource is relatively much greater in countries which treat obesity as a disease. The WHO classifies obesity as a disease, as does the USA, but many other countries (e.g. Australia, the UK) do not. Although there are arguments for and against classifying obesity as a disease, one could argue that a higher priority and greater financial resources for obesity management might improve the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults who have overweight or obesity.

Implications for research

Previous systematic reviews have shown that combinations of dietary, exercise, and behavioural approaches are effective strategies to manage overweight and obesity in adults (Avenell 2004; Jolly 2011; Dombrowski 2014; Peirson 2014; Samdal 2017) and children (Colquitt 2016; Al-Khudairy 2017l, Mead 2017).

Since obesity is such a major public health problem and resources for health care are limited, evidence-based and cost-effective healthcare interventions to improve the management of people with obesity are urgently needed. The review highlights the paucity of information about how clinical practice or the organisation of care for people with overweight and obesity might be improved. All of the evaluated interventions would need further investigation to ascertain their strengths and limitations as effective strategies to change the behaviour of healthcare professionals or the organisation of care.

Future studies of weight-loss interventions targeting healthcare professional or the organisation of care should:

- consider evaluating educational interventions other than brief face-to-face meetings, e.g. interactive online courses and learning materials that the healthcare professional can access at any time.
- consider evaluating the use of e-health systems in weight management, using distal measuring devices, which would enable more frequent contacts./follow-up with the patient (more high-intensive interventions).
- consider evaluating the use of smart phone functions in weight management, as the widespread use of smart phones, even in low- and middle-income countries, provides an opportunity to provide weight-management interventions in very remote and underserved areas.
- always Include cost and cost-effectiveness evaluations.
- ensure that the research populations are representative of people with overweight and obesity found in the healthcare setting under examination.
- describe characteristics of the participants that may modify the effects of interventions, for example, the degree of overweight or obesity according to international classifications (WHO 2005), and the participants' motivation and readiness to change.
- describe characteristics of the health professionals targeted by the interventions that may modify the effect of intervention,

e.g. their attitudes towards people with overweight and obesity, weight-counselling behaviours, and their confidence in the efficacy of treatment.

- ensure that innovative interventions are always compared to 'standard care'.
- ensure that (clinical) interventions are evidence-based.
- Involve consumers (patients) and healthcare professionals (whom the intervention targets), in the trial development (Counterweight Project Team 2008).
- follow guidelines for the reporting of clinical trials (Consort 2010, Consort 2010 cluster, CONSORT 2001 (Campbell 2010; Schulz 2010)).
- assess the effects of weight loss on important risk factors for cardiovascular disease, e.g. high blood pressure, lipid, and blood glucose levels, and new diagnoses of type 2 diabetes.
- clearly state whether or not the intervention effects found correspond to a clinically-meaningful weight change that relate to a risk factor reduction

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Baer 2016

Methods	**Study design:** Cluster-randomised trial **Unit of allocation:** the practice **Unit of analysis:** the participant **Sample size calculation:** N/A
Participants	**The total number of patients:** N = 35,665; Intervention N = 14,779; Control N = 20,886 eligible adults with BMI $\geq$ 25 kg/m^2 had visits during the intervention period (Phase 2) **Note:** Phase 1 of the intervention included all patients over 18, and ***not only people with obesity or overweight*** , so we have not included the results from this phase in the review. For Phase 2, the study population included all adults who had a visit at one of the intervention or control clinics between June 11, 2012 and December 10, 2012, and who had a BMI $\geq$ 25 kg/m^2. Patients who visited providers who saw fewer than 50 patients during this time period were excluded. **Practices:** all primary care practices (N = 12) affiliated with Brigham and Women's Hospital (BWH), an academic medical centre in Boston, Massachusetts (23 clinical areas or teams were randomised) **Hospitals:**1 hospital **Communities or regions:** located in both urban and suburban areas across the greater Boston area, which serve a racially and socio-economically diverse population of patients **Characteristics of participating healthcare providers:** **Profession**: primary care physicians, nurse practitioners, and physician assistants (Trainees (clinical fellows and residents) are in all of the clinics, and medical students in some of them **Level of training**: see above **Age:** N/A **Years since graduation or in practice**: N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** N/A **Characteristics of the participants:** full results are not yet published **Clinical problem(s)**: overweight and obesity **Baseline:** *Age, years, mean* (SD)*:* N/A *BMI SDS*: mean (SD), N/A *Ethnicity*: N/A **Setting:** Reimbursement system: - Setting of care: primary care Academic status of the setting of care: - Country: USA
Interventions	**Organisational intervention:** no **Professional intervention:** obesity management tool incorporated into an electronic health record/CDS tool

Description of the intervention: An electronic health record which included reminders to measure weight and height, an alert about putting obesity on the problem list, reminders with tailored management recommendations and other tools to help with obesity management

Preparatory phase: "We developed several new features within the Longitudinal Medical Record (LMR), an internally developed, certified EHR used by all primary care and outpatient specialty practices at Brigham and Women's Hospital (BWH).30 We first reviewed clinical practice guidelines on the identification, evaluation, and management of overweight and obesity that had been published by organizations such as the National Institutes of Health (NIH).We then convened an expert panel that included primary care providers, registered dietitians, and information technology specialists, who formulated recommendations for the proposed new features in the LMR. The expert panel's recommendations were reviewed by the LMR Executive Committee and the Clinical Content Committee, which oversee the design and content of the LMR, in order to decide on the final set of features."

Description of the LMR: "At the completion of this process, 4 new features were developed in the LMR. These were:

1. *Reminders to measure height and weight*. If a patient had no measure of height or no measure of weight in the LMR within the past year, a reminder would appear on the summary screen, asking the provider to enter a height or weight or both for the patient. The LMR automatically calculates BMI from patients' most recent height and weight entries; therefore, any patient with both height and weight should have a BMI

2. *An alert asking providers whether they want to add overweight or obesity to the problem list*, for patients with BMI 25 - 29.9 or $\geq$ 30 kg/m^2, respectively. The alert would appear as a pop-up screen, and the provider would have the option to add overweight or obesity or to dismiss the alert. This alert was added to an existing clinical alerting system, introduced in May 2010, which was designed to improve the completeness of electronic problem list documentation for 17 other conditions

3. *Reminders with tailored management recommendations, based on patients' BMI and other risk factors* (e.g. hypertension, hyperlipidaemia, type 2 diabetes) included on the problem list or identified from medications or laboratory results. For each patient with BMI $\geq$ 25, one reminder would appear on the summary screen with a recommendation that was based on the NIH guidelines. *A Weight Management screen with several features, including tools to help providers* assess patients' motivation to lose weight, calculate and set a 6-month weight loss goal, refer patients to other resources (e.g. nutritionist or medically-monitored weight loss program), and access more information."

Control: The new features were not activated for clinics in the control arm

Timing of intervention: "Due to other projects that the LMR development team was working on simultaneously, and the fact that the LMR is on a 6-month release cycle, the intervention was implemented in 2 phases; the height and weight reminders went live on December 15, 2011 (Phase 1), and all of the other features went live on June 11, 2012 (Phase 2). Before the new features were activated, the Principal Investigator conducted a brief presentation for providers at each intervention clinic and circulated a quick reference guide with information about the new features. Although no written information about the new features was distributed to providers in control clinics, the presentations were conducted in regularly-scheduled practice meetings because that was the only time when most providers were available; providers in both intervention and control clinics within a given practice could attend these meetings."

	Proximity to clinical decision-making: at the point of care **Frequency/number of intervention events:** 1 brief presentation, electronic health record activated during the whole study **Duration of intervention:** Both phases consisted of a 6-month accrual period, followed by 12 months of follow-up for the relevant outcomes (only results from Phase 2 are included in this review) **Healthcare professional recipient:** **Intervention group:** primary care physicians, nurse practitioners and physician assistants **Control group:** primary care physicians, nurse practitioners and physician assistants **Intervention deliverer:** N/A (electronic) **Types of targeted behaviour of the health professionals:** obesity management **Development of the intervention:** **Consultation with professional recipients**: We sought buy-in and obtained approval from several different groups, including the primary care practice leaders and the LMR Executive Committee **Evidence base of intervention**: no information **Consumer involvement:** "We then convened an expert panel that included primary care providers, registered dietitians, and information technology specialists, who formulated recommendations for the proposed new features in the LMR" **Barriers to change**: N/A **Source of funding:** This work was supported by a mentored research scientist career development award from the Agency for Healthcare Research and Quality and a pilot and feasibility grant from the Boston Nutrition Obesity Research Center. **Ethical approval:** The study was approved by the Partners Human Research Committee and was registered with ClinicalTrials.gov (NCT01480466). Participants were not made aware of the intervention and did not have to give consent **Competing interests:** no information
Outcomes	**Outcomes measured:** Primary outcomes: • 6-month and 12-month weight change (Phase 2 outcome). Weight change was calculated as the difference between the participant's weight at the first primary care visit during Phase 2 with BMI $\geq$ 25 (index visit) and his or her weight at the visit closest to 6 months later (4 - 8 month window) and closest to 12 months later (9 - 15 month window) Secondary outcomes: • the proportion of participants with BMI $\geq$ 25 who had a diagnosis of overweight or obesity on the problem list • the proportion of participants with BMI $\geq$ 27 kg/m^2 who had a nutrition counselling visit at BWH; and • the proportion of participants with BMI $\geq$ 27 kg/m^2 who were prescribed weight loss medications, such as orlistat (Xenical or Alli) • healthcare providers' attitudes on management of patients with overweight or obesity (assessed through a web based - survey) **Length of time outcomes measured after initiation of the intervention:** 6 and 12 months **Ceiling effect:** **Identified by investigator:** No **Identified by review author:** Not for weight outcomes, but for documentation of BMI,

	which was high in both groups at baseline (93% - 94%) **Losses to follow-up:** N/A Number randomised: N = 23 teams; *Intervention group:* N = 11 ; *Control group:* N = 12 clinics. Note: Prior to randomisation, the 23 clinics were grouped into 3 strata: hospital-based clinics (N = 10), community- based clinics (N = 11), and federally-qualified community health centres (N = 2) **Number completing follow-up:** *Intervention:* N/A *Control:* N/A **Reasons for loss to follow-up:** N/A **Economic variables:** N/A
Notes	**Unit of analysis error**: No, as clustering was taken into account in the analyses **Note:** The full results of this trial are not yet published.

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	p. 4 "Prior to randomization, the 23 clinics were grouped into 3 strata: hospital-based clinics (n = 10), community-based clinics (n = 11) , and federally-qualified community health centers (n = 2). The clinics within each of these strata were randomly allocated to the control or intervention group using a computer algorithm, with 12 clinics randomized to the control group and 11 to the intervention group"
Allocation concealment (selection bias)	Unclear risk	No information
Blinding (performance bias and detection bias) Objective outcomes	Low risk	p. 4 **Outcome group**: weight change, the proportion of patients with BMI > 25 kg/m^2 who had a diagnosis of overweight or obesity on the problem list; the proportion of patients with BMI > 27kg/m^2 who had a nutrition counselling visit at BWH, and the proportion of patients with BMI > 27kg/m^2 who were prescribed weight loss medications "Blinding was not possible, given the nature of the intervention." "Data on these outcomes, as well as other patient characteristics, were collected during routine clinical care and then extracted from coded fields in the LMR or from the BWH

		scheduling system.“ Objective outcomes
Blinding (performance bias and detection bias) Subjective outcomes	High risk	p. 4 **Outcome group:** healthcare providers' attitudes on management of obese or overweight patients ”Blinding was not possible, given the nature of the intervention.“ Data on these outcomes, , were collected through a web survey.”
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	Routine data collected for all objective outcomes
Incomplete outcome data (attrition bias) Subjective outcomes	High risk	Only 49% of the practitioners responded to the survey. The authors did not present an explanation for high attrition and did not explain if attrition was balanced for intervention and control groups
Selective reporting (reporting bias)	High risk	No measure of dispersion reported for the weight outcome. Trial register mention medication use as an outcome, but results for this outcome are not reported
Baseline characteristics similar?	High risk	There were some differences in characteristics of patients in the intervention and control groups (Table 3). For example, there was a higher percentage of women in the intervention group than in the control group ; this is because there is one women's health clinic, which was randomly allocated to the intervention group. There was also a higher percentage of Hispanic and Latino patients in the intervention group than in the control group, because there is one Spanish clinic, which was allocated to the intervention group. Patients in the intervention group were also slightly older and were more likely to have other medical problems (including hypertension, high cholesterol, type 2 diabetes, and cancer) compared to patients in the control group
Reliable primary outcome measures? Average weight change	Unclear risk	Information (Table 3) is lacking

Protection against contamination?	Unclear risk	The new features were not activated in the EHR of control providers. However, they received the same information as the intervention providers "Before the new features were activated, the Principal Investigator (HJB) conducted a brief presentation for providers at each intervention clinic and circulated a quick reference guide with information about the new features. Although no written information about the new features was distributed to providers in control clinics, the presentations were conducted in regularly-scheduled practice meetings because that was the only time when most providers were available; providers in both intervention and control clinics within a given practice could attend these meetings."

Banks 2012

Methods	**Study design:** Randomised controlled trial **Unit of allocation:** the participant **Unit of analysis:** the participant **Sample size calculation:** as this was a feasibility study, it was not powered to achieve statistical significance for the primary outcome
Participants	**The total number of participants randomised:** N = 76 children; Intervention Primary Care Clinic (PCC): N = 45; Control Bristol Royal Hospital for Children Care of Childhood Obesity (BRHC COCO): N = 31 **Note**: 121 (80%) children with obesity were suitable for primary care management and invited into the study. 45 families (30%) of children with obesity declined to participate (17.1% were unable to contact; 13.9% declined via the contact reply form without giving a reason, and 4% stated a preference to attend hospital). **Providers*:*** practice nurses at the nurse-led clinic (intervention), plus 1 exercise specialist and 1 dietitian, both of whom also worked in the COCO clinic at BRHC; unclear no of consultants at the BRHC COCO clinics (control) **Practices:** 2 primary care clinics: one in South and one in North Bristol (intervention) **Hospitals:** the secondary care BRHC COCO hospital clinic (control) **Communities or regions:** North and South Bristol in Southwest England **Characteristics of participating healthcare providers:** **Profession**: 2 nurses (PCC), consultants. (BRHC COCO), the same dietitian and exercise specialist worked at both settings **Level of training**: N/A **Age:** N/A **Years since graduation or in practice**: N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** N/A

	Characteristics of the participants : **Clinical problem(s)**: children with a BMI ≥ 98th percentile (children with comorbidities were excluded) **Baseline:** N = 68; BRHC: N = 26; PCC:N = 42 **Age, years: mean (SD), range:** Intervention:11.4 (2.8), 5.7 to 17.0; Control: 11.5 (2.5), 5.8 to 14.9 **BMI SDS**: **mean (SD), range:** Intervention: 3.17 (0.57), 2.05 to 4.74; Control: 2.86 (0.40), 2.15 to 3.60 Gender: N/A Ethnicity: N/A **Setting:** Reimbursement system: N/A Setting of care: secondary care (control), primary care (intervention) Academic status of the setting of care: N/A Country: England
Interventions	**Organisational intervention:** changing the site of service delivery (from hospital speciality clinic to primary care clinic) and changing who delivers the care (from consultant to nurse)- main intervention **Professional intervention:** training of nurses to deliver obesity care **Description of the intervention:** nurse-led PCC for people with obesity. Nurses received training which involved: "(1) shadowing the clinical team at the COCO outpatient clinic at BRHC on 3 occasions (each clinic ran for 4 hours), thus enabling the nurses to sit in with all members of the multidisciplinary team (doctor, specialist obesity nurse, dietitian, exercise specialist) on each of their 3 visits; (2) attendance at a one-off, secondary-care workshop run by a specialist obesity nurse; (3) study packs given to nurses, to read in their own time, which included guidance on obesity management from the National Institute for Health and Clinical Excellence, and the Department of Health care pathway for primary care management, along with other literature and the background to the COCO clinic itself and familiarisation with standard operating procedures for clinical practice written by COCO clinicians and research staff" **Control:** standard care at BRHC COCO clinic."The Care Of Childhood Obesity (COCO) clinic at the Bristol Royal Hospital for Children (BRHC) is an established service that uses a multicomponent-team approach in consultations with children and families. Clinical intervention: Patients attending the BRHC clinic had an initial consultation with the COCO consultant. They were offered a further four COCO appointments over a 1-year period at 3-monthly intervals, where they would also see a dietitian and/or exercise specialist as directed by the consultant" **Timing of intervention:** N/A **Proximity to clinical decision-making:** N/A **Frequency/number of intervention events:** 5 appointments over 12 months (in both intervention and control groups) **Duration of intervention:** 12 months **Healthcare professional recipient:** N/A **Intervention group:** nurses received training to deliver the intervention at the PCC (3 sit-in sessions and 1 workshop; 3 x 4 hours) **Control group:** N/A **Intervention deliverer:** N/A (organisational intervention) **Types of targeted behaviour of the health professionals:** provision of care to people

	with overweight and obesity **Development of the intervention:** **Consultation with professional recipients**: N/A **Evidence base of intervention**:p.e11, col 2, para.2 "An Australian PCC-based trial, where treatment was based on four GP consultations with each family and child over a 12-week period, was unable to show a significant reduction in BMI compared with controls, and overall BMI change (not BMI SDS) was -0.12 at 12 months. A recent study has evaluated the MEND (Mind, Exercise, Nutrition … Do it!) programme, which runs from local authority community settings as well as primary care sites. The programme is based on 18 sessions of group advice and exercise over 9 weeks. BMI SDS reductions in the intervention group were significantly better than in the control group, with an overall reduction of 0.24." **Consumer involvement:** N/A **Barriers to change**: N/A **Source of funding: "**This paper presents independent research commissioned by the National Institute for Health Research (NIHR) under its Research for Patient Benefit Programme Reference Number PB-PG-0706-10090.The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health" **Ethical approval:** Ethical approval for the study was granted by Southmead Research Ethics Committee on 18/07/2007; MREC No: 07/Q2002/35 **Competing interests:** The authors have declared no competing interests
Outcomes	**Outcomes measured:** • Change in BMI SDS (adjusted for age and sex); primary outcome • Quality of life (assessed with the Pediatric Quality of Life Scale (PedsQL)) • Satisfaction with care (assessed with an adapted instrument, developed from a similar study in primary care), and with the General Practice Assessment Questionnaire **Length of time outcomes measured after initiation of the intervention:** 12 months **Ceiling effect:** **Identified by investigator:** None. Qualitative research has found a degree of uncertainty among primary care practitioners about taking on child obesity treatment **Identified by review author:** None. There appear to be room for improvement **Losses to follow-up:** Number randomised: N = 76; N who attended the first appointment: 68: *Intervention group:* N = 13; *Control group:* N = 3 **Number completing follow-up:** *Intervention: N* = 29 (Includes 6 participants who withdrew from treatment and provided outcome measures) *Control: N* = 23 (Includes 7 participants who withdrew from treatment but provided outcome measures) **Reasons for loss to follow-up:** Motivation was the most prominent theme: parents struggled to motivate children between appointments, often leading to conflict between parent and child, thus disrupting family life. Some families felt clinic advice to be impractical or overambitious, and some felt it was not age-appropriate. Families also cited family events that overrode their commitment to participate in the programme **Economic variables:** none reported
Notes	**Unit of analysis error**: no

Banks 2012 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Pg. 2, Col.1 Para. 3 "A 'minimisation method' was used to balance groups with respect to sex and age (primary or secondary school age at entry), with separate lists for the designated north and south Bristol participants. The initial allocation ratio was 1:1 but was changed to 2:1 after 5 months to ensure more patients were assigned to PCC rather than hospital, thus ensuring maximum information was obtained regarding transferring the service to PCC. New randomisation lists were set up at this point. Randomisation was undertaken by an independent statistician." Comment: Assume adequate sequence generation as randomisation was undertaken by an independent statistician
Allocation concealment (selection bias)	Low risk	Randomisation undertaken by an Independent statistician
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: BMI SDS change** Healthcare professionals and participants could not be blinded to the intervention. No information about whether or not the outcome assessor was blinded. Change in BMI SDS is an objective outcome
Blinding (performance bias and detection bias) Subjective outcomes	High risk	**Outcome group: Quality of life, satisfaction with care** Participants could not be blinded to the intervention. No information about whether or not the outcome assessor was blinded
Incomplete outcome data (attrition bias) Objective outcomes	High risk	Pg. e10, Col.2, last para "Both arms experienced high levels of non adherence, with nearly half of those starting treatment withdrawing (29/68, 43%) .Withdrawals were higher in PCC (19/42 =45%) compared with BRHC (10/26 = 38%) but the difference was not statistically significant (P = 0.77)." Analysis was by intention-to-treat

Incomplete outcome data (attrition bias) Subjective outcomes	High risk	Data on quality of life from 23/45 (51%) intervention participants and 14/31 (45%) control participants
Selective reporting (reporting bias)	Low risk	No evidence of selective outcome reporting. All outcomes reported in the Methods section are reported
Baseline characteristics similar?	High risk	Only age and BMI reported. Baseline BMI differed between groups
Reliable primary outcome measures? Average weight change	Low risk	"With baseline differences in BMI SDS observed between the groups (Table 2), 12-month comparisons were explored further using covariate adjustment for baseline, rather than calculating simple changes; results were very similar (data are not shown) . A $\chi 2$ test was used to compare withdrawal rates between the two groups."
Protection against contamination?	Low risk	Cluster-randomised trial, and thus protected against decontamination

Cohen 1991

Methods	**Study design:** Cluster-randomised trial **Unit of allocation:** Provider: Family practice residents were randomly assigned to either an experimental or a control group (Pg 25/ Col 1/ Para 1) **Unit of analysis:** Participant: (Table 2/ Pg 27). No attempt was made to account for the clustering effect: analysis of covariance was used to compare weight change and blood pressure change between the experimental and control groups and to compare blood pressure change between the weight-losers and weight-gainers, adjusting for initial values. The unpaired T test (two-tailed) was used to compare the experimental and control groups and the weight-gainers and losers with respect to baseline age, weight, BMI, mean arterial pressure, number of medications, and number of visits to the physician. The Mann-Whitney U test was used to compare the experimental and control groups and the weight-losers and gainers with regard to change in the number of medications. The Spearman rank correlation coefficient was used to assess the correlation between change in number of medications and change in blood pressure. (Pg 26 /Col 1/ para 7) **Sample size calculation:** N/A
Participants	**The total number of providers randomised:** N = 18 **Episodes of care:** number of visits to family practitioner: 9.7 (SD 3.0) intervention; 5. 2 (SD 2.4) Control (Table 2/pg 27) **Patients:** 30 (Pg 26/ Col 2/ Para 1) (31 participants originally randomised but data for 1 patient who was excluded due to another health problem is not presented) **Providers:** 18: (Pg 26/ Col 2/ Para 1) Intervention: 10; Control: 8 **Practices:** 1 (The Lawrenceville Family Health Center, Pg 25/ Col 2/ Para2)

	Hospitals: N/A **Communities or regions:** N/A **Characteristics of participating healthcare providers:** **Profession:** Physicians: 18 family practice physicians (Pg 26/ Col 2/ Para1) **Level of training:** In postgraduate training: Residents (Pg 25/ Col 2/ Para 2) **Age of health professional:** N/A **Years since graduation or in practice:** N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** N/A **Characteristics of the participating patients:** **Clinical problem(s) of participating patients :** **Overweight (BMI $\geq$ 25 but $\leq$ 30):** Unclear: To be included participants had to be overweight defined by a BMI of 27.8 or more in men and 27.3 in women. (Pg 25 /Col 2/ Para 3). **Obese (BMI $\geq$ 30):** Unclear: To be included participants had to be obese, defined by a BMI of 27.8 or more in men and 27.3 in women. (Pg 25/ Col 2/ Para 3). Mean BMI 34.2 (intervention) and 34.0 (controls) (Table 1/ pg 26) But no distinction between overweight and obese populations provided **Diabetes:** N/A: **Ischaemic heart disease:** All participants were hypertensive (systolic blood pressure > 139 or diastolic blood pressure > 89) (Pg 25/ col 2/ para 3) **Other characteristics of participants :** **Age, years, mean: Intervention:** 59.3 years; Control: 59.7 years (Table 1/pg 26) **Baseline Weight/BMI** Intervention: 91.8 kg /34.2; Control: 91.7 kg /34.0 **Gender:** 22 women, 8 men, equally distributed between the 2 groups (Pg 26/ Col 2/ Para 1) **Ethnicity:** N/A **Other:** All hypertensive. Diagnosis of hypertension based on an average systolic BP of 140 mmHg or more on 2 or more readings, or an average diastolic BP of 90 mmHg on 2 or more readings recorded in the FHC record. (Pg 25/ Col 2/ Para 3) Mean arterial pressure 105.6 (intervention group), 105.9 (control group) (Table 1/pg 26) **Setting:** **Reimbursement system:** N/A **Setting of care:** General practice or community-based clinic: The Lawrenceville Family Health Center, (Pg 25/ Col 2/ Para 2) **Academic status of the setting of care:** University (teaching) hospital: The University of Pittsburgh, St Margaret Memorial Hospital (Pg 25/ Col 1/ Para 3). The Lawrenceville Family Health Centre is the model family practice unit for the family practice residents at St Margaret Memorial Hospital. (Pg 25/ Col 2/ Para 2) **Country:** USA: Pittsburgh, PA (Pg 25/ Col 1/ Para 3)
Interventions	**Professional intervention:** educational intervention **Description of the Intervention:** At a residents physicians' meeting all residents were informed of the broad principles of the trial; details that would influence the status of experimental or control groups were excluded. Physicians assigned to the experimental group were taught about the importance of weight reduction in managing hypertension and were provided with information about the effects of specific foods on body weight. The teaching session was conducted by a behavioural psychologist who has special interest

	and expertise in weight reduction. During the teaching session the physicians were questioned about their knowledge of the caloric content of foods and were given practical strategies for changing the dietary habits of their patients. The goal of the dietary advice was to reduce the caloric content of the diet without radically changing the patient's life style. Methods of encouraging patients, such as reinforcement, were also discussed. The residents were given an instruction sheet that included low-calorie alternatives to high calorie foods. Other key strategies included seeing patients monthly and reviewing the previous day's food intake with the patient. (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Control:** At a residents physicians meeting all residents were informed of the broad principles of the trial; details that would influence the status of experimental or control groups were excluded. The physicians in the control group received no special instructions or materials (Pg 25/ Col 2/ Para 4) **Timing of intervention:** N/A **Proximity to clinical decision-making:** Remote educational sessions: A single training session was provided at the start of the trial (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Frequency/number of intervention events:** A single training session was provided at the start of the trial (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Duration of intervention:** A single training session of unknown duration was provided at the start of the trial (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Healthcare professional recipient:** **Intervention:** A single training session was provided to the experimental group physicians at the start of the trial (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Control:** The physicians in the control group received no special instructions or materials (Pg 25/ Col 2/ Para 4) **Intervention deliverer:** **Intervention:** The teaching session was conducted by a behavioural psychologist who has special interest and expertise in weight reduction (Pg 25/ Col 2/ Para 5) **Control:** N/A **Types of targeted behaviour of the health professionals:** To use the practical strategies taught to change their patient's dietary habits (Pg 25/ Col 2/ Para 4 - Pg 26/ Col 1/ Para 1) **Development of the intervention:** N/A **Consultation with professional recipients:** N/A **Evidence base of intervention:** Unclear **Consumer involvement:** N/A **Barriers to change:** N/A **Source of funding for study:** This study was conducted as part of Dr Cohen's fellowship at St. Margaret Memorial Hospital (Pg 25/ Col 1/ Para 3) but the source of the funds was not stated. **Ethical approval:** N/A **Competing interests:** N/A
Outcomes	**Outcomes measured:** • Weight change • Blood pressure change (change in mean arterial pressure change in mmHg) • Change in the number of medications • Number of visits to the physician (Tables 2 - 3/ Pg 27)

	Length of time outcomes measured after initiation of the intervention: at baseline, 6 months and 12 months (Table 1/ Pg 27) **Ceiling effect:** **Identified by investigator:** N/A **Identified by reviewer:** No, potential for weight loss in population clear and demonstrated. (Table 1/ Pg 27). However, it was not clear to what extent physicians were already doing the intervention behaviours **Losses to follow-up:** **Number randomised:** **Intervention:** 15 (Pg 26/ Col 2/ Para 1) **Control:** 15 (Pg 26/ Col 2/ Para 1) **Number completing follow-up:** **Intervention:** 15. Over the entire 12-month period of study there were no dropouts from the experimental group (Pg 26/ Col 2/ Para 2) **Control:** 15. Over the entire 12-month period of study there were no drop-outs from the control group (Pg 26/ Col 2/ Para 2) **Reasons for loss to follow-up:** **Intervention group:** N/A **Control group:** N/A **Economic variables:** none reported
Notes	**Unit of analysis error**: Results were analysed without allowing for clustering of participants within physicians (page 26/Col1/Bottom para)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Pg 25/ Col 2/ Para 4 The residents were stratified by residency year and randomly assigned to either control or experimental groups
Allocation concealment (selection bias)	Unclear risk	No information.
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Weight change, mean arterial pressure change, number of visits, change in number of antihypertensive medications:** At each visit the patients weight was recorded and any weight change noted (Pg 26/ Para 1/ Col 4) At baseline the blood pressure was measured by a nurse who had been trained in accordance with recommendations of the American Heart Association (Pg 26/ Col 1/ Para 2) but no information was presented on later measurements. Unclear if the outcome assessor was blinded. However, ob-

Cohen 1991 (*Continued*)

		jective outcomes
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	**Outcome group: Weight change, mean arterial pressure change, number of visits, change in number of antihypertensive medications:** Over the entire 12-month period of the study there were no dropouts from either experimental or control groups
Selective reporting (reporting bias)	Low risk	The authors state they intend to measure changes in weight, arterial blood pressure, number of antihypertensive agents prescribed, number of visits, variables which are all presented in the paper (Table 1 and Table 3/ Pg 27)
Baseline characteristics similar?	Low risk	Table 1/pg26 Baseline characteristics similar
Reliable primary outcome measures? Average weight change	Low risk	**Weight change**: At baseline the participant's weight was measured by a nurse who had been trained in accordance with recommendations of the American Heart Association (Pg 26/ Col 1/ Para 2). At 6 and 12 months the participant's weight was noted by the same trained nurse. Weights similar at baseline
Protection against contamination?	Low risk	The physicians in the control group received no special instructions or materials. Physicians in the experimental group were asked not to share information from the educational sessions or special materials with control physicians. (Pg 25/ Col 2/ Para 4) There was no evidence of contamination between the experimental and control groups during the 12 months of the study. Chart audit revealed no use of the educational materials by control residents and interviews with them disclosed no awareness of information from the teaching session. (Pg 26/ Col 2/ Para 1)

Goodfellow 2016

Methods	**Study design:** Cluster-randomised trial **Unit of allocation:** the practice **Unit of analysis:** the patient **Sample size calculation:** "We assumed that, in the control arm, the level of adherence to the guideline recommendation on the offer of a weight loss intervention would be 46 %.This estimates was based on a local pilot study of management of obesity in primary care completed in 2010 to 2011 and was measured at the practice level. The aim of the study was to detect an increase to 60 % adherence in the intervention arm with 80 % power, using a two-sided test with alpha of 0.05. The ICC was assumed to be 0.05. We determined the number of clusters per treatment using these values and with various numbers of clusters and cluster sizes. Based on these scenarios, a total sample size of 28 practices was selected, which would allow adequate power even in the case of drop out of up to four practices."
Participants	**The total number of practices randomised:** N = 30; Intervention: N = 14; Control: N = 16 (2 practices withdrew from the intervention group due to lack of time). **Note**: With the exception of practices of the Derbyshire Clinical Commissioning Group, all general practices in the East Midlands of England were invited to participate (N = 400) , Practice recruitment ceased once the target sample size was reached **Providers*:*** N/A **Practices:** N = 30 : I: 14 : C: 16 **Hospitals:** N/A **Communities or regions:** East Midlands of England **Characteristics of participating healthcare providers:** **Profession**:GPs, practice nurses and healthcare assistants **Level of training**: - **Age:** - **Years since graduation or in practice**: - **Proportion of eligible providers (or allocation units) who participated in the study:** 30/400 (7.5%) **Characteristics of participating practices:** Practice-level Intervention: N = 12; Control: N = 16 Single-handed clinics: Intervention: 3; Control: 1 Duo practice: 0 in both groups Group practice: Intervention: 9; Control: 15 Rural area: Intervention: 3; Control: 6 Urban area: Intervention: 9; Control: 10 Deprivation score: Intervention: 26.2 (12.0); Control: 24.7 (9.8) Practice list size: Intervention: 4065 (2191 - 7373); Control: 5968 (3543 - 13,390) **Characteristics of the participants** **Clinical problem(s)**: overweight or obesity **Age, year, mean:** Intervention: 53.4 (17.8); Control: 50.1 (18.6) **Sex, female no (%):** Intervention: 19,476 (52.4%); Control: 35,969 (52.5%); **Ethnicity, white no (%):** I: 14,972 (72.9%); C: 21,451 (65.6%) **Weight (kg):** Intervention: (N = 12,171) 87.0 (18.1); Control: (N = 20,955) 86.1 (17. 9) **BMI (kg/m2):** Intervention: (N = 4481) 30.5 (5.8); Control:(N = 8948) 30.2 (5.4) **Waist circumference (cm):** Intervention: (N = 818) 101.6 (18.0); Control: (N = 1922) 98.5 (13.0)

	Comorbidities: Ischaemic heart disease: Intervention: 1405 (7.9%); Control: 2226 (6.9%) Hypertension: Intervention: 5205 (29.3%); Control: 8647 (27.0%) Disorder of lipid and lipoprotein metabolism: Intervention: 1919 (10.8%); Control: 3315 (10.3%) Cerebrovascular disease: Intervention: 857 (4.8%); Control: 1315 (4.1%) Diabetes: Intervention: 3264 (18.4%); Control:5371 (16.7%) **Setting:** Reimbursement system: N/A *Setting of care*: primary care/general practice Academic status of the setting of care: - Country: England (East Midlands)
Interventions	**Organisational intervention:** identification of an obesity lead **Professional intervention:** tailoring, training and educational resources for healthcare professionals (including a presentation, discussion and provision of the resources, e. g. patient booklets, BMI charts, calories and portions leaflets, posters, information on referral pathways) **Description of the intervention:** 4 previously-identified determinants were used to tailor interventions to address each of them. The intervention targeted 4 key recommendations of the NICE guidelines: 1. Determining degree of obesity and overweight; 2. Assessment of lifestyle and willingness to change; 3. Management of overweight and obesity; 4. Referral ***Training:*** Training sessions were conducted by a registered dietitian and began with a summary of the guidelines for professionals. Training addressed the issue of sensitively raising and discussing weight with patients, as they may be reluctant to discuss their weight or follow a proposed weight loss intervention. Training in waist measurement was provided with a live demonstration and explanation of the relationship of waist circumference to health risks. In the training session, ways in which the practice managed obese and overweight patients were discussed and the adoption of alternative approaches considered ***Visual reminders*** : Posters for consulting rooms containing information on how to measure waist circumference were given as a visual reminder. Training was given on how to assess patients' readiness to change their lifestyle and how to calculate energy requirements. Professionals were also provided with example scripts to use in raising and discussing weight with patients. A script containing questions to assess a patient's motivation and willingness to change were also provided, for use in discussion with patients. They were also given a prescriptive weight loss plan for patients because professionals felt that they did not always have sufficient knowledge or skill to advise patients on changes to their diet ***Support and follow-up*** : During the monthly telephone calls and additional meeting, we assisted several practices develop links with potentially useful local services, for example, an exercise class for people with limited mobility being run by a volunteer centre, or a health trainer service that offered one-to-one support in weight management. In these telephone calls, we also asked whether practices were having any difficulties, or were using the resources as planned, and when necessary, we addressed concerns in the follow-up visits ***Patient materials*** : A poster and associated patient leaflet were provided to help professionals inform patients of the benefits of losing 5% - 10% of their weight and to increase

	patient motivation through showing the benefits of a modest weight loss. Additional posters were also provided in paper and electronic format, including a poster to encourage patients to speak to a professional about their weight, plus BMI charts, and dietary guidance ***Patient resources:*** materials to help motivate patients,assess lifestyle and patients' willingness to change and prescriptive information on the management of overweight and obesity **Control:** no intervention (standard care) **Timing of intervention:** N/A ***Proximity to clinical decision-making:*** N/A ***Frequency/number of intervention events:*** 1 hour training, monthly telephone calls, follow-up meeting ***Duration of intervention:*** 9 months **Healthcare professional recipient:** practice teams (GPs, practice nurses and healthcare assistants) **Intervention deliverer:** registered dietitian **Types of targeted behaviour of the health professionals:** compliance with obesity care guideline **Development of the intervention:** **Consultation with professional recipients**: the trialists worked closely with the obesity lead to improve their knowledge of the care of overweight and obese patients and to identify additional resources and tools which may be useful **Evidence base of intervention**: "This approach is referred to as tailoring, and our recent systematic review of 32 randomised trials of tailored interventions concluded that it could be effective, although the effect was variable, and as yet, the best methods of identifying determinants and choosing strategies to address them have not been identified". **Consumer involvement:** "A second study has compared various methods for investigating determinants; for example, interviews of professionals or patients, or brainstorming (manuscript in preparation). (...) have laid the foundation for the trial described in this protocol." **Barriers to change**: the trialists asked teams during the intervention workshop to discuss barriers within their own practices and ways in which they could be overcome. This led to some local adaptation of the intervention to meet practice needs. **Source of funding: "**The study was funded by a grant from the European Union FP-7 HEALTH-2010 (FP7/2007-2013) under grant agreement no. 258837. The funder had no role in the design, in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication." **Ethical approval:** Research ethics approval was granted from the National Research Ethics Service Committee, Camden & Islington (13/LO/1157) **Competing interests: "**The authors declare that they have no competing interests".
Outcomes	**Outcomes measured:** **Primary outcomes:** • the proportion of overweight or obese patients to whom the health professional had offered a weight loss intervention within the study period **Secondary outcomes**: • the proportion of patients with a BMI or waist circumference measurement recorded within the study period;

	• the proportion of patients with a record of lifestyle assessment; • the proportion of patients referred to privately- or publicly-funded external weight loss services, and • the proportion managed systematically within the practice, usually by referral to a practice nurse (internal weight management); • *the proportion of overweight/obese patients who changed weight during the study period, and* • *the mean weight change over the same period* **Length of time outcomes measured after initiation of the intervention:** 9 months after the intervention (in the intervention group) and from allocation into the control group **Ceiling effect:** N/A **Identified by investigator:** N/A **Identified by reviewer:** N/A **Losses to follow-up:** Number randomised: N = 30 practices: Intervention group: N = 2 lost; Control group: N = 0 lost to follow-up **Number completing follow-up:** Intervention: N = 12 practices Control: N =16 practices **Reasons for loss to follow-up:** lack of time to take part in study **Economic variables:** N/A
Notes	**Unit of analysis error**: No, the analysis took into account the possible effect of clustering

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	p.5, Col.2, Para.4 "For each of the four strata, a randomisation list (with block size 4) was produced using SAS PROC PLAN with a random seed number"
Allocation concealment (selection bias)	Low risk	p.5, Col.2, Para.2 Randomisation was performed independently by the Leicester Clinical Trials Unit
Blinding (performance bias and detection bias) Objective outcomes	Low risk	p.6, Col.1, Para.1 **Outcome group: mean weight loss during study period, proportion of overweight/obese patients who changed weight during the study period, proportion of overweight or obese patient offered a weigh loss intervention, proportion of patients with a BMI or waist circumference recorded, record of lifestyle assessment, referred to weight loss ser-**

		vices "Participant teams could not be blinded to receipt of an intervention." However, objective outcomes "Data collection was blinded and used a standard electronic system that extracted data from the general practice electronic health records and, to minimise bias, all data were collected using full anonymisation using electronic data extraction queries suitable for the different types of general practice computer systems used in England"
Incomplete outcome data (attrition bias) Objective outcomes	Unclear risk	p.7, Col.1, Para:1 "Thirty practices were recruited, 16 in the control and 14 in the intervention group. Of these, two practices withdrew from the intervention group between randomisation and receiving the intervention because they felt unable to devote the time to the study" There were no unacceptable reasons for withdrawal
Selective reporting (reporting bias)	Low risk	No evidence of selective reporting, based on trial registry (isrctn.com/ISRCTN07457585) and published results
Baseline characteristics similar?	Unclear risk	p.7, Col.2, Para:1 "There were some differences between the intervention and control groups for location, practice size and ethnicity of the patient population". However, weight and BMI were similar at baseline
Reliable primary outcome measures? Average weight change	Low risk	Primary outcome not measured before the intervention, but weight and BMI (our primary outcomes) were similar in both groups
Protection against contamination?	Low risk	Cluster-randomised trial, and thus protected against decontamination.

Martin 2006

Methods	**Design:** Cluster-randomised trial **Unit of allocation:** Provider: Clinician: Individualised (stratified by clinic, balanced, nested design) (Pg 1413/ Col 2/ Para 3) **Unit of analysis:** The analysis of the primary response variable, weight change at 6 months, was effected with a mixed linear model that included treatment group (2 levels) and clinic (4 physician practices were recruited from each of 2 clinics) as fixed effects in a factorial arrangement. An additional random effect was introduced to account for sampling variability among physician practices and to provide the appropriate test statistic for the treatment effect, due to the nesting of subjects within practice. (Pg 1415/ Col 2/ Para 2) **Sample size calculation:** The sample size of 20 participants per physician was chosen based on a power analysis indicating that 16 participants per physician (128 participants total) would give 80% power to detect a difference of 23% in success proportion under a 1-tailed hypothesis. The final target sample size of 20 participants per physician was judged adequate to allow for attrition and other sources of exclusion. The power analysis was conducted using a binomial model for a proportion of success of 5 lb or 2.27 kg within a physician practice in achieving weight loss. (Pg 1414/ Col 1/ Para 2)
Participants	**The total number of providers randomised into the trial:** N = 8 ***Episodes of care:*** Tailored intervention group received 6 monthly active treatment visits during which their physician delivered the intervention. Each visit lasted ~15 minutes. Unclear episodes of care for standard-care participants - they received no special instructions and were seen, as needed, for regular medical care. ***Participants:*** 144 adults (Fig 1 / Pg 1416) ***Providers:*** 8 (Pg 1413 / Col 2/ Para 3) ***Practices:*** 2 (Pg 1413 / Col 2/ Para 3) ***Hospitals:*** N/A ***Communities or regions:*** N/A **Characteristics of participating healthcare providers:** **Profession:** 8 physicians: 4 clinicians in each group, from 2 clinics (Pg 1413/ Col 2/ Para 3) **Level of training:** Fully trained (presumed rather than stated) (Pg 1413/ Col 2/ Para 3) **Age of health professional:** N/A **Years since graduation or in practice:** N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** N/A **Characteristics of the participants:** **Clinical problem(s) of participants:** **Overweight (BMI ≥ 25 but ≤ 30):** Not stated, all participants' BMI ≥ 25 (Pg 1413/ Col 2/ Para 2) **Obese (BMI ≤ 30):** Not stated, all participants BMI ≥ 25 (Pg 1413/ Col 2/ Para 2) **Diabetes:** N/A **Ischaemic heart disease:** N/A **Other characteristics of participants:** **Age:** Intervention: Mean 40.69 years, SD 12.59 (N = 73). Control: Mean 42.97 years, SD 11.38 (N = 71). (Table 1/ Pg 1415) Range: Inclusion criteria 18 to 65 years (Pg 1413/ Col 2/ Para 2) **Baseline Weight** kg (SD) Intervention (N = 71): 103.0 (17.95)

	Control (N = 73): 100.86 (20.8) **Gender:** 100% female (Pg 1413/ Col 2/ Para 2)women **Ethnicity:** 100% African-American (Pg 1413/ Col 2/ Para 2) **Other:** All low-income. All with no serious or uncontrolled medical condition (Pg 1413/ Col 2/ Para 2) **Setting :** **Reimbursement system:** Fee for service: "each physician received a USD 35.00 reimbursement for each office visit, which was the amount reimbursable under state Medicaid rules for similar office visits." (Pg 1414/ Col 1/ Para 3) **Setting of care:** General practice-based (Pg 1413/ Col 2/ Para 2) **Academic status of the setting of care:** Non-teaching or university affiliated: (Pg 1413/ Col 2/ Para 2) Unclear **Country:** USA, Baton Rouge, LA (Pg 1413/ Col 2/ Para 2)
Interventions	**Professional intervention:** educational intervention **Description of the Intervention:** Physicians from both groups initially received 2 hours of instruction on general obesity treatment, as outlined by the National Heart, Lung, and Blood Institute clinical practice guideline on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. The four physicians providing tailored interventions then received an additional 7 hours of training, which addressed the assessment of stage of change, motivational interviewing, and techniques for the behavioral treatment of obesity. This training also included instruction on appropriate dietary recommendations, such as ways to reduce dietary fat intake, appropriate fruit and vegetable intake, how to read food labels, and how to modify recipes. ***Tailored Intervention:*** "Patients in the tailored intervention group received six monthly active treatment visits during which their physician delivered the intervention. Each visit lasted 15 minutes. Physicians received protocols for each monthly visit, and participants received both oral recommendations from their physician and handouts summarising the focus of each visit. The treatment materials delivered by the physician were individually prepared and tailored to each patient by a multidisciplinary research team consisting of the physician, a health psychologist, a registered dietitian, and an exercise physiologist. Physicians provided feedback and input to the multidisciplinary team, although the actual materials were written and prepared by the other research team members. Physicians had the option of either delivering the treatment using a prepared script or delivering the intervention with the assistance of an outline of main points to be covered." "The content of the tailored interventions was obtained from the information provided by participants during the baseline assessment visit. Based on current eating practices and preferences, a dietitian provided recommendations to assist each participant in making healthier food choices and provided meal preparation tips. The exercise physiologist provided tailored physical activity recommendations based on the participant's current activity levels, activity preferences, and any barriers to activity reported (e.g. medical conditions, lack of social support, unsafe neighbourhoods). A health psychologist developed tailored behavioral change recommendations based on Social Cognitive Theory, the Transtheoretical Model, and behavioral principles that targeted constructs such as self-efficacy, motivational readiness to change, social support, pros/cons of behavior change, self-reinforcement, realistic goal setting, stimulus control, and contingency management. The recommendations written by each expert were incorporated into the tailored intervention materials that were presented by the physician to the patient. In

addition, the recommendations were tailored to the cultural and socioeconomic status backgrounds of the participants by taking cultural preferences into account when formulating dietary and exercise plans, providing educational materials prepared specifically for African Americans, and giving low-cost alternatives when making diet and physical activity recommendations. Topics of the monthly meetings included introductory information on weight loss, ways to decrease dietary fat, ways to increase physical activity, dealing with barriers to weight loss, healthy alternatives when eating out and shopping, and ways to stay motivated during weight loss efforts." (Pg 1414/ Col 2/ Para 2 - Pg 1415/ Col 1/ Para 1)

Control: "All physicians, regardless of treatment condition, initially received 2 hours of instruction on general obesity management, as outlined by the National Heart, Lung and Blood Institute clinical practice guideline on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults." (Pg 1414/ Col 2/ Para 2).

"Standard care physicians were instructed to provide their usual obesity management conducted during a typical office visit. Standard care participants received no special instructions and were seen, as needed, for regular medical care. Information provided by standard care participants during the initial assessment was not used during any subsequent office visit." (Pg 1415/ Col 1/ Para 2)

Timing of intervention: N/A

Proximity to clinical decision-making: Remote educational sessions (Pg 1414/ Col 2/ Para 2)

Frequency/number of intervention events: N/A (Pg 1414/ Col 2/ Para 2)

Duration of intervention: 7 hours of additional training (Pg 1414/ Col 2/ Para 3)

Healthcare professional recipient:

Intervention group: Unclear - simply states all physicians received 2 hours of training and those providing tailored intervention received an additional 7 hours of training. (Pg 1414/ Col 2/ Para 2)

Control group: Unclear - simply states all physicians received 2 hours of training (Pg 1414/ Col 2/ Para 2)

Intervention deliverer:

Intervention group: Unclear who delivered the training session (Pg 1414/ Col 2/ Para 2)

The treatment materials delivered by the physician were individually prepared and tailored to each participant by a multidisciplinary research team consisting of the physician, a health psychologist, a registered dietitian, and an exercise physiologist (Pg 1414/ Col 2/ Para 3)

Control group: N/A (Pg 1414/ Col 2/ Para 2)

Types of targeted behaviour of the health professionals: provision of tailored intervention to participants during 6, monthly active treatment visits (Pg 1414/ Col 2/ Para 3-4)

Development of the intervention: N/A

Consultation with professional recipients: N/A

Evidence-base of intervention: Unclear - Although the 2 hours of training provided to all the physicians was evidence-based: 2 hours of instruction on general obesity treatment, as outlined by NHLBI 1998. (Pg 1414/ Col 2/ Para 2) The additional 7 hours training for the intervention group was not referenced

Consumer involvement: N/A

Barriers to change: N/A

	Source of funding for study: The study was supported by The National Institute of Diabetes and Digestive and Kidney Diseases (Grant R01 DK57476) and co-sponsored by the Centers for Disease Control and Prevention, the Centre for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity, and by the Office of Research on Women's Health (Pg 1419/ Col 1/ Para 3) **Ethical approval:** Unclear if the boards that approved the study were ethics boards: The study was approved by the institutional review boards of the Pennington Biomedical Research Centre, the Louisiana State University Health Sciences Centre, and the Baton Rouge Medical Centre (Baton Rouge, LA) (Pg 1414/ Col 1/ Para 3) **Competing interests:** N/A
Outcomes	**Outcomes measured:** • Weight change • BMI **Length of time outcomes measured after initiation of the intervention:** at baseline and at 6 months (Pg 1414/ Col 1/ Para 4) **Ceiling effect:** **Identified by investigator:** N/A **Identified by reviewer:** Unclear **Losses to follow-up:** **Number randomised:** **Intervention group:** 71 (Fig 1/ Pg 1416) **Control group:** 73 (Fig 1/ Pg 1416) **Number completing follow-up:** **Intervention group:** 48 (6 months) (Fig 1/ Pg 1416) **Control group:** 58 (6 months) (Fig 1/ Pg 1416) **Reasons for loss to follow-up:** **Intervention group:** 8 lost to follow-up (1 died, 7 lost contact). 4 missed 6-month appointment. 3 no longer met medical inclusion criteria. (Fig 1/ Pg 1416) **Control group:** 19 lost to follow-up (5 scheduling conflicts, 14 lost contact). 1 missed 6-month appointment. 3 no longer met medical inclusion criteria (Fig 1/ Pg 1416) **Economic variables:** none reported
Notes	**Unit of analysis error:** No unit of analysis error. See Page 1415/Col2/ "Statistical analysis" section

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Pg 1414/ Col 1/ Para 1 "the randomization utilized clinic as a stratification variable, and the associated physicians' practices within each stratum were assigned to level of treatment under a balanced randomization. The basis of the randomization was the within-stratum ranks of a uniform (0, 1) (pseudo-) random deviate generated for each participating physi-

		cian. This resulted in a nested design, with participants recruited for the study being identified with the randomization assignment of their primary care physician.“
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Weight change, BMI** Blinding not referred to. However, objective outcomes
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	**Participant weight change:** Good explanation of missing data and an intent-to-treat (ITT) analysis using baseline values carried forward for dropouts was completed. (Pg 1417/ Col 1/ Para 2). Overall 20% attrition rate; more dropouts from the intervention group (23 of 71 in the intervention group and 15 of 73 in the control group). Also “Participants who dropped out of the study differed from study completers in that they tended to be younger, 35.4 (11.6) versus 43.3 (11.6) years (P <= 0.01). In addition, the dropouts among the intervention group tended to have smaller waist circumferences (P < 0.01) and to be younger (P < 0.05) than the standard care dropouts.” (Pg 1416/ Col 1/ Para 1)
Selective reporting (reporting bias)	High risk	Participants’ weight and BMI were obtained at baseline and 6 months (/ abut only weight change was reported in Table 1/ Pg 1416
Baseline characteristics similar?	Low risk	Participants in the intervention group are lighter, younger and have smaller waist circumferences but authors state that the differences are not statistically significant (Table 1/ Pg 1415 and Pg 1415 / Col 2/ Para 3)
Reliable primary outcome measures? Average weight change	Low risk	**Weight**: Standard measurement method by single clinician (Pg 414/ Col 1/ Para 4). Similar wight at baseline
Protection against contamination?	High risk	Clinicians in the intervention and control groups worked at the same 2 clinics so communication likely

Moore 2003

Methods	**Design:** Cluster-randomised trial **Unit of allocation:** Practice: "We have evaluated, in a cluster randomised trial, a training programme (the intervention) promoting the evidence based treatment of obesity, delivered to general practice teams "(unit of randomisation). (Pg 1/ Col 2/ Para 3) **Unit of analysis:** No unit of analysis error: See Page 33/Col1"sample size and analysis" section: "We analysed .... using Stata to account for both within cluster and between cluster variation." **Sample size calculation:** A clinically significant effect of intervention can be achieved with as little as 5% (or 3 - 5 kg) weight loss in obese people. We designed the study to have 80% power to detect a mean difference in weight between treatment arms of approximately 3 - 5 kg, assuming 5% significance and a within-practice correlation coefficient of 0.05. Allowing for withdrawal and loss to follow-up of 15%, this gave a required number of patients per treatment arm of approximately 660, equivalent to 22 practices recruiting 30 patients each (Pg3/ Col 1/ Para 4)
Participants	**The total number practices randomised into the trial:** N = 44 **Episodes of care:** unclear **Patients:** Number invited unknown; 991 adults returned consent form, 843 completed baseline assessment and randomised. (Fig 2 / Pg 1086). **Providers:** 245 (Fig 1/ Pg 1086). **Practices:** 44 practices randomised (Fig 1/ Pg 1086) **Hospitals:** N/A **Communities or regions:** N/A **Characteristics of participating healthcare providers:** **Profession:** Unclear: 245 staff (elsewhere referred to as practitioners; a mix of GPs and practice nurses) (Fig 1/ Pg 1086). **Level of training:** N/A **Age of health professional:** N/A **Years since graduation or in practice:** N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** From Figure 1/ Pg 1086, 161 practices invited to participate, 46 agreed and 44 were randomised. All 44 practices completed the trial. 1 practice (allocated to the intervention group) declined the training intervention but agreed to continue with outcome assessment, and 1 would only consent to the training if 2 of the 3 sessions were combined. Page 3 column1, start of results section **Characteristics of the participating patients:** **Clinical problem(s) of participants:** **Overweight (BMI $\geq$ 25 but $\leq$ 30):** 0 **Obese (BMI $\geq$ 30):** The study protocol required practice staff to invite consecutively attending obese adults (BMI $\geq$ 30 kg/m^2) aged 16 to 64 years to participate in the trial over a defined 6-month recruitment period (Pg 1086/ Col 1/ Para 2) **Diabetes:** N/A **Ischemic heart disease:** N/A **Other characteristics of participating patients:** All numbers from participants who completed baseline data collection and were randomised. 415 intervention; 428 control, 843 overall ***Age:*** Mean (SD), Intervention group 48.8 (10.9); Control group 48.8 (12.2) years (Table 1/ Pg 1087) ***Gender:*** N (%) male; Intervention group 104 (25%); Control group 116 (27%). Overall

	220 (Table 1/ Pg 1087) ***Ethnicity:*** N/A ***Weight,* kg, mean (SD):** Intervention group 100.8 (18.1); Control group 100.2 (17.4) ***BMI,* mean (SD):** Intervention group 37.0 (5.7); Control group 36.9 (5.8). (Table 1/ Pg 1087) **Setting:** **Reimbursement system:** Unclear: UK NHS Primary Care; not described in terms of reimbursement system. **Setting of care:** General practice or community-based: We recruited practices from 4 health authority areas in the Northern and Yorkshire region of England during a 4-month period (Pg 1085/ Col 2/ Para 5). **Academic status of the setting of care:** N/A **Country:** UK
Interventions	**Professional intervention:** educational intervention **Desription of the Intervention:** "We delivered three 90-minute sessions, intended to be delivered at intervals of no less than one week and no more than two weeks apart, to the 22 intervention practices. We asked all general practitioners and practice nurses to attend all three sessions. Four dietitians were trained in the standardised delivery of the training and then delivered the programme to small group, multidisciplinary general practice teams. The programme promoted a model approach to obesity treatment, which incorporated best evidence and was perceived to be brief enough that primary care staff could deliver it to their patients. The training covered information on the clinical benefit of weight loss and effective treatment options, including reduction of dietary energy intake, increased physical activity, and pharmaceutical intervention. The model of obesity management entailed practitioners seeing patients regularly (about every two weeks) until they had lost 10% of their original body weight and then less regularly (about every one to two months) for maintenance of weight over a sustained period. Current and target weight and dietary and activity targets were to be recorded in the patients' records to facilitate continuity of support across practice teams. Prescription of a moderate energy deficit diet was advocated, as recommended by the Scottish Intercollegiate Guidelines Network. A "ready reckoner" was produced to allow practitioners to estimate a patient's daily energy requirement and then to calculate a daily 500 kcal (2.5 MJ) deficit. Diet sheets and supporting written resources facilitated the dietary prescription to patients. At the end of the three training sessions, practices devised individualised weight management protocols based on the model and were encouraged to implement this with patients recruited to the study" (Pg 1086/ Col 2/ Para 1-2) **Control: "**Control practices were asked to provide standard care to their patients." (Pg 1087/ Col 1/ Para 1). Note: Control practices still had to engage with participant recruitment. The study protocol required practice staff to invite consecutively attending obese adults (BMI $\geq$ 30 kg/m^2) aged 16 to 64 years to participate in the trial over a defined 6-month recruitment period. Patients were asked to return a consent form to the practice by stamped addressed envelope or on their next visit. The recruitment strategy was extended to include assistance from study personnel and mail shots. Towards the end of the recruitment period, a researcher accessed the list of patients who had been recruited in the early stages and invited them to attend for collection of baseline data, so that all participants had been weighed within 2 months of randomisation. (Pg 1086/ Col 1/ Para 2)

	Timing of intervention: ***Proximity to clinical decision-making:*** Remote educational sessions: "We delivered three 90 minute sessions, intended to be delivered at intervals of no less than one week and no more than two weeks apart, to the 22 intervention practices. We asked all general practitioners and practice nurses to attend all three sessions." (Pg 1086/ Col 2/ Para 1) ***Frequency/number of intervention events:*** 3 sessions (Pg 1086/ Col 2/ Para 1) ***Duration of intervention:*** Three 90-minutes sessions over 4 weeks (Pg 1086/ Col 2/ Para 1) **Healthcare professional recipient:** ***Intervention group:*** Group/practice: 4 dietitians were trained in the standardised delivery of the training and then delivered the programme to small group, multidisciplinary general practice teams. "We asked all general practitioners and practice nurses to attend all three sessions" (Pg 1086/ Col 2/ Para 1 and Pg 1087/ Col1/ Para 1) ***Control group:*** None: Control practices were asked to provide standard care to their patients. Note: Control practices still had to engage with patient recruitment. (Pg 1086/ Col 1/ Para 2 and Pg 1087/ Col1/ Para 1) **Intervention deliverer:** ***Intervention group:*** 4 dietitians were trained in the standardised delivery of the training and then delivered the programme. (Pg 1086/ Col 2/ Para 1) ***Control group:*** None. **Types of targeted behaviour of the health professionals:** The programme promoted a model approach to obesity treatment, which incorporated best evidence and was perceived to be brief enough that primary care staff could deliver it to their patients. (Pg 1086/ Col 2/ Para 1) **Development of the intervention:** **Consultation with professional recipients:** No: The educational strategy was based on a previous nutrition training programme. (Pg 1086/ Col 2/ Para 1) **Evidence base of intervention:** Yes: The programme promoted a model approach to obesity treatment, which incorporated best evidence and was perceived to be brief enough that primary care staff could deliver it to their patients. (Pg 1086/ Col 2/ Para 1) **Consumer involvement:** Not specified **Barriers to change:** Not clear **Source of funding for study:** NHS Executive, Northern and Yorkshire (Pg 1089/ Col 2/ Para 2) **Ethical approval:** The Northern and Yorkshire regional medical research ethics committee and 5 local research ethics committees approved the study. (Pg 1089/ Col 2/ Para 4) **Competing interests:** None declared
Outcomes	**Outcomes measured:** • Weight and change in weight • Clinician behaviour (self-report) • Clinician knowledge **Length of time outcomes measured after initiation of the intervention:** Weight and change in weight at 3, 12, and 18 months: The primary outcome measure was difference in mean weight of participants between intervention and control practices 12 months after the intervention. We also measured difference in weight at 3 months and 18 months post-intervention. (Pg 1087 / Col 1/ Para 2) Clinician behaviour: Researchers extracted information from the medical records of those

	still participating in the trial, in both arms, 1 year after the intervention. (Pg 1087/ Col 1/ Para 3) Clinician knowledge: After the intervention (time point unclear): We measured knowledge of obesity management and self-reported behaviour in obesity management consultations for all practice staff before and after the intervention. (Pg 1087 / Col 1/ Para 2) **Ceiling effect:** ***Identified by investigator:*** Unclear: Implied but not stated ***Identified by review author:*** No: Plenty of room for weight loss in the patient population. However, unclear how frequently healthcare professionals are advising about weight loss **Losses to follow-up:** **Number randomised:** **Staff:** Of 245 staff, 14 did not complete baseline assessment and do not appear in the numbers randomised (Fig 1/ Pg 1086) Patients - 991 returned consent form; 148 of these were lost prior to completing baseline assessment; 843 randomised (Fig 2/ Pg 1086) ***Intervention group:*** 22 practices (Fig 1/ Pg 1086); 116 staff (Fig 1/ Pg 1086); 415 participants ***Control group:*** 22 practices (Fig 1/ Pg 1086); 115 staff (Fig 1/ Pg 1086); 428 participants (Table 1/ Pg 1087) **Number completing follow-up:** ***Intervention group:*** 22 practices (Fig 1/ Pg 1086); 95 staff (at follow-up) (Fig 1/ Pg 1086); 331 participants at 3 months (Fig 2/ Pg 1086); 279 participants at 12 months (Fig 2/ Pg 1086); 256 participants at 18 months (Fig 2/ Pg 1086) ***Control group:*** 22 practices (Fig 1/ Pg 1086); 97 staff (at follow-up) (Fig 1/ Pg 1086); 333 participants at 3 months (Fig 2/ Pg 1086); 286 participants at 12 months(Fig 2/ Pg 1086); 275 participants at 18 months (Fig 2/ Pg 1086) **Reasons for loss to follow-up:** ***Intervention group:*** Practices: N/A; Staff: None given; Participants: None given ***Control group:*** Practices: N/A; Staff: None given; Participants: None given **Economic variables:** none reported
Notes	**Unit of analysis error:** No unit of analysis error: See Page 33/Col1/"sample size and analysis" section

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Raab and Butcher did the randomisation, using the method they described in 2001 (Raab 2001 - see also below), in which "patient level characteristics (body mass index at recruitment, age, and sex) and practice level characteristics (practice size, socioeconomic status, and existence of dietetic ser-

		vice) were used to inform randomisation. One permutation of treatment allocation with acceptable balance was randomly selected, a method that ensured equal numbers of practices and approximately equal numbers of patients in both treatment arms. Researchers collecting baseline data contacted a distant member of the project team to ascertain intervention status". (Pg 1086/ Col 1/ Para 3) "We initially considered randomisation stratified by Health Authority area and practice size. This would have ensured acceptable balance at the practice level and, in practical terms, would have meant that 50 per cent of each dietitian's local practices would require intervention. In the long run, such a procedure could be expected to yield approximately equal distribution of patient characteristics at baseline, but for an individual trial balancing of allocation on baseline practice and patient-level characteristics in the design becomes more important as the number of clusters decreases. Since we perceived the number of clusters to be relatively small in each Health Authority area (for example, six in Scarborough), we felt it was particularly important to ensure good balance on these characteristics within each Health Authority area.Owing to patient recruitment occurring prior to practice allocation, it is possible to use additional information on patient-level as well as practice-level characteristics to balance the practice allocation. We will use the method described by Raab 2001 to randomly select one permutation of treatment allocation with acceptable balance. This method will ensure approximately equal numbers of patients and practices in both treatment arms. It will also balance practice and patient level characteristics thought to be important predictors of outcome: practice size, socioeconomic status and existence of a practice dietitian at the practice level; age, sex and body mass index at the patient level. (Moore 2001 Pg 337)/ Col 1/ Para 3-4)

Allocation concealment (selection bias)	Low risk	"Researchers collecting baseline data contacted a distant member of the project team to ascertain intervention status." (Pg 1086/ Col 1/ Para 3)
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Weight and change in weight:** "Patients were not aware of the intervention status of their practice, and researchers collecting outcome measurements from patients were blind to the intervention status of the practices, both before and after the intervention. Double blinding was not possible in this trial, as practice staff were inevitably aware of whether or not they had been trained." (Pg 1087/ Col 1/ Para 5) Objective outcome
Blinding (performance bias and detection bias) Subjective outcomes	High risk	**Outcome group: Clinician behaviour:** As above. It is unclear whether the research staff were blind to allocation for this outcome measure. (Pg 1087/ Col 1/ Para 5) . Clinician behaviour was based on self-report
Incomplete outcome data (attrition bias) Objective outcomes	High risk	**Weight and change in weight:** Not specifically stated. Fig 2/ Pg 1086 shows the losses of participants to the study. These are of a similar proportion but were not formally statistically tested Attritions not alluded to but high - 991 participants gave consent but only 843 attended for randomisation; of these, 664 (78.7%) attended 3 monthly follow-up, 565 (67%) 12 months follow-up and 531 (62.9%) 18 months follow-up (Table 1 / Pg 1087). Of the participants randomised, 38% of participants in intervention practices and 36% of participants in control practices were lost to 18 months follow-up (Fig. 2). Analysis was by intention-to-treat when possible
Incomplete outcome data (attrition bias) Subjective outcomes	High risk	**Clinician behaviour:** Although data were collected for 670 patient records (Pg 1087/ Col 2/ Para 4) , the results reported are for fewer participants and the numbers of omissions from each group are not reported (Table 4/ Pg 1088).

		Practitioners knowledge: 95% completed the baseline questionnaire and 83% the post-intervention assessment but again it is not stated what proportions of intervention versus control practices were represented. (Pg 1087/ Col 2/ Para 3). Also clinicians could be more likely to respond if they knew the answers
Selective reporting (reporting bias)	High risk	In Moore 2001 the authors state they intend to measure "change in indicators of patients' food choice" and "measures of patient psychological and physical well being will be measured using validated questionnaires" (Pg 338/ Col 1/ Para 5 of and cite references for The Hospital Anxiety and Depression Scale and EuroQoL. These data are not reported in the primary report of the study
Baseline characteristics similar?	Low risk	Table 1/ Pg 1087 The baseline characteristics appear similar, but no statistical testing of the differences reported
Reliable primary outcome measures? Average weight change	Unclear risk	Weight and change in weight measured (and no differences between groups at baseline) but who measured these outcomes and the method used was not clearly stated
Protection against contamination?	Unclear risk	"As stated earlier, in an effort to further eliminate contamination, we offered training only to general practitioners and practice nurses. In reality, enforcing this research condition was difficult, and many additional practice staff, including district nurses and health visitors, showed up for the training. We detected no evidence of contamination between intervention groups, but this cannot be ruled out." (Pg 1088/ Col 2/ Para 2)

Pritchard 1999

Methods	**Design:** Randomised trial **Unit of allocation:** Participants: Immediately after screening, the study dietitian used a table of random numbers to allocate each consecutive patient (Pg 312/ Col 2/ Para 3) **Unit of analysis:** Participants: A Chi^2 test was used to compare the demographic composition of the study groups. Confidence intervals for differences in means were used to compare groups with respect to outcome measurements. (Pg 313/ Col 1/ Para 4) **Sample size calculation:** Based on an expected 5% weight reduction in the dietitian group and 10% in the doctor/dietitian group, a minimum of 35 overweight participants per group were required to achieve a power of 0.9 that the null hypothesis would be rejected at the 0.5 level. (Pg 312/ Col 2/ Para 3).Number expected = 35 x 3 groups = 105 (Pg 312/ Col 2/ Para 3). Number recruited = 273 (Pg 313/ Col 2/ Para 4). Number overweight recruited = 270 (Table 1/ Pg 313)
Participants	**The total number of participants randomised into the trial:** N = 270 adults ***Episodes of care:*** Dietitian group: 6 sessions (Pg 312/ Col 2/ Para 5) Dietitian/GP group: 6 sessions with dietitian plus 3 sessions with GP (Pg 312/ Col 2/ Para 7) Control group: Baseline and endpoint assessment plus standard care (Pg 313/ Col 1/ Para 1) ***Patients:*** 270 (plus 3 participants who had hypertension or diabetes or both but who were not overweight) (Table 1/ Pg 313) ***Providers:*** 1 Dietitian (Pg 312/ Col 1/ Para 4). Unclear numbers for GPs ***Practices:*** 1 GP practice (Pg 312/ Col 1/ Para 4) ***Hospitals:*** N/A ***Communities or regions:*** N/A **Characteristics of participating healthcare providers:** **Profession:** Physicians (general practitioners), 1 Dietitician (Pg 312/ Col 1/ Para 4) **Level of training:** Fully-trained general practitioners and nutritionist (Pg 312 / Col 1/ Para 4) **Age of health professional:** N/A **Years since graduation or in practice:** N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** Unclear: Only a single site was used (a university general practice) but the number and proportion of general practitioners in this group practice that participated was not stated (Pg 312/ Col 1/ Para 4) **Characteristics of the participating patients:** **Clinical problem(s) of participating patients:** ***Overweight (BMI ≥ 25 but ≤ 30):*** Unclear: Patients with a BMI of more than 25 were diagnosed as overweight. (Pg 312/ Col 1/Para 6). Total N = 270 overweight participants. Number who were overweight versus obese was not stated ***Obese (BMI ≥ 30):*** Unclear: Patients with a BMI of more than 25 were diagnosed as overweight (312/1/6). Total N = 270 overweight participants (Table 1/ Pg 313). But number overweight versus number obese not stated ***Diabetes:*** Unclear: N = 17 (but some of these may not have been overweight) (Table 1/ Pg 313). ***Ischaemic heart disease:*** IHD not stated, but 97 had hypertension. Some of these may not have been overweight (Table 1/ Pg 313). **Other characteristics of participants:** NB these data based on all 273 participants of

	whom 3 were not overweight and therefore not included in the results for this review ***Age:*** Unclear: 73% of participants were < 50 years old (Pg 313/ Col 2/ Para 4) **Baseline Weight (kg), mean (no SD provided):** Doctor/dietitian group (N = 92): 91.7 Dietitian (N = 88): 85.5 Standard care (N = 90): 89.1 **Baseline hypertension (mean blood pressure = diastolic BP + (systolic BP - diastolic BP)/3, in mm Hg), mean (no SD provided):** Doctor/dietitian group (N = 33): 112 Dietitian (N = 30): 109 Standard care (N = 34):110 **Baseline type 2 diabetes (% glycated haemoglobin), mean (no SD provided):** Doctor/dietitian group: (N = 6) 8.0 Dietitian (N = 5): 8.2 Standard care (N = 6): 7.7 **Gender:** 75 men and 198 women (Pg 313/ Col 2/ Para 4) **Ethnicity:** Unclear **Other:** Socio-economic status quartile: 58% most disadvantaged, 20% more disadvantaged, 2% least disadvantaged Occupation: 56% home duties (84% female), 20% driver/trade/labourer, 6% unemployed.14% clerical/sales, 4% manager/professional 22% without partners; 78% married or de facto, 31% had hypertension. (Pg 313/ Col 2/ Para 5-6) **Setting:** **Reimbursement system:** N/A **Setting of care:** General practice (Pg 312/ Col 1/ Para 4) **Academic status of the setting of care:** Non-teaching or university-affiliated: a university general practice (Pg 312/ Col 1/ Para 4) **Country:** Australia (Lockridge, near Perth, Western Australia (Pg 312/ Col 1/ Para 4)
Interventions	**Professional intervention:** - **Organisational intervention:** changing who delivers the care (i.e. type of healthcare professional or team delivering care) **Description of the intervention groups:** *Dietitian group:* "Patients allocated to the dietitian group were invited to join the study by the dietitian at the time of screening. The dietitian conducted six individual counselling sessions, spaced equally, with the last session 12 months after recruitment. The initial session occupied 45 minutes, with 15 minutes for later sessions. Measurements were repeated at all sessions under similar conditions. Counselling focused on principles of good nutrition and exercise. The dietitian questioned life style and dietary patterns to identify problem areas. Counselling included advice on food shopping and cooking methods, food selection, meal planning, and exercise programmes. Patient kept food records and diet history was used in the counselling sessions to provide individual advice. Recommendations included restriction of total dietary energy, reduction of the fat component to no more than 30%, with carbohydrate contributing 50% or more and protein the balance. Smoking was discouraged. Alcohol consumption of no more than two standard drinks a day for women and four for men was recommended, with at least two alcohol-free days a week." (Pg 312/ Col 2/ Para 5-

6)
GP and dietitian group:
"After screening, the dietitian flagged the patient record to request the general practitioner, with whom the patient had made an appointment, to invite the patient to join the study. Patients saw the same general practitioner on two other occasions during the 12 months to encourage the patient and monitor progress.
The dietitian coordinated the follow-up appointments and flagged the patient record with progress measurements to enable the general practitioner to discuss progress with the patient. Five minutes of general practitioner time was allocated to these tasks. Otherwise, treatment was the same as for the dietitian group." (Pg 312/ Col 2/ Para 7-8)
Control:
Standard care group:
"The control group received the results of the initial measurements and if they had queries were advised to discuss these with the doctor with whom they had made an appointment. No counselling was given by the dietitian. If patients asked the doctor about the measurements, they were treated as any other patient attending the practice. The fact that they were in the control group did not prevent the doctor from providing care usually provided for such conditions. This could include monitoring, advice and prescriptions, but not referral to the study's dietitian. After 12 months, they received one mailed invitation to attend for reassessment of the initial measurements. In accordance with protocol, doctors were never informed about who was in the control and the dietitian groups. If a patient who was not in the doctor/dietitian asked about screening results, the doctor would not know to which group, if any, the patient belonged." (Pg 312/ Col 2/ Para 9 - Pg 313/ Col 1/ Para 2)
Timing of intervention:
Proximity to clinical decision-making:
Dietitian group:
"Patients allocated to the dietitian group were invited to join the study by the dietitian at the time of screening. The dietitian conducted six individual counselling sessions, spaced equally, with the last session 12 months after recruitment." (Pg 312/ Col 2/ Para 5-6)
GP and dietitian group:
"After screening, the dietitian flagged the patient record to request the general practitioner, with whom the patient had made an appointment, to invite the patient to join the study. Patients saw the same general practitioner on two other occasions during the 12 months to encourage the patient and monitor progress.
The dietitian coordinated the follow-up appointments and flagged the patient record with progress measurements to enable the general practitioner to discuss progress with the patient. Five minutes of general practitioner time was allocated to these tasks." (Pg 312/ Col 2/ Para 7-8)
Frequency/number of intervention events: Unclear: Dietitians saw the participants on 2 additional occasions but unclear how often the dietitian flagged the participant records for the clinicians attention (Pg 312/ Col 2/ Para 7-8)
Duration of intervention: "Five minutes of general practitioner time was allocated to these tasks" (i.e. to read notes flagged by dietitian and to discuss them with the participant) (Pg 312/ Col 2/ Para 7-8). The course of the intervention ran over 12 months (Pg 312/ Col 2/ Para 5-6)
Healthcare professional recipient:
Intervention group: N/A - organisation of care intervention

	Control group: N/A - organisation of care intervention **Intervention deliverer:** ***Intervention group:*** N/A - organisation of care intervention ***Control group:*** N/A - organisation of care intervention **Types of targeted behaviour of the health professionals:** N/A - organisation of care intervention **Development of the intervention:** **Consultation with professional recipients:** N/A **Evidence base of intervention:** N/A **Consumer involvement:** N/A **Barriers to change:** N/A **Source of funding for study:** The research was funded by a grant from the Western Australian Health Promotion Foundation. (Pg 315/ Col 2/ Para 7) **Ethical approval:** Ethics approval was obtained from the Committee of Human Rights, The University of Western Australia. (315/2/8) **Competing interests**: None
Outcomes	**Outcomes measured:** • Weight change • Blood pressure • Glycated haemoglobin • Cardiovascular medication use • Costs **Length of time outcomes measured after initiation of the intervention:** 12 months (Pg 313/ Col 2/ Para 1) **Ceiling effect:** ***Identified by investigator:*** Unclear ***Identified by reviewer:*** No (potential for weight loss clear and demonstrated) **Losses to follow-up:** **Number randomised**(Table 1/ Pg 314) ***Intervention groups:*** Dietitian: 88; GP + dietitian: 92; Control group: 90 **Number (%) completing follow-up at 12 months** (Table 1/ Pg 314) ***Intervention groups:*** Dietitian: 48 (55%); GP + dietitian: 65 (71%); Control group: 64 (71%) **Reasons for loss to follow-up:** ***Intervention groups:*** N/A ***Control group:*** N/A **Economic variables:** **Costs of the intervention:** Yes (Table 3/ Pg 314) • Total cost per group • Cost per patient • Additional cost per patient • Additional cost per kg lost • Costs included were dietitian and clinician time, materials, room use and usual practice overheads. (Pg 313/ Col 1/ Para 6) **Changes in direct healthcare costs as a result of the intervention:** Not reported **Changes in non-healthcare costs as a result of the intervention:** Not reported **Costs associated with the intervention linked with provider or patient outcomes in**

	an economic evaluation: Yes (Table 3/ Pg 314): Additional cost per patient Additional cost per kg lost
Notes	**Unit of analysis error:** No unit of analysis error. See page 313/Col1/ "outcome and statistical methods" section

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Used a table of random numbers to allocate each consecutive patient (Pg 312/ Col 2/ Para 4)
Allocation concealment (selection bias)	High risk	Immediately after screening, the study dietitian used a table of random numbers to allocate each consecutive patient (Pg 312/ Col 2/ Para 4). Not done by an independent person. No allocation concealment
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Changes in weight (overweight group)** "doctors were never informed about who was in the control and the dietitian groups" (Pg 313/ Col 2/ Para 1) However, doctors were obviously not blinded to those who were in the doctor/dietitian versus dietitian group. No reference is made to blinding of outcome assessors. However, weight is an objective outcome
Blinding (performance bias and detection bias) Subjective outcomes	Unclear risk	**Outcome group: Costs** Usually cost is an objective outcome, but in this case it appears that the study dietitian recorded the costs.He or she maintained a record of activities for 2 periods of 2 weeks during the study. Time spent on the study tasks of screening, arranging appointments, changing appointments, drawing patient files, data entry, and counselling was recorded. This recording of time cost was not done by an independent person
Incomplete outcome data (attrition bias) Objective outcomes	High risk	26 (29%) out of 90 control group participants dropped out, 27 out of 92 participants from the doctor/dietitian group dropped out and 40 out of 88 participants (45.5%) from the dietetica group. Missing

		data have been imputed using appropriate methods: The main outcomes evaluated were changes in weight and mean blood pressure (diastolic pressure + (systolic-diastolic pressure)/3) for each of the 3 groups. These outcomes were subjected to analysis by intention-to-treat, which assumed that a participant's measurements remained unchanged after the participant dropped out of the study. Thus a participant's last measurement was used to populate all subsequent missing data values
Incomplete outcome data (attrition bias) Subjective outcomes	Low risk	
Selective reporting (reporting bias)	Low risk	All of the study's prespecified primary outcomes (weight and blood pressure) have been reported (Table 1/ Pg 314):
Baseline characteristics similar?	Low risk	Authors state that there were no significant differences between intervention and control groups with respect to sex or age or socioeconomic status quartiles or occupation. (Pg 313 / Col 2/ Para 4-5 and Table 1/ Pg 313)
Reliable primary outcome measures? Average weight change	Low risk	Collected by individual: screened opportunistically by the study dietitian. Body weight and height were measured with participants wearing only light indoor clothing. Body weight was measured on digital balance scales to the nearest 0.1 kg with the participant wearing no shoes. (Pg 312/ Col 1/ Para 6)
Protection against contamination?	High risk	The same GP could have delivered care to participants in an intervention group and to participants receiving standard care

Rogers 1982

Methods	**Design:** Randomised trial **Unit of allocation:** Unclear Of the eligible patients 484 were randomly selected and assigned to either an intervention or control group (Pg 64/ Col 2/ Para 1). Physicians participating in the study were randomly divided into 3 groups: 1) those who were to see only patients with automated records available; 2) those who were to see patients without automated records; and 3) those whose patient load was approximately half with and half without automated records (Pg 64/ Col 2/ Para 2).The relationship between physician groupings and intervention and control group is not explained **Unit of analysis:** Unclear."The analysis of variance and the analysis of covariance were used to compare the experimental and control conditions on blood pressure and weight measurements" (Pg 65/Col 2/Para 1) **Sample size calculation:** no
Participants	**The number randomised into the trial:** n = 147, n = 114 provided baseline measures ***Episodes of care:*** Not available (Table 1/ Pg 67) ***Patients:*** 147 obese adult patients (Table 1/ Pg 67) ***Providers:*** Unclear - number of physicians not stated (Pg 64/ Col 2/ Para 2) ***Practices:*** N/A ***Hospitals:*** 1 - The Cardiac Pulmonary and Renal Clinics of the Northwestern University (Pg 64/ Col 1/ Para 3) ***Communities or regions:*** N/A **Characteristics of participating healthcare providers:** **Profession:** Physicians but number not stated (Pg 64/ Col 2/ Para 2) **Level of training:** Not stated (Pg 64/ Col 2/ Para 2) **Age of health professional:** Not stated (Pg 64/ Col 2/ Para 2) **Years since graduation or in practice:** Not stated (Pg 64/ Col 2/ Para 2) **Proportion of eligible providers (or allocation units) who participated in the evaluation:** Not stated (Pg 64/ Col 2/ Para 2) **Characteristics of the participants:** **Clinical problem(s) of participants:** ***Overweight (BMI ≥ 25 but ≤ 30):*** Unclear: (Table 1/ Pg 66), Participants whose weight exceeded 20% of their ideal weight were classified as obese - but breakdown not available ***Obese (BMI ≥ 30):*** Unclear: (Table 1/ Pg 66), Participants whose weight exceeded 20% of their ideal weight were classified as obese - but breakdown not available ***Diabetes:*** (Table 1/ Pg 67) 48/147 obese i.e. 33.3% ***Ischemic heart disease:*** N/A **Other characteristics of participants:** ***Age:*** N/A (Table 1/ Pg 67) ***Gender:*** 88 women, 26 men (77% female) (Table 5/ Pg 71) ***Ethnicity:*** Not available (Table 1/ Pg 67) ***Other:*** N/A **Setting :** **Reimbursement system:** Unclear **Setting of care:** The Cardiac Pulmonary and Renal Clinics of the Northwestern University (Pg 64/ Col 1/ Para 3) **Academic status of the setting of care:** University (teaching) hospital: The Cardiac Pulmonary and Renal Clinics of the Northwestern University (Pg 64/ Col 1/ Para 3). **Country:** USA: Michigan (Pg 63/ Col 1/ Para 5)

Interventions	**Professional intervention:** reminders **Description of the Intervention:** In the experimental group patients had available a *computer printout* of a current NUCRSS summary in addition to the traditional medical record. (Pg 64/ Col 2/ Para 1). A computerised medical record system (NUCRSS) was developed to provide physicians with concise and current information on patient's problems, to identify omissions in recording of observations and treatment recommendations, to show ordered procedures that were not carried out, to record deficiencies in medical reasoning, and most importantly, to recommend corrective actions according to selected criteria. These criteria of "good care" were established by consensus of the physicians providing care at our university (Pg 64/ Col 1/ Para 3) **Control:** The control group had available only the handwritten traditional medical record (Pg 64/ Col 2/ Para 1) **Timing of intervention:** ***Proximity to clinical decision-making:*** Immediately proximate to clinical decision-making. In the experimental group participants had available a computer printout of a current NUCRSS summary in addition to the traditional medical record (Pg 64/ Col 2/ Para 1). The control group had available only the handwritten traditional medical record (Pg 64/ Col 2/ Para 1) ***Frequency/number of intervention events:*** Not stated ***Duration of intervention:*** N/A **Intervention deliverer:** ***Intervention groups:*** (i) Computer system (NUCRSS) (Pg 64/ Col 1/ Para 3) and (ii) 50% Computer system (NUCRSS) and 50% handwritten traditional medical record ***Control group:*** The control group had available only the handwritten traditional medical record (Pg 64/ Col 2/ Para 1) **Types of targeted behaviour of the health professionals:** The NUCRSS keeps track of weight loss progress and reminds physicians to review or change diets (Pg 72/ Col 2/ Para 1) **Development of the intervention:** **Consultation with professional recipients:** Yes: "The criteria (used by NUCRSS) of good care were established by consensus of the physicians providing care at our university" (Pg 64/ Col 1/ Para 3) **Evidence-base of intervention:** Explicitly not evidence-based: "These criteria of "good care" were established by consensus of the clinicians providing care at our university" (Pg 64/ Col 1/ Para 3) **Consumer involvement:** N/A **Barriers to change:** N/A **Source of funding for study:** The major support for this project was provided by Grant-Number HS02649 from the National Centre for Health Services Researcgh, HRA. Initial data collection and analysis were made possible by DHEW Grant number H500674-04 and USPAS Grant number RR05370 (NIH). (Pg 63/ Col 1/ Para 4) **Ethical approval:** N/A **Competing interests:** N/A
Outcomes	**Outcomes measured:** • Pounds overweight (participants) • Failure to give advice or review diet (clinicians) **Length of time outcomes measured after initiation of the intervention:** Baseline; Year 1 (10 - 15 months); Year 2 (22 - 24 months) (Table 4/ Pg 69)

	Ceiling effect: ***Identified by investigator:*** No ***Identified by reviewer:*** No - see Table 3/ Pg 68 **Losses to follow-up:** NB - data not available for all participants at 1 year and 2 year follow-up time points **Number randomised:** n=147 ***Intervention group:*** 68 (Table 1/ Pg 66) ***Control group:*** 79 (Table 1/ Pg 66) **Number completing follow-up:** ***Intervention group:*** 62 (at end of study) (Table 1/ Pg 66) ***Control group:*** 62 (at end of study) (Table 1/ Pg 66) **Reasons for loss to follow-up:** ***Intervention group:*** 1 dead, 5 moved (at end of study) (Table 1/ Pg 66) ***Control group:*** 7 dead, 10 moved (at end of study) (Table 1/ Pg 66) **Economic variables:** none reported
Notes	**Unit of analysis error:** Unclear whether there was a unit of analysis error: See Page 65/ Col 2/Top para

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Pg 64/ Col 2/ Para 1-2 No information
Allocation concealment (selection bias)	Unclear risk	Pg 64/ Col 2/ Para 1-2 No information
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Weight loss, dietary advice:** Blind retrospective chart reviews were done for both experimental and control participants. Objective outcomes
Blinding (performance bias and detection bias) Subjective outcomes	Low risk	
Incomplete outcome data (attrition bias) Objective outcomes	High risk	**Outcome group:** Weight loss, dietary advice: Table 5/ Pg 71. Obese patients entered into study: 68 computer-assisted, 79 handwritten notes Baseline: 55 computer group, 59 handwritten group 12 months: 55 computer group, 57 handwritten group 24 months: 46 computer group (33% lost)

		, 44 handwritten group (45% lost) Dropout info (Table 1/ Pg 66) does not even cover all of the dropouts by baseline. No mention of intention-to-treat analysis having been used
Selective reporting (reporting bias)	High risk	Not all of the study's prespecified primary outcomes have been reported (Pg 64/ Col 2/ Para 3): The database consisted of: 1) items related to the utilisation of services and to the overall quality of care (e.g. number of clinic visits, yearly routine physical examinations etc.) 2) more detailed information such as the presence or absence of recommended laboratory examinations for participants with obesity 3) answers to a questionnaire concerning participants' views on their own health and on the care received, i.e. only some of 1) is reported; it is unclear what tests 2) were to be ordered for obesity, and 3) is not reported at all
Baseline characteristics similar?	Unclear risk	The number of men and women is not given in the baseline Table 1/ Pg 67 but sex is used to divide the results later. Also information not given for the proportion of obese patients with diabetes and length of prior clinic attendance
Reliable primary outcome measures? Average weight change	Unclear risk	**Weight loss:** Blind retrospective chart reviews were done for both experimental and control participants (Pg 64/ Col 2/ Para 3) . No baseline weight reported, only mean pounds overweight at baseline
Protection against contamination?	Unclear risk	No information was provided to assure us that there were no misallocated patients, or that computerised records were always available

Sherwood 2006

Methods	**Design:** Randomised trial **Unit of allocation:** Participant: Following baseline, the Project Manager randomised participants using an automated computer system to 1 of 3 conditions: mail intervention, phone intervention, and standard care (Pg 1566/ Col 1/ Para 6) **Unit of analysis:** Participant: **Sample size calculation:** The primary outcomes examined in this study are changes in body weight from baseline to 18 and 24 months. A required sample size of 500 participants was determined using calculations to have 90% power (α = 0.05, two-tailed) to detect a small effect size for intent-to-treat analyses. (Pg 1567/ Col 2/ Para 3). Number expected to be recruited: 500 per group, i.e. 1500 total. Number actually recruited: Mail: 600; Phone: 601; Standard care: 600; i.e. 1801 total (Fig 1/ Pg 1568)
Participants	**The number randomised into the trial: Mail: N=600;** Telephone: N=601; Standard care: N=600 ***Episodes of care:*** Up to 10 sessions in mail and phone groups. Number of sessions actually received by participants described in Figure 1/ Pg 1568 *'Weigh-To-Be' course encounters (the clinical intervention)* Activated, 0 sessions completed : Mail: 260; Phone:24; Standard care: - Completed 1 - 9 sessions : Mail 206 ; Phone 165 ; Standard care: - Completed all 10 sessions: Mail 62 ; Phone 227; Standard care - Other weight-related encounters (outside the 'Weigh-To-Be' course) 0-1 counselling encounters; Mail:430 ; Phone: 218; Standard care:486 2 - 10 counselling encounters: Mail 115; Phone 138; Standard care 154 10 + counselling encounters: Mail 55 ; Phone 245; Standard care 60 "The operational definition of an 'encounter' was an educational interaction that focused on the topics of weight, diet, and/or physical activity between CHP staff and a participant. " ***Patients:*** 1801 adults (Figure 1/ Pg 1568) ***Providers:*** Unclear ***Practices:*** 4 clinics (Pg 1566/ Col 1/ Para 2) ***Hospitals:*** N/A ***Communities or regions:*** N/A **Characteristics of participating healthcare providers:** **Profession:** Counsellors were staff members of the CHP and were trained nutritionists and/or exercise specialists but numbers not specified (Pg 1566/ Col 2/ Para 3) **Level of training:** Fully trained: Counsellors were staff members of the CHP and were trained nutritionists and/or exercise specialists (Pg 1566/ Col 2/ Para 3) **Age of health professional:** N/A **Years since graduation or in practice:** N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation:** N/A **Characteristics of the participants:** **Clinical problem(s) of participants:** ***Overweight (BMI $\geq$ 25 but $\leq$ 30):*** Mail: 25.3% of 600, i.e. 152; Phone: 27.8% of 601, i.e. 167; Control: 27.4% of 600, i.e. 164; Total: 483 (Table 1/ Pg 1569) ***Obese (BMI $\geq$ 30):*** Mail 74.7% of 600, i.e. 448; Phone 72.2% of 601, i.e. 434; Control: 72.6% of 600, i.e. 436; Total 1318 (Table 1/ Pg 1569)

	Diabetes: % on medications for diabetes: Mail 4.7% of 600, i.e. 28; Phone 6.5% of 601, i.e. 39; Control 5.3% of 600, i.e. 32; Total 99 (Table 1/ Pg 1569) ***Ischaemic heart disease:*** % on medication for CVD-related: Mail: 26.0% of 600, i.e. 156; Phone: 27.6% of 601, i.e. 166; Control: 28.3% of 600, i. e. 170; Total 492 (Table 1/ Pg 1569) **Other characteristics of participating patients:** ***Age :*** **Mean (Standard error)** (Table 1/ Pg 1569) Mail: 50.6 years (0.5); Phone: 50.7 years (0.5); Control 50.8 years (0.5); Total mean age = 50 years, SD 12 (Pg 1568/ Col 1/ Para 2) **Baseline BMI (kg/m^2), mean (standard error):** Mail (N = 600): 34.1 (0.2); Phone (N = 601): 33.5 (0.2); Standard care (N = 600): 34. 0 (0.2) ***Gender:*** Female N = 1293, 72% (Pg 1568/ Col 1/ Para 2) ***Ethnicity:*** White N = 1639, 91% (Pg 1568/ Col 1/ Para 2) ***Other:*** Well-educated N = 899, 50% college or graduate degree (Pg 1568/ Col 1/ Para 2) **Setting :** **Reimbursement system:** Mixed: HealthPartners is a mixed model managed care organ-isation (MCO) (Pg 1566/ Col 1/ Para 2) **Setting of care:** Community/home-based interventions. Participants recruited from 4 clinics (Pg 1566/ Col 1/ Para 2) **Academic status:** Non-teaching or university-affiliated. Participants recruited from 4 clinics (Pg 1566/ Col 1/ Para 2) **Country:** USA
Interventions	**Professional intervention:** setting of delivery of care (standard care, mail, telephone delivery of care) **Description of the Intervention:** "To measure relative interest in the two treatment conditions, participants were asked to notify the study when they wished to begin their program. Mail intervention individuals were asked to indicate their readiness by sending a postcard to the study office. Phone treatment individuals were given a phone number to call to activate treatment. Once activated, the two weight loss interventions proceeded in parallel formats. Both comprised 10 interactive lessons designed to be completed in sequence with feedback between each lesson from a health counsellor. Each lesson included instructional material describing a rationale for a specific behavior change strategy, behaviour change goals related to that strategy, and homework to be completed before beginning the next lesson. Lesson topics included nutrition, physical activity, and behavior management techniques (e.g. behavioral assessment, goal setting, stimulus control, social support, and self-motivation). The primary homework assignment was to keep a food and exercise log. Weight management lessons were designed to be completed as rapidly as one lesson per week. However, study participants were encouraged to proceed at a pace comfortable for them. For phone intervention individuals, all 10 lessons and homework assignment materials were mailed at the beginning of the program. A series of calls was scheduled between the participant and a phone counsellor to provide guidance through each lesson and feedback about progress. Phone counsellors were staff members of the CHP and were trained nutritionists and/or exercise specialists. During an introductory telephone call, program format and expectations were explained and subsequent calls were scheduled.

	These calls comprised discussion of behavioural strategies tried since the last session, discussion of content and activities for the lesson, counsellor advice about how to improve/ maintain lifestyle behaviours, goal setting, and counsellor description of the rationale and behavioral assignment for the next lesson. The average length of calls was 19 min. Mail intervention used the same 10 written lessons, behavioral assignments, and counselling protocol and staff. However, interactions between counselling staff and participants were entirely by mail. Participants were first mailed a course manual with two lessons and two feedback forms and were instructed to complete the first lesson and return a progress report. Progress report information included behaviour change goals, perceived progress, and action steps taken to achieve goals. When this progress report was received by the counsellor, she reviewed it and made comments in writing, which were forwarded, along with the next session, by return mail. This sequence was repeated for each lesson until the course was completed." (Pg 1566/ Col 2) "Follow-up intervention options were available to both the phone and the mail groups after completion of the 10-lesson course. These comprised individual follow-up on topics of the participant's choosing. Resources available to the counsellor included a wide range of educational resources on lifestyle topics related to weight management maintained by the CHP. Participants could also enrolls in other CHP health-related courses. Additionally, participants could repeat all or any part of the Weigh-To-Be (WTB) intervention. Participants who discontinued contact with their counsellor prior to course completion were contacted at 1-, 2-, and then 6-month intervals for up to 2 years to encourage intervention resumption. Individuals who did not activate their assigned intervention were also contacted at 6-month intervals to encourage engagement." (Pg 1567/ Col 1/ Para 1) **Control group: "**standard care participants had access only to weight management services generally available to members of HealthPartners. After randomisation, they were sent a resource sheet detailing MCO and community weight management options including free general phone counselling, a structured weight management phone course, or a group class offered at several MCO clinics. The phone course and group classes required a modest fee of $25. Similar to participants in the treatment groups, standard care participants could enrol in other CHP health-related courses." (Pg 1567/ Col 1/ Para 2) **Timing of intervention:** N/A ***Proximity to clinical decision-making:*** N/A - organisation of care intervention ***Frequency/number of intervention events:*** N/A - organisation of care intervention ***Duration of intervention:*** N/A - organisation of care intervention **Healthcare professional recipient:** ***Intervention group:*** N/A - organisation of care intervention ***Control group:*** N/A - organisation of care intervention **Intervention deliverer:** ***Intervention group:*** N/A - organisation of care intervention ***Control group:*** N/A - organisation of care intervention **Types of targeted behaviour of the health professionals:** N/A - organisation of care intervention **Development of the intervention:** **Consultation with professional recipients:** N/A **Evidence base of intervention:** Not specified **Consumer involvement:** N/A

	Barriers to change: Not clear **Source of funding for study:** N/A **Ethical approval:** N/A **Competing interests**: N/A
Outcomes	**Outcomes measured:** • Weight loss • Costs • Number of CHP Weight-Related Encounters • Number of sessions taken up **Length of time outcomes measured after initiation of the intervention:** Baseline, 6, 12, 18 and 24 months (Fig 2/ Pg 1569) **Ceiling effect:** ***Identified by investigator:*** Yes - "'standard care' was unusually potent in this study. The CHP is unique in its offering of relatively low cost weight management services to members. Many members, however, are probably not aware of these services and thus do not use them. Standard care participants in this study were explicitly made aware of these member services and participated in them at relatively high rates, about 1 person in 3. As a result, significant weight loss observed in our 'control' group may have lessened our ability to detect effects in our active treatments." (Pg1571/ Col 2 / Para 1) ***Identified by reviewer:*** No - overall potential for weight loss demonstrated **Losses to follow-up:** **Number randomised:** (Fig 1/ Pg 1568) ***Intervention groups:*** Mail: N = 600; Phone: N = 601 ***Control group:*** N = 600 **Number completing follow-up:** (Fig 1/ Pg 1568) ***Intervention groups:*** Mail: N = 381 (24 months); Phone: 404 (24 months) ***Control group:*** N = 410 (24 months) **Reasons for loss to follow-up:** ***Intervention groups:*** N/A ***Control group:*** N/A **Economic variables:** **Costs of the intervention:** Yes: • Counseling/subject • Program development/subject • Materials and supplies/subject • Overhead/subject • Total cost/participant (Table 5/ Pg 1571) Changes in direct healthcare costs as a result of the intervention: Not reported Changes in non-healthcare costs as a result of the intervention: Not reported **Costs associated with the intervention linked with provider or participant outcomes in an economic evaluation:** Cost/weight loss of 1 kg (Table 5/ Pg 1571)
Notes	**Unit of analysis error:** No unit of analysis error: See Page 1567/Col 2/"Analysis" section

Risk of bias

Bias	Authors' judgement	Support for judgement

Random sequence generation (selection bias)	Low risk	"Following baseline, the Project Manager randomised participants using an automated computer system to one of three conditions: mail intervention, phone intervention, and standard care. The randomisation scheme consisted of blocks of 15 with the numbers 1-3 to indicate treatment group (phone, mail and standard care)" (Pg 1566/ Col 1/ Para 3 - Pg 1566/ Col 2/ Para1)
Allocation concealment (selection bias)	Low risk	The randomisation sequence was concealed until after interventions were assigned (Pg 1566/ Col 2/ Para1)
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Weight** At baseline and 24 months, clinic visits were held at which body weight was measured and self-report measures were completed. Measurement staff were blind to study condition (Pg 1567/ Col 1/ Para 3)
Blinding (performance bias and detection bias) Subjective outcomes	Low risk	**Outcome group:** Self-reported measures No blinding, but the review authors judge that the outcome and the outcome measurement are not likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	**Weight:** These analyses used an intent-to-treat approach in which baseline values for body weight (0 weight loss) were used for individuals who did not complete follow-up surveys. (Pg 1567/ Col 2/ Para 3). The losses to follow-up were 22.3% in the mail group, 21.3% in the phone group and 17. 6% in the control group, and losses to follow up wee relatively similar across groups-
Incomplete outcome data (attrition bias) Subjective outcomes	Unclear risk	We could not find enough information to assess the risk of bias for this item
Selective reporting (reporting bias)	High risk	The protocol was published in Jeffery 2004, which stated that the following outcomes would be measured: Questionnaire on Eating and Weight-Revised, A 24-item dietary fat screener, Paffenbarger Activity Questionnaire, Frequency of weighing oneself on a monthly basis. None of these are

		reported in Sherwood 2006
Baseline characteristics similar?	Low risk	Table 1/ Pg 1569 and Pg 1568 / Col 1/ Para 2 Treatment groups differed significantly on only one baseline variable. Phone group participants were more likely to report taking depression medication than those in the other groups (P < 0.013)
Reliable primary outcome measures? Average weight change	Low risk	**Weight:** At baseline and 24 months, clinic visits were held at which body weight was measured and self-report measures were completed. Measurement staff were blind to study condition. (Pg 1567/ Col 1/ Para 3)
Protection against contamination?	Low risk	Unlikely that the control group received the intervention and weight control activity participation was measured across all 3 groups. No one in the control group was reported to have participated in the interventions (Fig 1/ Pg 1568) Standard care participants had access only to weight management services generally available to members of HealthPartners. (Pg 1567/ Col 1/ Para 2) **Participation measures: "**Weight control activity participation was assessed in two ways using the tracking systems that are part of the CHP delivery platform.These records document the dates and types of all contacts between CHP staff and members, both for the WTB program and other CHP programs. Analysis variables for mail and phone group participants included enrolment status (yes/no) and number of WTB course sessions completed (0-10). Additionally, the total number of weight-related encounters outside of the WTB protocols were examined. The operational definition of an 'encounter' was an educational interaction that focused on the topics of weight, diet, and/or physical activity between CHP staff and a participant. This information was available for all three study conditions. " (Pg 1567/ Col 2/ Para 2)

Taveras 2011

Methods	**Study design:** Cluster-randomised trial **Unit of allocation**: the practice **Unit of analysis:** the patient **Sample size calculation:** no
Participants	**The total number children randomised into the trial:** N = 475 children**; Intervention:** N = 271**; Control:** N = 204 ***Episodes of care:*** " We aimed for intervention participants to complete 6 intervention activities with the nurse practitioner by 1-year. Among the 253 intervention participants, 141 (56%) had completed at least two of 6 activities." ***Patients:*** N = 475 obese children ***Providers:*** paediatric nurse practitioners (unclear number) were the key intervening clinicians (but the whole primary care team were trained i.e. also the physicians, medical assistants and receptionist) ***Practices:*** 10 primary care paediatric offices of Harvard Vanguard Medical Associates (HVMA), a multisite group practice in Massachusetts, USA ***Hospitals:*** - ***Communities or regions:*** Massachusetts, USA **Characteristics of participating healthcare providers:** **Profession**: nurse practitioner **Level of training:** N/A **Age:** N/A **Years since graduation or in practice**:N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation**:N/A **Characteristics of the participants:** **Clinical problem(s) of participants**:obesity BMI, kg/m^2 (SD): All: 19.2 (2.4); Intervention: 19.2 (2.6), Control: 19.1 (2.0) BMI, z-score (SD): All: 1.85 (0.63); Intervention: 1.88 (0.69), Control: 1.82 (0.56) BMI category 85th to 94th percentile: All: 195 (44%); Intervention: 118 (47%), Control: 77 (40%) ≥ 95th percentile: All: 250 (56%); Intervention: 135 (53%); Control: 115 (60%) **Comorbidities** (e.g. diabetes and Ischaemic heart disease): N/A ***Age, years, mean (SD):*** All: 4.9 (1.2); Intervention: 4.8 (1.2), Control; 5.2 (1.1) ***Gender*** : Male: All: 230 (52%); Intervention: 132 (52%), Control: 98 (51%) ***Ethnicity*** : White All: 252 (57%); Intervention: 118 (47%); Control: 134 (70%) Black: All: 84 (19%); Intervention: 70 (28%), Control: 14 (7%) Latino: All: 74 (17%); Intervention: 48 (19%); Control: 26 (14%) Other: All: 35 (8%); Intervention: 17 (7%); Control: 18 (9%) **Setting :** **Reimbursement system**: N/A **Setting of care**: multisite group practice in Massachusetts, primary paediatric care **Academic status** :N/A **Country:** USA
Interventions	**Organisational intervention:** organisational restructuring (i.e. introducing the chronic care model); skill mix change Intervention practices received primary care organisational restructuring of primary care (families received motivational interviewing by clinicians and educational modules tar-

geting TV, fast food, and sugar-sweetened beverages)
Professional intervention: enhanced electronic medical record (with decision support) , training in motivational interviewing (nurses) and in brief focused negotiation (clinicians)
Description of the intervention:
"The overarching model for this intervention was the Chronic Care Model 24 which posits that changes in primary care to produce functional patient outcomes require changes for all members of the practice team. Major components of the intervention involved changes to the healthcare system. We trained all members of the practice team to play an active role in the intervention. We enhanced the electronic medical record system to assist clinicians with decision support, patient tracking, follow-up,scheduling, and billing
After reorganization of the delivery of primary and acute care, the paediatric nurse practitioners conducted chronic disease management visits with intervention participants. Prior to the start of the intervention, we negotiated with the regional insurance companies to pay for up to four visits for both overweight and obese patients in the first year of the study."
Motivational interviewing :
"We trained the paediatric nurse practitioners to be the key intervening clinicians and to use motivational interviewing (MI) during four, 25 minute, in-person, chronic disease management visits and three, 15 minute telephone calls in the first year of the intervention.No information was provided in the review on the duration and frequency of training session, or who delivered the training to the healthcare professionals.If, and to what degree, the healthcare professionals used Mi during patient encounters is not clear. "
"Motivational interviewing: MI is a communication technique that enhances self-efficacy, increases recognition of inconsistencies between actual and desired behaviours, teaches skills for reduction of this dissonance, and enhances motivation for change. Components include de-emphasis on labelling, giving the parent responsibility for identifying which behaviours are problematic, encouraging parents to clarify and resolve ambivalence about behavior change, and setting goals to initiate the change process."
Brief focused negotiation:
"We trained the primary care paediatricians in the intervention practices to use brief focused negotiation skills at all routine well child care visits to endorse family behavior change. Brief focused negotiation is based on the concepts of MI but tailored for brief sessions such as the clinical encounter. To ensure accurate measurements of heights and weights, we trained all medical assistants in intervention and usual care practices on conducting research-standard anthropometric measurements. We also trained the medical receptionists to schedule initial and follow-up visits with the nurse practitioners based on the study protocol."
Resources:
"We developed several resources to assist the physicians and nurse practitioners in supporting participants and their family in behavior change. For the patient waiting rooms, we created posters highlighting our targeted behaviours to encourage dialogue during well child care visits (Figure 2). For the chronic disease management visits with the nurse practitioners, we developed educational modules targeting TV, fast food, and sugar sweetened beverages that were matched to a family's stage of readiness to change; 27 printed and electronic tools for self-management support, lists of local resources for physical ac-

	tivity; and an interactive web site with educational materials, recipes, and other features. To further support behaviour change, the nurse practitioners provided small incentives such as water bottles, books, and snack containers. In addition, the nurse practitioners offered interested families an electronic TV monitoring device to assist with the goal of reducing TV viewing." "Based on the Chronic Care Model, the High Five for Kids intervention involved changes in the roles and responsibilities for the entire practice team, retraining of clinicians to support family behavior change, as well as updating clinical information systems and providing families' links to their community for physical activity. We designed intervention components to be sustainable in a "real-world" primary care setting by training existing clinical staff to deliver the intervention. The intervention was also designed to be of moderate to high intensity requiring 6 intervention activities over a 1-year period." **Control: "**Participants randomized to usual care received the current standard of care offered by their paediatric practice. This included well child care visits and follow-up appointments for weight checks with their paediatrician or a sub specialist (e.g. nutritionist).Visits for families in the usual care group included the baseline and annual well child care visits." **Professional intervention:** no **Timing of intervention:** N/A - organisational intervention ***Proximity to clinical decision-making:*** N/A - organisational intervention ***Frequency/number of intervention events:*** N/A (6 clinical events planned during the first 12 months) ***Duration of intervention:*** 12 months intensive intervention followed by a 12-months maintenance period **Healthcare professional recipient:** The practices received reorganisation and training. The participant received the clinical intervention **Intervention deliverer:** N/A (organisational intervention), unclear who trained the nurses **Types of targeted behaviour of the health professionals:** improved management of obese children **Development of the intervention:** **Consultation with professional recipients**: N/A **Evidence base of intervention**: N/A (only evidence for the clinical intervention) **Consumer involvement:** N/A **Barriers to change**: N/A **Source of funding for study**: "This study was supported by grant R01 HD 050966 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development." **Ethical approval**: All study procedures were approved by the Human Subjects Committee of Harvard Pilgrim Health Care. Informed consent was sought from participants **Competing interests:** N/A.
Outcomes	**Outcomes measured:** • Change in BMI from baseline to 1 year (and BMI z-score calculated) **Length of time outcomes measured after initiation of the intervention:** 12 months (intervention period was 2 years, first an intensive intervention period and then a maintenance period) **Ceiling effect:**

	Identified by investigator: no *Identified by reviewer: no* **Losses to follow-up:** **Number randomised:** N = 475 *Intervention group:* N = 271 *Control group:* N = 204 **Number completing follow-up:** *Intervention group: N = 253 (93% of those enrolled)* *Control group:* N = 194 (94% of those enrolled) completed a 1-year telephone interview and well-child care visit for BMI measurement **Reasons for loss to follow-up:** *Intervention group:* N/A *Control group:* N/A **Economic variables:** none reported
Notes	**Unit of analysis error:** No. For all models, to account for intraclass correlation,the authors performed generalised linear mixed models that accounted for clustering by practices

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	P.3/Para.1 "To pair practices in preparation for blocked, or stratified, randomization, we first divided the practices into the biggest 4 and smallest 6, then matched within those groups as closely as possible on racial/ethnic composition. Within each of five pairs, a computerized routine randomly allocated one practice to the intervention group and one to the usual care control group."
Allocation concealment (selection bias)	Low risk	Cluster-randomised trial and blocked randomisation
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: Change in BMI** No information on whether or not the outcome assessor (the medical assistant) was blinded. However, objective outcome
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	Intervention group: N = 253 (93% of those enrolled) and Control group: N = 194 (94% of those enrolled) completed a 1-year telephone interview and well-child care visit for BMI measurement

Taveras 2011 (*Continued*)

Selective reporting (reporting bias)	Low risk	No evidence of selective outcome reporting, based on trial registry (clinicaltrials.gov/ct2/show/study/NCT00377767) and published outcomes
Baseline characteristics similar?	Unclear risk	"Children randomized to the intervention group were more likely to be racial/ethnic minorities, have an obese parent, and live in lower income households (Table 1). There were no group differences at baseline in health behaviors (Table 1)."
Reliable primary outcome measures? Average weight change	Unclear risk	P.717, Col.1, Para 1 "Fifty-three percent of intervention children had a BMI in the 95th percentile or higher versus 60% of usual care children"
Protection against contamination?	Low risk	Protected, as the practices were the unit of allocation (cluster-randomised trial). Blinding (performance bias and detection bias). Secondary outcomes

Taveras 2015

Methods	**Study design:** Cluster-randomised trial **Unit of allocation**: the clinics **Unit of analysis:** the individual children **Sample size calculation:** no
Participants	**The total number of practices randomised into the trial:** N = 14 **; Intervention (CDS) :** N = 5**; Intervention (CDS+coaching):** N = 5; **Control:** N = 4 Note: CDS+coaching is not included in this review ***Episodes of care:*** CDS + coaching arm to complete 4 telephone calls with the health coach. Unclear number of face-to-face meetings for usual care participants. ***Patients:*** All N = 549 obese children; CDS: N = 194; CDS+Coaching: N = 171; Usual Care (UC): N =184 ***Providers:*** N/A ***Practices:*** 14 paediatric offices of Harvard Vanguard Medical Associates, a multispecialty group practice in Massachusetts, USA ***Hospitals:*** N/A ***Communities or regions:*** Massachusetts, USA **Characteristics of participating healthcare providers:** **Profession**: paediatric clinicians **Level of training:** N/A **Age:** N/A **Years since graduation or in practice**: N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation**: all eligible clinics participated (100%); Note: of the 1338 patients contacted, 521

	were excluded (of which 78 were ineligible and 445 declined participation), 268 of the remaining 817 patients were excluded due to different reasons, leaving 549 participants **Characteristics of the participants:** **Clinical problem(s) of participants**: obesity **Body mass index:** BMI, mean (SD): All; 25.8 (4.3); CDS: 25.6 (4.5); (CDS+coaching: 26.0 (4.2)); UC: 25.7 (4.2), P = 0 .67 **Body mass index z-score** : BMI, *z*-score, mean (SD): All: 2.06 (0.30); CDS: 2.04 (0.30); (CDS+coaching: 2.08 (0. 30)), UC: 2.05 (0.30), P = 0.54 **Comorbidities** (e.g. diabetes and Ischaemic heart disease): ***Age,* mean (SD), yrs**: All: 9.8 (1.9); CDS: 9.8 (2.0); (CDS+coaching 9.8 (1.8)); UC: 9. 8 (1.9), P = 0.97 ***Gender:*** Female: All: 257 (46.8), CDS: 93 (47.9); (CDS+coaching: 80 (46.8)), UC: 84 (45.7) P = 0.88 Male; All: 292 (53.2); CDS: 101 (52.1), (CDS+coaching: 91 (53.2)), UC: 100 (54.3), p=0.88 ***Ethnicity:*** White: All: 281 (51.4); CDS: 125 (64.4), (CDS+coaching: 74 (43.5)), UC: 82 (44.8), P < 0.001 Black : ALL:116 (21.2); CDS: 31 (16.0);(CDS+coaching: 44 (25.9) : UC:41 (22.4) Latino : All: 77 (14.1), CDS: 12 (6.2); (CDS+coaching: 25 (14.7)); UC: 40 (21.9) Asian : All:27 (4.9); CDS: 9 (4.6), (CDS + coaching: 9 (5.3)); UC: 9 (4.9) Other: All: 46 (8.4);CDS: 17 (8.8), (CDS+coaching: 18 (10.6));UC 11 (6.0) ***Family disadvantage index*** : N/A **Setting:** **Reimbursement system**: N/A **Setting of care**: paediatric primary care **Academic status**: N/A **Country:** USA
Interventions	**Organisational intervention:** - **Professional intervention:** clinical decision support system **Description of the intervention: "**A clinical decision support (CDS) delivered to pae- diatric clinicians at the point of care of obese children, with or without individualised family coaching: In the 10 practices randomized to the 2 intervention arms (CDS and CDS + coaching),we modified the existing electronic health record to deploy a comput- erised, point-of-care CDS alert to paediatric clinicians at the time of a well-child visit for a child with a BMI at the 95th percentile or greater.The alert contained links to growth charts, evidence-based childhood obesity screening and management guidelines,and a pre populated standardised note template specific for obesity that included options for: (1) documenting and coding for the BMI percentile, (2) documenting and coding for nutrition and physical activity counselling, (3) placing referrals for weight management programs, (4) placing orders for laboratory studies if appropriate, (5) printing educational materials." **Training**: "In these 10 practices, we also trained the clinicians to use brief motivational interviewing to negotiate a follow-up weight management plan with the patient and their family. These training sessions were conducted in person at each of the 10 sites

	during regularly scheduled clinical meetings and were led by expert faculty (E.M.T.and R.M.) and information technology specialists.To augment the clinical intervention and to support families in behavior change, we developed a comprehensive set of educational materials for paediatric clinicians to provide to their patients." **Control**: "Control arm participants received the current standard of care offered by their paediatric office. No new decision support tools for obesity were made available in the electronic health records of the four usual care practices." **Timing of intervention:** ***Proximity to clinical decision-making:*** at the point of care ***Frequency/number of intervention events:*** N/A (software) ***Duration of intervention:*** 12 months **Healthcare professional recipient:** Paediatric clinicians/paediatric practices received the CDS and the training (patients and families received the coaching) **Intervention deliverer:** expert faculty (E.M.T. and R.M.) and information technology specialists and electronic CDS tool **Types of targeted behaviour of the health professionals:** Improved recognition/identification of and counselling of obese children **Development of the intervention:** **Consultation with professional recipients**: **Evidence base of intervention**: p536, col.1, para.4 "Incorporating point-of-care health information technology may be especially effective if augmented by outreach to parents and children. Telephone support has been used to deliver motivational interviewing and brief focused negotiation to effect behavior change.15,16 Mobile technology strategies, such as text messaging, have been used to provide outreach and support for behavior change to parents and adolescents.Systematic reviews of interactive telephone or text message interventions for obesity found few studies with only modest intervention effects but concluded that electronic approaches appeared to be promising " **Consumer involvement:** N/A **Barriers to change**: N/A **Source of funding for study**: This study was supported by award R18 AE000026 from the American Recovery and Reinvestment Act (Dr Taveras). **Ethical approval**: "We obtained written informed consent from the parents via mail. All study activities were approved by the institutional review board at Harvard Pilgrim Health Care, Boston, Massachusetts." **Competing interests:** None reported
Outcomes	**Outcomes measured:** • Body mass index (BMI) • Healthcare performance/quality of care (assessed with the HEDIS instrument) **Length of time outcomes measured after initiation of the intervention:** 12 months **Ceiling effect:** *Identified by investigator: None. The authors state that "*Despite the availability of obesity management guidelines, interventions to improve BMI in children have not proved effective in the context of primary care, and paediatric clinicians have been slow to adopt recommended screening and management practices" *Identified by review authors: None.There appear to be room for improvement.* **Losses to follow-up:** **Number randomised:** N = 549 *Intervention group (CDS): 194 children received intervention (unclear number randomised)*

	Intervention group (CDS+coaching):171 children received the intervention (unclear number randomised) *Control group: 184 children received usual care (unclear number randomised)* **Number completing follow-up:** *Intervention group (CDS): 183 provided 1-year data (11 children lacked 1-year visit)* *Intervention group (CDS+coaching): 165 provided 1-year data (6 children lacked 1-year visit)* *Control group: 172 provided 1-year data (12 children lacked 1-year visit)* **Reasons for loss to follow-up:** *Intervention group: N/A* *Control group: N/A* **Economic variables:** none reported
Notes	**Unit of analysis error**: In intent-to-treat analyses, we assessed BMI and BMI z-scores using linear mixed-effects models to account for clustering by practice and within each person

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Pg.536/Col.2/ Para.3 "We created 5 strata from the 14 practices based on patient volume. A blinded biostatistician (K.P.K.) used a pseudo-random number generator to assign practices within each stratum to 1 of the 2 intervention arms or to the control arm."
Allocation concealment (selection bias)	Low risk	Pg.536/Col.2/ Para.3 "A blinded biostatistician (K.P.K.) used a pseudo-random number generator to assign practices within each stratum to 1 of the 2 intervention arms or to the control arm."
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: BMI z-score, documentation of BMI percentile and use of counselling codes for nutrition and physical activity (HEDIS**) "We ascertained the main outcome measures for this study-BMI and quality of care-using the child's electronic health record from well-child visits."
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	BMI data at study end was lacking for 11 of 195 participants in the CDS group, (6 of 171 in the CDS+coaching group), and 12 of 181 in the usual care group. Most

Taveras 2015 (*Continued*)

		likely the HEDIS data were retrieved from participant notes, and should therefore be complete
Selective reporting (reporting bias)	High risk	Cost listed as an outcome in trial registry (clinicaltrials.gov/ct2/show/NCT01537510), but was not reported as part of main publication
Baseline characteristics similar?	Unclear risk	At the initial study visit, a higher proportion of children in practices randomised to the usual-care arm were racial/ethnic minorities and had a parent who was born outside the United States. We found no other substantial group differences in sample characteristics
Reliable primary outcome measures? Average weight change	Low risk	"We ascertained the main outcome measures for this study-BMI and quality of care-using the child's electronic health record from well-child visits." Similar BMI in both groups at baseline
Protection against contamination?	Low risk	Yes, cluster-randomised trial and thus protected against decontamination

Wake 2013

Methods	**Study design:** Randomised trial **Unit of allocation**: the participant **Unit of analysis:** the participant **Sample size calculation: "**Allowing for 10% loss to follow-up, we aimed to recruit 172 children. This would provide 80% power to detect a mean difference of 0.3 body mass index z-score units at 15 months (which is comparable to published mean changes seen from specialist obesity clinics) between arms at the 5% (two sided) level of significance."
Participants	**The total number children randomised into the trial:** N = 118;**Intervention:** N = 62; **Control:** N = 56 ***Episodes of care:*** 1 tertiary appointment followed by up to 11 general practice consultations ***Patients:*** 118 obese children (above the 95th percentile) ***Providers:*** 35 GPs, 3 paediatricians, 2 dietitians ***Practices:*** 22 family practices ***Hospitals:*** 1 tertiary weight management service ***Communities or regions:*** metropolitan Melbourne (population 3.9 million), Australia **Characteristics of participating healthcare providers:** **Profession**: GPs, paediatricians, dietitians **Level of training:** specialist paediatricians

	Age: N/A **Years since graduation or in practice**: N/A **Proportion of eligible providers (or allocation units) who participated in the evaluation**: N/A (70 who expressed interest, 35 ultimately participated in 22 practices) **Characteristics of the participants:** **Clinical problem(s) of participants**: obesity **Body mass index**: Intervention: 22.3 (2.7) ; Control; 22.8 (3.6) **Body mass index z-score** : Intervention: 2.2 (0.5); Control:2.1 (0.3) **Comorbidities** (e.g. diabetes and ischaemic heart disease): N/A ***Age,* years, mean (SD)*:*** Intervention: 7.2 (2.3) years; Control: 7.4 (2.2) ***Gender:*** Boys, No (%) Intervention: 31 (50); Control: 33 (59) ***Ethnicity: N/A*** ***Family disadvantage index*** : Intervention: 1029 (65.7); Control: 1030 (45.3) Mother: BMI: Intervention: 26.9 (5.7), Control: 28.0 (7.1); Overweight or obese, No (%) Intervention:(N = 55) 28 (51); Control: (N = 44) 26 (59) Father: BMI Intervention: (N = 49) 27.8 (6.9); Control: (N = 37) 29.8 (4.9); Overweight or obese, No (%): Intervention (N = 49) 39 (80), Control: (N = 37) 31 (84) **Setting:** **Reimbursement system**: Medicare Australia Benefits Schedule 36 **Setting of care**: Primary and tertiary care **Academic status**: N/A **Country:** Australia
Interventions	**Organisational intervention:** shared care/multidisciplinary team **Professional intervention:** web-based software supporting shared care *Intervention*: 1 tertiary obesity clinic appointment followed by up to 11 general practice consultations over 1 year, plus web-based software supporting shared care *Control: p*articipants in the usual care arm were free to seek assistance from their GP or from any other service **Timing of intervention:** N/A ***Proximity to clinical decision-making:*** N/A ***Frequency/number of intervention events:*** 1 (tertiary care appointment) + 11 (GP appointments) were offered ***Duration of intervention:*** 12 months **Healthcare professional recipient:** GPs or paediatricians and dietitians **Intervention deliverer:** software **Types of targeted behaviour of the health professionals:** provision of care to obese children **Development of the intervention:** **Consultation with professional recipients**: N/A **Evidence base of intervention**: see p.2, Col.1, Para 4. "Cochrane reviews of shared models of care for chronic conditions are mixed; Smith et al found insufficient evidence to support shared primary-specialist care, but Gruen et al reported that "specialist outreach can improve access, outcomes and service use, especially when delivered as part of a multifaceted intervention." More specifically, for obese adults attending a tertiary weight management clinic, shared care with general practitioners outperformed the specialist arm in short term (10 week) weight loss and dietary habits and achieved comparable six month weight loss The only childhood trial so far published randomised obese 5-16 year olds to either shared care (a single tertiary

	care visit followed by nurse led primary care) or wholly tertiary care, achieving similar reductions in 12 month body mass index z-scores of 0.17 and 0.15.28 However, lack of a true control group was a limitation, and the potential of shared care approaches remains to be confirmed." **Consumer involvement:** N/A **Barriers to change**: N/A **Source of funding for study**: "HopSCOTCH was funded by the Australian National Health and Medical Research Council (NHMRC Priority Driven Research Grant 491212). MW was part funded by NHMRC Population Health Career Development Grants 284556 and 546405 and MAS by NHMRC Professional Training Fellowship 1012201. Murdoch Childrens Research Institute is supported by the Victorian Government's Operational Infrastructure Support Program" **Ethical approval**: "The project was approved by the Royal Children's Hospital Ethics in Human Research Committee (HREC 280178) and the University of Melbourne Human Research Ethics Committee (0827435)." **Conflict of interest:** "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: MW, KL, MAS, JG, KG, CH, ZM, SC, and GW have support from the Australian National Health and Medical Research Council (NHMRC) for the submitted work; no relationships with any companies that might have an interest in the submitted work in the previous three years; no non-financial interests that may be relevant to the submitted work"
Outcomes	**Outcomes measured:** • **BMI z-score** - primary outcome • Body fat percentage • Waist circumference • Physical activity (not included in this review) • Quality of diet (not included in this review) • Harm (Health-related quality of life, self-esteem, body dissatisfaction) • Parents' body mass index (not included in this review) • Acceptability and feasibility **Length of time outcomes measured after initiation of the intervention:** 15 months post-enrolment **Ceiling effect:** *Identified by investigator:None. The investigators state that "*general practitioners typically measure and interpret body mass index infrequently, often under-diagnose overweight and obesity,22 have low confidence in managing overweight/obesity and achieving weight change, and only rarely treat obese children actively for their weight.*"* *Identified by review author: None.There appear to be room for improvement.* **Losses to follow-up:** **Number randomised:** *Intervention group:* N = 60 *Control group:* N = 56 **Number completing follow-up:** *Intervention group:* N = 56 *Control group:* N = 51 **Reasons for loss to follow-up:** *Intervention group: N/A*

	Control group: N/A **Economic variables:** none reported
Notes	**Unit of analysis error:** no

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Pg.2/Col.2/Para.6 "An independent research assistant allocated enrolled children to intervention or "usual care" (control) arms in a 1 to 1 ratio by using a concealed computerised random number sequence, stratified by general practitioner, pre-generated by a biostatistician not otherwise connected with HopSCOTCH."
Allocation concealment (selection bias)	Low risk	See above
Blinding (performance bias and detection bias) Objective outcomes	Low risk	**Outcome group: BMI z-score,** Once allocated, participants could not be blinded to group membership. Specialists and general practitioners were aware only of children in the intervention group. Research assistants blind to group allocation measured outcomes. Objective outcomes
Blinding (performance bias and detection bias) Subjective outcomes	Unclear risk	**Outcome group: body fat percentage, waist circumference, health-related quality of life, self-esteem, body dissatisfaction** We could not find enough information to assess the risk of bias for these
Incomplete outcome data (attrition bias) Objective outcomes	Low risk	118 (62 intervention, 56 control) children were recruited and 107 (91%) were retained and analysed (56 intervention, 51 control). All retained intervention children attended the tertiary appointment and their general practitioner for at least one (mean 3.5 (SD 2.5, range 1-11)) weight management consultation
Incomplete outcome data (attrition bias) Subjective outcomes	Unclear risk	We could not find enough information to assess the risk of bias for this item

Wake 2013 (*Continued*)

Selective reporting (reporting bias)	High risk	Blood pressure/heart rate and behavioural measure listed as outcomes in published protocol, but results not published in main report
Baseline characteristics similar?	Low risk	The trial arms were similar at baseline (table 2), as were those children retained and lost to follow-up
Reliable primary outcome measures? Average weight change	Low risk	Research assistants blind to group allocation measured outcomes.Similar BMI in both groups at baseline
Protection against contamination?	Low risk	No risk of contamination.

BP: blood pressure; BMI: body mass index; BRHC: Bristol Royal Hospital for Children; COCO: Care Of Childhood Obesity clinic; CVD: cardiovascular disease; EHR: electronic health record; GP: general practitioner; ICC: intraclass correlation coefficient; N/A: not available; NHS: National Health Service; NICE: National Institute for Health and Care Excellence; SD: standard deviation; SDS: standard deviation score

Locations of supporting text in published study indicated by (Page number/ Column number/ Paragraph number) e.g. (Pg 150/ Col 1/ Para 4)

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

Study	Reason for exclusion
Ashley 2001	Lack of standard-care arm. Participants not recruited in the context of a healthcare setting
Atkinson 1977	No standard-care arm.The intervention was not led solely by qualified healthcare professionals
Balch 1976	No standard-care arm. Recruitment of overweight participants did not occur in a healthcare setting
Banerjee 2013	Weight loss or BMI at the end of study not reported
Ben Noun 1988	The comparator was not routine care
Boltri 2007	Not all of the participants were overweight or obese (Table 1). It did not report weight or weight loss at the end of study (i.e. no objective outcome measure was reported)
Counterweight Prog 2004	Not a randomised study
De Mello 2004	The participants were not recruited in the context of a healthcare setting, nor was the intervention led by a qualified healthcare professional

(*Continued*)

Donnelly 2007	No standard-care arm. Unclear if participants were recruited in the context of a healthcare setting. There was also concern that the "experienced health educators" used in this study were not qualified health professionals
Dunstan 2006	No standard-care arm. Not all participants were recruited in the context of a healthcare setting. Overweight and obese participants were not supervised by health professionals in the gym, but by YMCA staff
Ferstl 1975	No standard-care arm. Not all participants were recruited in the context of a healthcare setting, nor did the intervention take place in healthcare setting; the whole intervention was devised for this study and delivered at a non-profit institute for therapy research
Finnish DPS Group 1999	The participants were not recruited in the context of a healthcare setting. "The study subjects were recruited through various methods, e.g. from epidemiological surveys and by opportunistic population screenings with special emphasis on the high-risk groups such as obese subjects and first-degree relatives of Type II diabetic patients. Subjects were also recruited through advertising in local newspapers." (Page 794/ col 2 / para 5 of Eriksson 1999)
Hagen 1974	Recruitment of overweight participants did not occur in a healthcare setting
Hakala 1994	Randomised trial organisation: inpatient versus outpatient.Too much variation in content between the 2 groups
Harrigan 2016	Ineligible population
Jay 2013	Quasi-randomised study.Not a proper randomised trial
Jeffery 1979	No standard-care arm. It only compared the frequency of therapist contact. The intervention has been designed for the study at Stanford University and it is unclear if any sort of care programme was in place for overweight undergraduates at the University
Jeffery 1982	No standard-care arm. Participants were not recruited in the context of a healthcare setting. The intervention was not led by qualified healthcare professionals
Kromann 1985	This study appears to be a CBA with a convenience sample of participants. Also the standard-care arm physicians received additional training and are described by the authors as not representative of other GP practices
Levitz 1974	Participants were not recruited in the context of a healthcare setting. Weight loss intervention led by non-health professionals
Lewis 2013	Evaluated different weight-loss programmes, many of which were not led by qualified healthcare professionals (intervention not targeting the healthcare professionals or the organisation of care)
Lindstrom 1976	Participants not recruited in the context of a healthcare setting. The intervention was not led by a qualified healthcare professional

(*Continued*)

Martin 2013	Unclear if all participants were overweight or obese, and the proportion of overweight or obese people. Contacted authors but received no reply
McDonald 1984	No objective participant outcome data reported, i.e. it did not report weight or weight loss at the end of the study
Meyers 1996	No standard-care arm, the face-to-face group is not "standard care" and also the intervention was designed solely for the study. The participants were not recruited in the context of a healthcare setting
Ogden 1997	No objective outcome measures, i.e. it did not report weight or weight loss at the end of study
Panaite 2010	Conference abstract. Unclear setting and delivery of care. We tried to contact authors but received no reply
Perri 1987	Participants not recruited in context of a healthcare setting. No standard-care arm
Resnicow 2015	3 arms, compares step in intensity and frequency of intervention, regardless of deliverer
Richman 1996	Not a randomised trial (controlled before-after study)
Robson 2016	Descriptive study, and no weight outcomes
Ruotsalainen 2015	No usual care delivery, only face book- delivered intervention with or without self-monitoring
Ryan 2010	Intervention does not target the healthcare professionals or the organisation of care
Schriefer 2009	Did not report weight loss or weight change at end of study
Simkin-Silverman 1997	No objective outcome measures, i.e. it did not report weight or weight change at the end of study
Stettler 2015	Preventing weight gain; not about promoting weight reduction
Sullivan 2011	Partcipants not recruited in a healthcare setting. Intervention not delivered in a healthcare setting
Tang 2012	No weight measure at end of study
Trief 2014	No usual care. Life style programme delivered to a participant or a group of participants
Vallabhan 2015	Mainly about acceptance of using motivational interviewing methods in obesity treatment. No weight outcomes
Vinicor 1987	Not all of the participants were overweight or obese (Table 1, pg 350)
Willaing 2004	Not all of the participants were overweight or obese

(*Continued*)

Yardley 2014	A feasibility trial of a web-based weight management intervention in primary care, comparing different levels of nurse support

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

Brown 2015

Trial name or title	Training and coaching primary care teams for obesity and lifestyle management decreases the prevalence of metabolic syndrome in their patients
Methods	Objectives: To assess the impact of this intervention on lifestyle related practices by PCPs and patient health indicators Methods: randomised study
Participants	Patients with regular follow-up in 10 FMGs were recruited.
Interventions	5 randomly-selected FMGs received a 2-day preceptor ship, web tools, monthly webcasts, and on-site coaching
Outcomes	Participants were evaluated at baseline and at 18 months and their charts were audited. Preliminary data (but no weight data reported): 439 participants (66.1% women, 57.5 ±14.4 years, 29.4±5.8 kg/m^2). Preliminary data show no change in the frequency of lifestyle counselling reported in charts but assessment of readiness for change was significantly higher at 18 months in the intervention FMGs (17.8% versus 8.2%; P < 0.005). No change of participants' BMI was noted, but waist circumference of control group increased significantly and stayed stable in the intervention group (0.3±5.5 versus 2.3±6.7 cm; P < 0.005). Furthermore, the prevalence of metabolic syndrome decreased in the intervention group (from 40% to 35%, P < 0.03) but was unchanged in the control group
Starting date	November 2009 (planned end date June 2017)
Contact information	Correspondence: marie-france.langlois@usherbrooke.ca
Notes	Preliminary data only. Ongoing study. No results for weight or weight change yet reported

Campbell-Scherer 2014

Trial name or title	Implementation and evaluation of the 5As framework of obesity management in primary care: design of the 5As Team (5AsT) randomised control trial
Methods	Study design: theoretically informed, pragmatic randomised controlled trial with mixed methods evaluation Description: Clinic-based multidisciplinary teams (RN/NP, mental health, dietitians) will be randomised to control or the 5AsT intervention group Evaluation will be informed by the RE-AIM framework
Participants	Clinic-based multidisciplinary teams (RN/NP, mental health, dietitians)

Campbell-Scherer 2014 (*Continued*)

Interventions	Bi-weekly learning collaborative sessions supported by internal and external practice facilitation. The learning collaborative content addresses provider-identified barriers to effective obesity management in primary care. Evidence-based shared decision-making tools will be co-developed and iteratively tested by practitioners
Outcomes	The primary outcome measure, to which participants are blinded, is number of weight management visits/ full-time equivalent position. Participant-level outcomes will also be assessed, through a longitudinal cohort study of patients from randomised practices Participant outcomes include clinical (e.g. BMI, blood pressure), health-related quality of life (SF-12, EQ5D) , and satisfaction with care. Qualitative data collected from providers and participants will be evaluated using thematic analysis to understand the context, implementation and effectiveness of the 5AsT programme
Starting date	Study Start Date: September 2013. Estimated Study Completion Date: December 2016
Contact information	Arya Sharma, University of Alberta
Notes	Ongoing study. No results for weight or weight change yet reported

DRKS00009241

Trial name or title	Die Fünf-A-Beratung zur Behandlung adipöser Patienten in der hausärztlichen Versorgung: Eine cluster-randomisierte kontrollierte Studie (INTERACT) [The Five-A-Counseling for the Treatment of Obese Patients in Home Care: A cluster-randomized controlled trial (INTERACT)]
Methods	The aim of this study is to examine the effectiveness of an online training programme (based on the 5As) for general practitioners, with the goal of improving weight counselling for severely overweight patients
Participants	20 general practitioners will be recruited and randomly assigned to an intervention group (access to the online learning programme) or control group (usual care). 134 participants will be recruited in total
Interventions	5A Adipositas Management training programme to optimise weight counselling in the home care of people with obesity. Includes guidance, assessment, advice, tailored goals, and support, adapted for this study as a German-language 90-minute online tutorial for physicians
Outcomes	Participant outcomes: characteristics of the physician-patient interaction, on the satisfaction of the participant, on the course of weight development and self-stigma, as well as on their own changeability for weight management (baseline, 6 and 12 months) GP outcomes: counselling, knowledge of obesity and satisfaction with their own knowledge and stigma (baseline and 12 months)
Starting date	2015; End date: 2017
Contact information	Franziska Welzel, Dipl.-Psych Leipzig University, Germany
Notes	

ISRCTN46869894

Trial name or title	A pilot study to test the delivery of midwife training sessions on obesity and weight management in pregnancy to support clinical practice (The GLOWING study)
Methods	Study design: Cluster-randomised trial Description: "The midwives in the NHS Trusts randomly allocated to one of two groups. Those in the first group continue with the normal practice. Those in the second group receive a one day training programme, and information resources to support their routine clinical practice. Midwives in all four NHS Trusts are asked to complete questionnaires about their routine practice before the programme is delivered, and again at 3 and 6 months after training. Midwives who have received the training are also invited to take part in a focus group to share their experiences. Pregnant women are asked to complete a questionnaire about their lifestyle and about the information they have received from their midwives before the programme is delivered. After the training, pregnant women are asked to repeat the questionnaire and have their weight measured in their third trimester (39-40 weeks), and again at 3, 6, 9, and 12 months after they have had the baby. Women are also invited to have an interview to discuss the information they have received from their midwife, and their diet and physical activity behaviours in their third trimester of pregnancy and at 6 months after giving birth."
Participants	Midwives at participating hospitals, and obese pregnant women over the age of 18
Interventions	The intervention uses Social Cognitive Theory, and is an intensive 1-day training programme for midwives on weight communication and weight management in pregnancy, and the provision of information resources to support midwives' clinical practice. Control sites will receive no intervention or resources (usual practice)
Outcomes	Weight and questionnaire data on lifestyle and about information received from the midwifes
Starting date	September 2015 (to September 2017)
Contact information	Dr Nicola Heslehurst: nicola.heslehurst@ncl.ac.uk
Notes	Ongoing study. No results for weight or weight change yet reported

NCT01040975

Trial name or title	Teen CHAT: Improving physician communication with adolescents about healthy weight
Methods	Study design: Aim: "The purpose of this study is to teach primary care physicians effective ways to counsel overweight and obese adolescent patients to attain a healthy weight. Fifty physicians and up to 660 adolescent patients from Duke University Health System Primary Care Clinics will take part in this study." Data collection: "Data will be collected by trained data technicians, in-person and over the phone. Data is collected on laptop computers and then downloaded into password protected electronic files on a secure network server. All participants (adolescent patients and physicians) will be assigned a code number that is the sole identifier on all study data forms. Prior to and after coding, digital files will be stored in password protected directories to which only the data technicians and project manager have access. The web-based intervention will be password protected."
Participants	Participants will be identified by research study staff and asked if they would be willing to have their clinic visit audio-recorded for research purposes

NCT01040975 (*Continued*)

Interventions	"There are three phases of data collection. First, baseline encounters (N = 200, 4 per physician) are audio recorded. Then, half of the physicians will be randomised to receive a tailored web-based intervention containing information about evidence-based techniques (i.e. Motivational Interviewing) to help adolescents attain a healthy weight. A new set of 200 encounters (4 per physician) will be audio recorded. Then, all physicians will receive a Summary Report that outlines the adolescent's high risk behaviours that contribute to weight (sweetened beverages, fast food, breakfast, physical activity, screen time, and sleep) and a new set of 200 encounters will be audio recorded."
Outcomes	Primary outcome measures: Physician communication Secondary outcome measures: Assess whether summary report increases whether physicians address 6 health risk behaviours Adolescent nutrition, physical activity, and BMI z-score Examine whether participants whose physician was in the motivational interviewing education arm improved their nutrition, physical activity, and BMI z-score 3 months post-visit more than participants whose MD was in the control arm
Starting date	September 2009; End date: February 2014
Contact information	Kathryn I Pollak, PhD, Duke University
Notes	Ongoing study. No results for weight or weight change yet reported

NCT01827800

Trial name or title	New media obesity treatment in community health centres
Methods	"This purpose of this trial is to determine whether a 12-month eHealth behavioral intervention that includes interactive self-monitoring and feedback, tailored skills training materials, telephone counselling calls, and PCP counselling will produce greater weight change at 12 months than a standard primary care control"
Participants	Adult obese patients 21 years and older. • At least 1 visit in the previous 12 months to an adult medicine, internal medicine, or family practice provider at a participating community health centre • BMI between 30.0 - 45.0 kg/m^2 and weight $\leq$ 320 pounds • Diagnosis of hypertension or diabetes
Interventions	Behavioural: eHealth weight loss intervention. "This trial involves a multi-level, systems-change weight loss intervention. At the provider level, we make it easier for PCPs to deliver weight loss counselling by embedding patient progress data and counselling recommendations in the electronic health record. At the patient level, we provide engaging self-monitoring interfaces, immediate tailored feedback, skills training, and evidence-based lifestyle counselling from trusted care providers."
Outcomes	Primary outcomes: • Weight change Secondary outcomes: • The achievement and maintenance of > 5% weight loss • Diet • Cardiometabolic risk markers

NCT01827800 (*Continued*)

	• Global Framingham risk score (a validated scoring system used to determine an individual's chances of developing cardiovascular disease). We will calculate this score at baseline and 12 months. • An evaluation of the intervention's impact and dissemination potential using the Reach Effectiveness Adoption Implementation Maintenance (RE-AIM) framework • Physical activity - will be measured at baseline and 12 months using the GPAQ (the Global Physical Activity Questionnaire developed by the World Health Organization).
Starting date	Study Start Date: June 2013. Study end date: October 2016
Contact information	
Notes	

Thomas 2015

Trial name or title	The effect of nutritional and psychotherapeutic video-telecommunications on weight loss for morbidly obese patients post-bariatric (sleeve gastrectomy) surgery
Methods	www.soard.org/article/S1550-7289(15)00451-7/abstract
Participants	P: morbidly obese participants post-bariatric (sleeve gastrectomy) surgery
Interventions	I: Video-telecommunication follow-up C: Current standard of care of face-to-face nutrition/psychotherapy follow-up
Outcomes	BMI
Starting date	
Contact information	
Notes	Abstract only. Not enough information to determine whether the study is eligible or not

BMI: body mass index;
CDS: clinical decision support
FMG: family medicine group;
NHS: National Health Service;
PCP: primary care physician;
RN/NP: registered nurse/nurse practitioner

DATA AND ANALYSES

Comparison 1. Interventions targeting health professionals - Education versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body weight (kg) at longest follow-up	3	705	Mean Difference (Random, 95% CI)	-1.24 [-2.84, 0.37]
1.1 Change in body weight between baseline and end of study	2	174	Mean Difference (Random, 95% CI)	-1.77 [-2.80, -0.74]
1.2 Body weight at end of study	1	531	Mean Difference (Random, 95% CI)	1.3 [-1.86, 4.46]
2 Weight (kg) at 12 months follow-up (or closest time point available)	3	705	Mean Difference (Random, 95% CI)	-1.29 [-2.77, 0.20]
2.1 Change in weight between baseline and end of study	2	174	Mean Difference (Random, 95% CI)	-1.77 [-2.80, -0.74]
2.2 Weight at end of study	1	531	Mean Difference (Random, 95% CI)	1.0 [-1.96, 3.96]

Comparison 2. Interventions targeting health professionals - Tailoring versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body weight (kg) at the end of study	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected

Comparison 3. Interventions targeting health professionals - Reminders versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body weight (kg) at longest follow-up	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
1.1 Amount overweight at end of study (men)	1		Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Amount overweight at end of study (women)	1		Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]

Comparison 4. Interventions targeting health professionals - Clinical decision support tools versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 BMI z-score at 12 months follow-up (children)	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Comparison 5. Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians) versus standard care (doctors)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body weight (kg) at 12 months follow-up (or closest time point available)	1		Mean Difference (Random, 95% CI)	Totals not selected
1.1 Doctor/dietitian versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Dietitian versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
2 Body weight (kg) at longest follow-up	1		Mean Difference (Random, 95% CI)	Totals not selected
2.1 Doctor/dietitian versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Dietitian versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]

Comparison 6. Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 BMI z-score at 15 months follow-up	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Total body fat (%) at 15 months	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Waist circumference (cm) at 15 months	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Health-related quality of life at 15 months	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
5 Body dissatisfaction at 15 months	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Comparison 7. Interventions targeting the organisation of care - Changes in skill mix (organisational restructuring) versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Change in BMI at 12 months compared to baseline	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Comparison 8. Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone) versus standard care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body weight (kg) at longest follow-up	1		Mean Difference (Random, 95% CI)	Totals not selected
1.1 Mail intervention versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Telephone intervention versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
2 Body weight (kg) at 12 months follow-up (or closest time point available)	1		Mean Difference (Random, 95% CI)	Totals not selected
2.1 Mail intervention versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Telephone intervention versus standard care	1		Mean Difference (Random, 95% CI)	0.0 [0.0, 0.0]

Comparison 9. Interventions targeting the organisation of care - Changes in the setting of service delivery (nurse at primary care clinic) versus standard care (specialist clinic)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Change in BMI z-score at 12 months compared to baseline	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

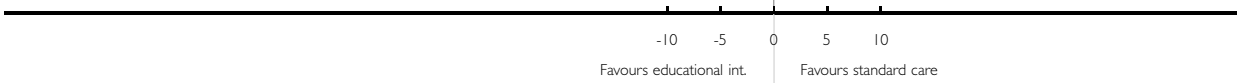
Analysis 1.1. Comparison 1 Interventions targeting health professionals - Education versus standard care, Outcome 1 Body weight (kg) at longest follow-up.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 1 Interventions targeting health professionals – Education versus standard care

Outcome: 1 Body weight (kg) at longest follow-up

Study or subgroup	Educational interven-tion N	Standard care N	Mean Difference (SE)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Change in body weight between baseline and end of study						
Cohen 1991	15	15	-2.18 (1.3177)		25.6 %	-2.18 [-4.76, 0.40]
Martin 2006	71	73	-1.69 (0.57292)		55.2 %	-1.69 [-2.81, -0.57]
Subtotal (95% CI)	**86**	**88**			**80.7 %**	**-1.77 [-2.80, -0.74]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.12, df = 1 (P = 0.73); I^2 =0.0%						
Test for overall effect: Z = 3.36 (P = 0.00077)						
2 Body weight at end of study						
Moore 2003	256	275	1.3 (1.61)		19.3 %	1.30 [-1.86, 4.46]
Subtotal (95% CI)	**256**	**275**			**19.3 %**	**1.30 [-1.86, 4.46]**
Heterogeneity: not applicable						
Test for overall effect: Z = 0.81 (P = 0.42)						
Total (95% CI)	**342**	**363**			**100.0 %**	**-1.24 [-2.84, 0.37]**
Heterogeneity: Tau^2 = 0.89; Chi^2 = 3.40, df = 2 (P = 0.18); I^2 =41%						
Test for overall effect: Z = 1.51 (P = 0.13)						
Test for subgroup differences: Chi^2 = 3.28, df = 1 (P = 0.07), I^2 =70%						



Analysis 1.2. Comparison 1 Interventions targeting health professionals - Education versus standard care, Outcome 2 Weight (kg) at 12 months follow-up (or closest time point available).

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 1 Interventions targeting health professionals – Education versus standard care

Outcome: 2 Weight (kg) at 12 months follow-up (or closest time point available)

Study or subgroup	Experimental N	Control N	Mean Difference (SE)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Change in weight between baseline and end of study						
Cohen 1991	15	15	-2.18 (1.3177)		23.7 %	-2.18 [-4.76, 0.40]
Martin 2006	71	73	-1.69 (0.57292)		56.9 %	-1.69 [-2.81, -0.57]
Subtotal (95% CI)	**86**	**88**			**80.7 %**	**-1.77 [-2.80, -0.74]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.12, df = 1 (P = 0.73); I^2 =0.0%						
Test for overall effect: Z = 3.36 (P = 0.00077)						
2 Weight at end of study						
Moore 2003	256	275	1 (1.51)		19.3 %	1.00 [-1.96, 3.96]
Subtotal (95% CI)	**256**	**275**			**19.3 %**	**1.00 [-1.96, 3.96]**
Heterogeneity: not applicable						
Test for overall effect: Z = 0.66 (P = 0.51)						
Total (95% CI)	**342**	**363**			**100.0 %**	**-1.29 [-2.77, 0.20]**
Heterogeneity: Tau^2 = 0.68; Chi^2 = 3.11, df = 2 (P = 0.21); I^2 =36%						
Test for overall effect: Z = 1.70 (P = 0.089)						
Test for subgroup differences: Chi^2 = 3.00, df = 1 (P = 0.08), I^2 =67%						

Analysis 2.1. Comparison 2 Interventions targeting health professionals - Tailoring versus standard care, Outcome 1 Body weight (kg) at the end of study.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 2 Interventions targeting health professionals – Tailoring versus standard care

Outcome: 1 Body weight (kg) at the end of study

Study or subgroup	Tailoring N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Goodfellow 2016 (1)	5784	87.5 (1.2)	9769	85.3 (3.2)		2.20 [2.13, 2.27]

(1) Adjusted changes for weight: MD: 0.05 (-0.32 to 0.41), P = 0.81

Analysis 3.1. Comparison 3 Interventions targeting health professionals - Reminders versus standard care, Outcome 1 Body weight (kg) at longest follow-up.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 3 Interventions targeting health professionals – Reminders versus standard care

Outcome: 1 Body weight (kg) at longest follow-up

Study or subgroup	Reminders N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
1 Amount overweight at end of study (men)						
Rogers 1982	11	15.8 (6.6)	9	27 (13.2)		-11.20 [-20.66, -1.74]
2 Amount overweight at end of study (women)						
Rogers 1982	35	23.6 (14.7)	35	24.9 (10.8)		-1.30 [-7.34, 4.74]

Analysis 4.1. Comparison 4 Interventions targeting health professionals - Clinical decision support tools versus standard care, Outcome 1 BMI z-score at 12 months follow-up (children).

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 4 Interventions targeting health professionals – Clinical decision support tools versus standard care

Outcome: 1 BMI z-score at 12 months follow-up (children)

Study or subgroup	CDS tool N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
Taveras 2015	194	1.93 (0.39)	184	2.01 (0.33)		-0.08 [-0.15, -0.01]

Analysis 5.1. Comparison 5 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians) versus standard care (doctors), Outcome 1 Body weight (kg) at 12 months follow-up (or closest time point available).

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 5 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians) versus standard care (doctors)

Outcome: 1 Body weight (kg) at 12 months follow-up (or closest time point available)

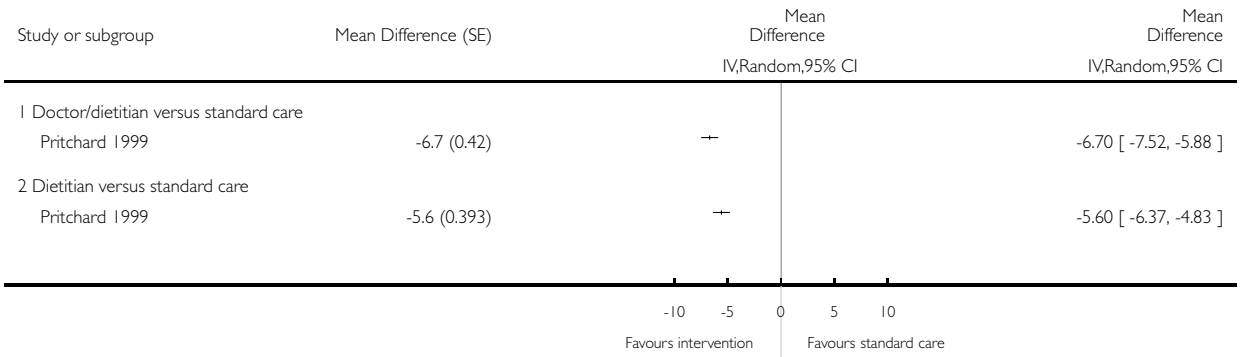
Study or subgroup	Favours Multidisci-plinary N	Favours Doctor N	Mean Difference (SE)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
1 Doctor/dietitian versus standard care					
Pritchard 1999	92	90	-6.7 (0.42)		-6.70 [-7.52, -5.88]
2 Dietitian versus standard care					
Pritchard 1999	88	90	-5.6 (0.393)		-5.60 [-6.37, -4.83]

Analysis 5.2. Comparison 5 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians) versus standard care (doctors), Outcome 2 Body weight (kg) at longest follow-up.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 5 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (doctor/dietitians) versus standard care (doctors)

Outcome: 2 Body weight (kg) at longest follow-up

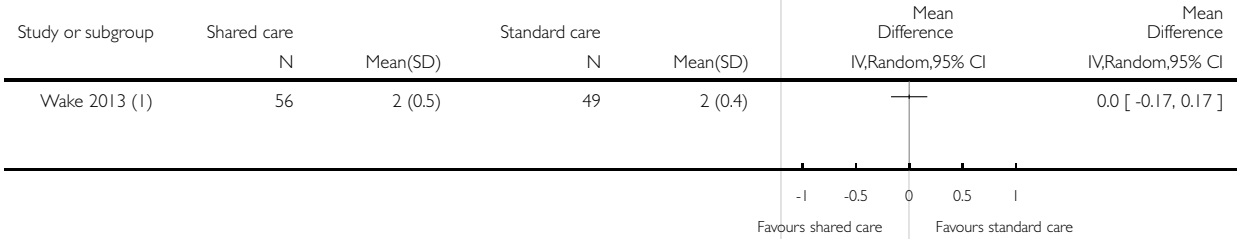


Analysis 6.1. Comparison 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care, Outcome 1 BMI z-score at 15 months follow-up.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome: 1 BMI z-score at 15 months follow-up



(1) Adjusted MD -0.05 (95% CI -0.14 to 0.03)

Analysis 6.2. Comparison 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care, Outcome 2 Total body fat (%) at 15 months.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome: 2 Total body fat (%) at 15 months

Study or subgroup	Shared care N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
Wake 2013	56	32.9 (7.2)	48	34.2 (6.2)		-1.30 [-3.88, 1.28]

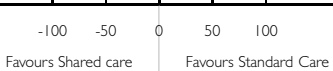
Analysis 6.3. Comparison 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care, Outcome 3 Waist circumference (cm) at 15 months.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome: 3 Waist circumference (cm) at 15 months

Study or subgroup	Shared care N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
Wake 2013	56	75.6 (13)	49	77.9 (13.8)		-2.30 [-7.45, 2.85]



Analysis 6.4. Comparison 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care, Outcome 4 Health-related quality of life at 15 months.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome: 4 Health-related quality of life at 15 months

Study or subgroup	Shared care		Standard care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
Wake 2013	51	73 (15)	45	75.2 (14.5)		-2.20 [-8.11, 3.71]

Analysis 6.5. Comparison 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care, Outcome 5 Body dissatisfaction at 15 months.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 6 Interventions targeting the organisation of care - Introduction of multidisciplinary teams (shared care) versus standard care

Outcome: 5 Body dissatisfaction at 15 months

Study or subgroup	Shared care		Standard care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
Wake 2013	51	1.3 (1.2)	45	1.6 (1.2)		-0.30 [-0.78, 0.18]

Analysis 7.1. Comparison 7 Interventions targeting the organisation of care - Changes in skill mix (organisational restructuring) versus standard care, Outcome 1 Change in BMI at 12 months compared to baseline.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 7 Interventions targeting the organisation of care – Changes in skill mix (organisational restructuring) versus standard care

Outcome: 1 Change in BMI at 12 months compared to baseline

Study or subgroup	Restructuring N	Mean(SD)	Standard care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
Taveras 2011	269	0.31 (0.09)	204	0.49 (0.1)		-0.18 [-0.20, -0.16]

Analysis 8.1. Comparison 8 Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone) versus standard care, Outcome 1 Body weight (kg) at longest follow-up.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 8 Interventions targeting the organisation of care – Changes in the setting of service delivery (mail or telephone) versus standard care

Outcome: 1 Body weight (kg) at longest follow-up

Study or subgroup	Organisational intervent. N	Standard care N	Mean Difference (SE)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
1 Mail intervention versus standard care					
Sherwood 2006 (1)	600	600	-0.14 (0.3906)		-0.14 [-0.91, 0.63]
2 Telephone intervention versus standard care					
Sherwood 2006 (2)	601	600	-0.34 (0.3906)		-0.34 [-1.11, 0.43]

(1) -0.14 [-0.91, 0.63]

(2) -0.34 [-1.11, 0.43]

Analysis 8.2. Comparison 8 Interventions targeting the organisation of care - Changes in the setting of service delivery (mail or telephone) versus standard care, Outcome 2 Body weight (kg) at 12 months follow-up (or closest time point available).

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 8 Interventions targeting the organisation of care – Changes in the setting of service delivery (mail or telephone) versus standard care

Outcome: 2 Body weight (kg) at 12 months follow-up (or closest time point available)

Study or subgroup	Favours intervention N	Control N	Mean Difference (SE)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
1 Mail intervention versus standard care					
Sherwood 2006	600	600	-0.36 (0.42)		-0.36 [-1.18, 0.46]
2 Telephone intervention versus standard care					
Sherwood 2006	601	600	-0.44 (0.42)		-0.44 [-1.26, 0.38]

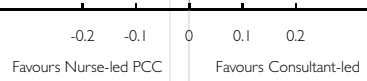
Analysis 9.1. Comparison 9 Interventions targeting the organisation of care - Changes in the setting of service delivery (nurse at primary care clinic) versus standard care (specialist clinic), Outcome 1 Change in BMI z-score at 12 months compared to baseline.

Review: Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in children and adults with overweight or obesity

Comparison: 9 Interventions targeting the organisation of care – Changes in the setting of service delivery (nurse at primary care clinic) versus standard care (specialist clinic)

Outcome: 1 Change in BMI z-score at 12 months compared to baseline

Study or subgroup	Nurse-led primary care N	Mean(SD)	Consultant-led care N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
Banks 2012	29	-0.17 (0.25)	23	-0.15 (0.25)		-0.02 [-0.16, 0.12]



ADDITIONAL TABLES

Table 1. Professional interventions versus standard care

Study ID	Comparisons	Main process effect	Main participant outcome
Baer 2016	I: enhanced EHR with 4 new features for improved obesity management C: EHR - without the new obesity management features Note: full results not yet reported	From the pre-intervention period to Phase 2, *Diagnosis of overweight or obese on the problem list* I: increased from 36% to 71% C: decreased from 16% to 8% (P < 0.001). Among participants with BMI > 27 kg/m^2, similar proportion of participants who had a nutrition counselling visit or were prescribed weight loss medication in both groups Providers' attitudes about management of overweight and obese people: Increases in confidence in counselling patients about weight: I: Pre: 68.1%, Post: 81.6%; C Pre: 72.2%; Post: 73.0% (Pre: N = 84; Post: N = 86; 49% responded) Would like more help creating weight loss plans for their patients: I: 77.6%; C 89.2% Providers in the intervention group, 28.6% reported that the recommendations about management of overweight and obesity were useful, 14.3% reported that the new features in the EHR improved the quality of care 45.7% reported that the new features were very cumbersome to use	Eligible patients with BMI ≥ 25 kg/m^2 who had visits during Phase 2: I: N = 14,779; C: N = 20,886 Mean weight change at 6 months: I: -0.25 lbs (-0.11 kg); C: -0.14 lbs (-0.06 kg) Mean weight change at 12 months: I: -0.94 lbs (-0.43 kg); C: -0.73 lbs (-0.33 kg), P = 0.47 Mean % weight change over 12 months: I: -0.38%; C: -0.37% (P = 0.89 for effect of the intervention over time)
Cohen 1991	I: 1 educational teaching session C: standard care	Not done, except for recording how many participants the 18 general practitioners (I: N = 10; C: N = 8) recruited each one	See Table 2[a]. *Weight change from baseline (SD) (kg)* *0 to 6 months* I: (N = 15) -1.8 (3.4) C: (N = 15) 0.56 (2.5)

Table 1. Professional interventions versus standard care (*Continued*)

			I-C = -2.36 (favours I) *6 - 12 months* I: (N = 15) 0.94 (3.3) C: (N = 15) 0.73 (2.2) I-C = 0.21 (favours C) *0 - 12 months* I: (N = 15) -0.88 (4.0) C: (N = 15) 1.3 (3.0) I-C = -2.18 (favours I)
Goodfellow 2016	I: tailoring, training, and educational resources (and identification of an obesity lead) C: standard care	Primary outcome Weight management: I: 13.2% (5.9%) ; C: 15.1% (10.8%) ICC: 0.094, OR: 1.17 (95% CI 0.72 to 1.89), P = 0.53 I: N = 17,728; 12 practices; C: N = 32,079; 16 practices Secondary outcomes BMI or waist circumference measured: I: 39.6% (10.6%); C: 42.7% (10.3%), ICC: 0.031, OR: 1.15 (95% CI 0.89 to 1.48), P = 0.28 I: N = 12,171; C: N = 20,955 Referral to external weight loss services: I: 3.7% (3.4%); C: 5.1% (3.4%), ICC: 0.026, OR: 1.45 (95% CI 0.81 to 2.63), P = 0.21 Internal weight management: I: 8.7% (6.7%); C: 9.6% (9.1%) , ICC: 0.123, OR: 1.09 (95% CI 0.55 to 2.15), P = 0.81 Lifestyle assessment I: 23.9% (6.1%); C: 23.1% (7.6%) , ICC: 0.025, OR: 0.98 (95% CI 0.76 to 1.26), P = 0.88 Weight loss of at least 1 kg I: 41.7% (4.1%); C: 42.2% (4.1%) , ICC: 0.003, OR: 0.98 (95% CI 0.87 to 1.09), P = 0.67 An OR > 1 favours the intervention group	Weight loss of at least 1 kg I: 41.7% (4.1%); C: 42.2 % (4.1%) , ICC: 0.003, OR: 0.98 (95% CI 0.87 to 1.09), P = 0.67 I: N = 5784; C: N = 9769 An OR < 1 favours the intervention group BMI (kg/m^2) I: 30.5 (1.1); C: 30.4 (0.9); ICC: 0.000; OR: 0.08 (95% CI −0.12 to 0.28), P = 0.43 I: N = 1243; C: N = 2440 Weight (kg) I: 87.5 (1.2); C: 85.3 (3.2); ICC: 0.002; MD: 0.05 (95% CI −0.32 to 0.41), P = 0.81 I: N = 5784; C: N = 9769 A mean difference > 1 favours the intervention group.
Martin 2006	I: GP-targeted intervention: remote educational teaching session and interventions tailored to the character of the overweight and obese partic-	No post-intervention assessment of GP practice.	See Table 2[a] (Intention-to-treat analysis) and pg 1417/Col. 1/ Para 2. *Weight change from baseline (SD)*

Table 1. Professional interventions versus standard care (*Continued*)

	ipants by a multidisciplinary team delivered over 6 months C: standard care		*(kg)* *0 - 6 months* I: (N = 69) -1.44 (3.30) C: (N = 69) 0.25 (3.30) I-C: -1.69 (favours I)
Moore 2003	I: 3 90-minute educational sessions over 4 weeks targeting GPs and their teams C: standard care	Values are numbers responding "yes" at 12 months *Evidence that weight discussed in consultation* (N = 650) I: 186: C: 129 OR 2.0 (95% CI 1.3 to 3.2) P = 0.003 *Weight recorded* (N = 650) I: 197; C: 137 OR 2.0 (95% CI 1.3 to 3.3) P = 0.004 *Target weight recorded* (N = 643) I: 46; C: 9 OR 13.6 (95%CI 4.2 to 44.3) P < 0.001 *Dietary targets recorded* (N = 648) I: 48; C: 14 OR 4.5 (95% CI 1.2 to 16.7) P = 0.02 *Exercise targets recorded* (N = 648) I: 46; C: 25 OR 1.9 (95 % CI 0.7 to 5.0) P = 0.2	See Figure 2 and Table 2[a] *Difference in weight, I- C (SE)* *3 months* I: N = 331 C: N = 333 I-C: 0.6 (1.38) *12 months* I: N = 279 C: N = 286 I-C: 1.0 (1.51) (Favours C) *18 months* I: N = 256 C: N = 275 I-C: 1.3 (1.61) (Favours C) *Difference in BMI (kg/m^2): I- C (SE)* *3 months* I-C: -0.2 (0.52) (Favours I) *12 months* 0.0 (0.52) *18 months* I-C: 0.1 (0.55) (Favours C)
Rogers 1982	I: computerised reminders C: standard care	*Number of diets given or reviewed:* Reminders versus control: Year 1: 2 (4.8%) Year 2: 4 (9.1%) Done both years: 7 (13.5%) Not done: 24 (27.5%) P = 0.007 'for all obese patients combined for sex' (but not clear which of the above figures this is for) (No SD/SEs so not possible to calculate CIs)	See Table 5, pg 71[a] Follow-up: 147 participants classified as obese, 23 dropped out, but data collected for: *Mean kg. overweight:* *10 - 15 months* *Men*: I: (N = 15) 20.4 (7.5) C: (N = 11) 25.7 (12.6) I-C= -5.3, SE = 4.35 (favours I) *Women:* I: (N = 42) 23.4 (13.3) C: (N = 46) 24.8 (11.5) I-C = -1.4, SE = 2.76

Table 1. Professional interventions versus standard care (*Continued*)

			(favours I) at *22 - 24 months* *Men:* I: (N = 11) 15.8 (6.6) C: (N = 9) 27.0 (13.2) (favours I) *Women:* I: (N = 35) 23.6 (14.7) C: (N = 35) 24.9 (10.8) (favours I)
Taveras 2015	I: CDS tool + training in motivational interviewing C: usual care	*HEDIS performance measures for childhood obesity:* *BMI percentile documentation* *Preintervention:* I: 45 (28 to 62) C: 65 (46 to 80) *Postintervention(at 12 months):* I: 69 (52 to 88) C: 69 (51 to 83) Unadjusted OR: 2.28 (95% CI 1. 16 to 4.52) Adjusted OR: 2.28 (95%CI 1.15 to 4.53) (benefits CDS) Nutrition or physical activity counselling documentation: *Preintervention:* I: 0; C:0 (0 to 2) *Postintervention (at 12 months):* I: 45 (37 to 53); C: 0 (0 to 2) CDS arm 45% (P < .001) more documented counselling compared with usual care arm	BMI z-score at 12 months follow-up I: 1.93 (SD 0.30); C: 2.01 (SD 0. 33); MD: -0.08 (95% CI -0.16 to -0.00)

BMI: body mass index; C: control; CI: confidence interval; CDS clinical decision support; EHR: electronic health record; GP: general practitioner; HEDIS: the Healthcare Effectiveness Data Information Set; I: intervention; ICC: intraclass correlation coefficient; lbs: pounds; OR: odds ratio; SD: standard deviation; SE: standard error

[a]Locations of supporting text in published study indicated by (Page number/ Column number/ Paragraph number), e.g. (Pg 150/ Col 1/ Para 4)

Table 2. Organisational interventions versus standard care

Study ID	Comparisons	Main process effect	Main patient outcome
Banks 2012	I: Nurse-led primary care clinic (PCC) C: Consultant-led secondary care clinic (BHRC COCO)	Nearly half of those starting treatment withdrew (29/68, 43%) Withdrawals were higher in PCC (19/42 = 45%) compared with	Page e9, N from table 4[a] *BMI (kg/m^2) SDS at baseline:* I: 3.17 (0.57); 2.05 to 4.74, N = 29 C:2.86 (0.40); 2.15 to 3.60, N = 23

Table 2. Organisational interventions versus standard care (*Continued*)

		BRHC (10/26 = 38%) The overall did-not-attend rate (total did not- attend/total appointments offered) was 23%, which was similar in both arms (BRHC = 24%; PCC = 22%) **Note**: 30% of those who were invited to participate declined participation	*Change in BMI SDS (SD); 95% CI, relative to control at 12 months* I : -0.17 (0.26); -0.27 to -0.07 C: -0.15 (0.25); -0.26 to -0.05. Difference in means: -0.02 (2-sided 95% CI = -0.16 to 0.12) *Secondary outcomes:* *Mean satisfaction score* Consultations: I: 1.59 (0.77); N = 22; C: 2.03 (0.94), N = 16 Appointments: I: 1.65 (0.62), N = 22; C: 2.85 (0.89), N = 17 Access/convenience: I: 1.91 (0.76), n = 2; C: 2 2.84 (0.83), n = 17 Note: lower score indicate higher satisfaction (1 = excellent to 6 = very poor) *Mean quality of life score:* PedsQL scores rose in both arms over the 12 months: I: 10 points (95% CI 3 to 18 points), N = 23; C: 8 points (95% CI -2 to 18 points), N = 14 2-sample t-test P = 0.65
Pritchard 1999	I1: doctor/ dietitian I2: dietitian C: standard care	None measured	P. 314: sections on "Weight outcomes", "Blood pressure outcomes"; N from Table 2[a] I1: N = 92 I2: N = 88 C: N = 90 *Weight change relative to control* *12 months* I1-C: -6.7 (0.42) I2-C: -5.6 (0.39) I1 - I2: -1.1 (0.92) *Change in blood pressure relative to control (mmHg)* *12 months* I1-C: -12 (1.56) I2-C: -7 (1.56) I1 - I2: -5 (1.56) *Total cost per group:* I1-C: (N = 93) USD 8240.30 I2-C: (N = 89) USD 5715.06

Table 2. Organisational interventions versus standard care (*Continued*)

			C: (N = 91) USD 2103.53 *Additional cost per kg lost:* I1-C: (N = 93) USD 9.76 I2-C: (N = 89) USD 7.30
Sherwood 2006	I1: mail-delivered intervention I2: phone-delivered intervention C: standard care	Activation of treatment: I1: 88.0% (N = 528) I2: 69.2% (N = 416), P< 0.001 Number of sessions completed: I1: 2.3 (3.5) I2: 7.2 (3.7), P < 0.001 Completion of the whole programme: I1: 10.3% (N = 62) I2: 38.4% (N = 231)	See Table 2 and Table 5[a] *Weight change (kg), mean (SD):* *18 months* I1: (N = 600) -2.27 (5.9) I2: (N = 601) -2.35 (5.9) C: (N = 600) -1.91 (5.9) *24 months* I1: (N = 600) -0.73 (5.4) I2: (N = 601) -0.93 (5.4) C: (N = 600) -0.59 (5.4) I1-C: -0.14 I2-C: -0.34 (Favours I1, I2) *Total costs/participant :* I1: (N = 600) USD 50.45 I2: (N = 601) USD 127.39 C: (N = 600) USD 42.18 *Cost/weight loss of 1 kg*: I1: (N = 600) USD 72.08 I2: (N = 601) USD 132.70 C: (N = 600) USD 71.50
Taveras 2011	I: organisational restructuring (i.e. introducing the chronic care model/ skill mix change) C: usual care	None measured	*BMI (kg/m^2)* *At baseline:* I: 19.2 (0.2); C: 19.1 (0.1) *At 12 months:* I:19.5 (0.2); C: 19.6 (0.2); Difference unadjusted: -0.19 (95% CI -0.50 to 0.12); Difference adjusted:-0.21 (95% CI -0.50 to 0.07), P = 0.15
Wake 2013	I: shared care and software supporting shared care C: standard care	All children who remained in the study at follow-up (92%) had attended the tertiary appointment and their general practitioner for at least 1 consultation (mean 3.5 (SD 2.5, range 1 - 11)). The recommended number of visits was 5 to 12	Page 9, Table 3, outcomes at 15 months[a] *BMI, mean (SD):* I: 25.2 (3.8), N = 56; C: 23.6 (4.56) , N = 49; Difference unadjusted: -0.4 (95% CI −2.0 to 1.2), P = 0.6; Difference adjusted: -0.1 (95% CI −0.7 to 0.5), P = 0.7 *BMI z-score, mean (SD):* I: 2.0 (0.5); C; 2.0 (0.4), Difference unadjusted: -0.01 (95%

Table 2. Organisational interventions versus standard care (*Continued*)

			CI −0.20 to 0.18), P = 0.9; Difference adjusted: -0.05 (9%% CI −0.14 to 0.03), P = 0.2 *Total body fat (%): :* I: 32.9 (7.2); C:34.2 (6.2) Difference unadjusted: -1.3 (-3.9 to 1.4), P= 0.3 Difference adjusted: −0.9 (95% CI −2.6 to 0.8), P = 0.3 Waist circumference (cm): I: 75.6 (13.0): C: 77.9 (13.6) Difference unadjusted: -2.3 (95% CI -7.5 to 2.8), P = 0.4: Difference adjusted: -1.7 (95% CI -4.1 to 0.6), P = 0.1 Health-related Quality of Life (health status) I: 73.0 (15.0); C: 75.2 (14.5); Difference unadjusted: -2.2 (95% CI -8.2 to 3.9), P = 0.5 Difference adjusted: -1.9 (95% CI -7.8 to 4.0), P = 0.5 Physical appearance/self-worth % positive I: 58.7; C: 57.0 Difference unadjusted: 1.1 (95% CI 0.6 to 1.8), P = 0.8 Difference adjusted: 1.0 (95% CI 0. 8 to 1.7), P = 0.9 Body dissatisfaction I: 1.3 (1.2); C: 1.6 (1.2) Difference unadjusted: -0.4 (95% CI -0.8 to 0.1), P = 0.1 Difference adjusted: -0.3 (95% CI -0.8 to 0.2), P = 0.3

BMI: body mass index; BRHC: Bristol Royal Hospital for Children; COCO: Care of childhood obesity; cm: centimeter; CI: confidence interval; C: control; I: intervention; Kg: kilogram; PedsQL: Pediatric Qulity of Life Inventory; PCC: primary care clinic; SDS: standard deviation score

[a] Locations of supporting text in published study indicated by (Page number/ Column number/ Paragraph number), e.g. (Pg 150/ Col 1/ Para 4)

Table 3. Interventions targeting healthcare professionals for the management of children and adults with overweight or obesity versus standard care

Overview of professional interventions versus standard care for the management of children and adults with overweight or obesity				
Patient or population: General practitioners, nurses, dietitians and exercise specialists caring for adults or children with overweight or obesity **Settings:** Primary care practices in the USA and in the UK **Intervention:** Interventions targeting the healthcare professional (i.e. education, reminders, decision support tools) **Comparison:** Standard care				
Type of Interventions[a]	**Impact**	**Outcomes and certainty of the evidence (GRADE)**[b] **(№ of studies, practices, participants)**		
		Body weight/BMI z score	**Adverse effects**	**Costs**
Education	Brief educational interventions targeting GPs may slightly reduce (body) weight of their adult patients with overweight or obesity	⊕⊕⊖⊖ LOW (3 studies, 47 practices, 1017 adults with overweight or obesity)	No data available for this outcome	No data available for this outcome
Tailoring (plus visual reminders and patient materials)	Tailoring interventions (using determinants of practice), and aiming to improve GPs compliance with obesity guidelines, probably leads to little or no difference in weight loss	⊕⊕⊕⊖ MODERATE (1 study, 30 practices; 15,553 adults with overweight or obesity)	No data available for this outcome	No data available for this outcome
Reminders (printed)	It is uncertain if providing doctors with reminders results in a greater weight reduction than standard care	⊕⊖⊖⊖ VERY LOW (1 study, 1 hospital; 90 adults with overweight or obesity)	No data available for this outcome	No data available for this outcome
CDS tool (plus training in Motivational Interviewing)	Providing clinicians with a CDS tool to assist with obesity management at the point-of-care, leads to little or no difference in BMI z-score of children[c]	⊕⊕⊕⊖ MODERATE (1 study, 26 primary care/paediatric clinics; 378 children with obesity)	No data available for this outcome	No data available for this outcome

Table 3. Interventions targeting healthcare professionals for the management of children and adults with overweight or obesity versus standard care (*Continued*)

CDS tool	Providing clinicians with a CDS tool to assist with obesity management at the point-of-care, leads to little or no difference in weight loss in adults[d]	⊕⊕⊖⊖ LOW (1 study, 12 primary care clinics; 35,665 adults with overweight or obesity)	No data available for this outcome	No data available for this outcome

BMI: body mass index; **CDS**: clinical decision support tool; **GP**: general practitioner;
*BMI z-score or percentile represents a measure of weight, adjusted for height, sex and age, relative to a smoothed reference distribution, and not simply a measure of height and weight of a child
**BMI, or body mass index, is a person's weight in kilograms divided by the square root of the height in metres

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

[a] The included studies evaluated different interventions targeting the healthcare professional.
[b] See individual 'Summary of findings' tables (by intervention type) for specific impact and rationale for downgrading evidence.
[c] BMI z-score increased in both arms, but the increase was slightly smaller in the intervention arm.
[d] Full results remain to be published.

Table 4. Interventions targeting the organisation of care for the management of children and adults with overweight or obesity versus standard care

Overview of organisational interventions versus standard care for the management of adults or children with overweight or obesity

Patient or population: General practitioners, consultants, nurses, dietitians and exercise specialists caring for adults or children with overweight or obesity
Settings: Primary care and family practices in Australia, UK, and the USA
Intervention: Interventions targeting the organisation of care
Comparison: Standard care provision

Type of Interventions[a]	**Impact**	**Outcomes and certainty of the evidence (GRADE)**[b] **(№ of studies, practices (practitioners), participants)**		
		Body weight/BMI z score	**Adverse effects**	**Costs**
Introduction of multidisciplinary teams- doctor-dietitian team or	Overweight or obese adults may lose more weight if the care	⊕⊕⊖⊖ LOW (1 study; 1 GP prac-	No data available for this outcome	⊕⊕⊖⊖ LOW

Table 4. Interventions targeting the organisation of care for the management of children and adults with overweight or obesity versus standard care (*Continued*)

dietitian-only delivering care	is provided by a doctor-dietitian team or by a dietitian alone as compared to care delivered by a doctor	tice; 1 dietitian and unclear number of GPs; 270 adults with overweight or obesity)		
Introduction of multidisciplinary teams- shared care (primary care physicians, dietitians and paediatricians deliver care)	Shared care, i.e. general practices and a tertiary weight management clinic providing care to obese children probably leads to little or no difference in the BMI z-score (and adverse effects)	⊕⊕⊖⊖ LOW (1 study; 22 family practices (35 GPs), 1 tertiary weight management service; primary care physicians; 2 dietitians; 3 paediatricians; 105 obese children)	⊕⊕⊖⊖ LOW	No data available for this outcome
Changes in skill mix - reorganisation of the delivery of primary care (i.e. introducing the chronic care model)	Introducing the chronic care model leads to a slightly smaller *increase* in BMI of children who received care at intervention clinics, compared to children receiving standard care	⊕⊕⊕⊖ MODERATE (1 study; 10 primary care clinics; 475 children with obesity)	No data available for this outcome	No data available for this outcome
Changes in the setting of service delivery - Method of service delivery (e.g. mail or telephone versus standard care)	Mail and phone interventions probably lead to little or no difference in weight loss in obese adults as compared to standard care. Phone counselling was less cost-effective than mail counselling or standard care,	⊕⊕⊕⊖ MODERATE (1 study; 4 primary care clinics; 1801 adults with overweight or obesity)	No data available for this outcome	⊕⊕⊕⊖ MODERATE
Changes in the setting of service delivery - Nurse at primary care clinic versus consultant at children's specialist obesity clinic	It is uncertain if care delivered by a nurse at a primary care clinic lead to any difference in BMI z-score in obese children, compared to standard care delivered by a consultant at a specialised children's obesity clinic Quality-of- life ratings were similar in both groups, and the satisfaction was slightly	⊕⊖⊖⊖ VERY LOW (1 study; 2 primary care clinics and one specialist hospital clinic; 2 nurses and unclear no.of consultants; 52 children with obesity)	No data available for this outcome	No data available for this outcome

Table 4. Interventions targeting the organisation of care for the management of children and adults with overweight or obesity versus standard care (*Continued*)

	higher in the intervention group			

BMI: body mass index; **GP:** general practitioner;
* BMI z-score or percentile, represents a measure of weight, adjusted for height, sex and age, relative to a smoothed reference distribution, and not simply a measure of height and weight of a child
**BMI, or body mass index, is a person's weight in kilograms divided by the square root of the height in metres
Note: We did not attempt to pool the results of the organisational interventions or even report them in the same forest plot (without pooling), as they reported different effect measures, and using the standardised mean difference would have made interpretation of the results more difficult

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

[a] The included studies evaluated different organisational interventions.
[b] See individual summary of findings tables (per intervention type) for specific impact and rationale for downgrading evidence.

APPENDICES

Appendix 1. EPOC Taxonomy

INTERVENTIONS
EPOC reviews include professional, financial, organisational or regulatory interventions.
State all interventions for each comparison/study group. (The categories are not mutually exclusive.)
Type of intervention
1) *Professional interventions*
a) Distribution of educational materials (Distribution of published or printed recommendations for clinical care, including clinical practice guidelines, audio-visual materials and electronic publications. The materials may have been delivered personally or through mass mailings.)
b) Educational meetings (Health care providers who have participated in conferences, lectures, workshops or traineeships.)
c) Local consensus processes (Inclusion of participating providers in discussion to ensure that they agreed that the chosen clinical problem was important and the approach to managing the problem was appropriate.)
d) Educational outreach visits (Use of a trained person who met with providers in their practice settings to give information with the intent of changing the provider's practice. The information given may have included feedback on the performance of the provider(s).)
e) Local opinion leaders (Use of providers nominated by their colleagues as 'educationally influential'. The investigators must have explicitly stated that their colleagues identified the opinion leaders.)
f) Patient mediated interventions (New clinical information (not previously available) collected directly from patients and given to the provider e.g., depression scores from an instrument.)

g) Audit and feedback (Any summary of clinical performance of healthcare over a specified period of time. The summary may also have included recommendations for clinical action. The information may have been obtained from medical records, computerised databases, or observations from patients.)

i) The following interventions are excluded:

(1) Provision of new clinical information not directly reflecting provider performance which was collected from patients e.g., scores on a depression instrument, abnormal test results. These interventions should be described as patient mediated.

(2) Feedback of individual patients' health record information in an alternate format (e.g., computerised). These interventions should be described as organisational.

h) Reminders (Patient or encounter specific information, provided verbally, on paper or on a computer screen, which is designed or intended to prompt a health professional to recall information. This would usually be encountered through their general education; in the medical records or through interactions with peers, and so remind them to perform or avoid some action to aid individual patient care. Computer aided decision support and drugs dosage are included.)

i) Marketing (Use of personal interviewing, group discussion ('focus groups'), or a survey of targeted providers to identify barriers to change and subsequent design of an intervention that addresses identified barriers.)

j) Mass media

i) Varied use of communication that reached great numbers of people including television, radio, newspapers, posters, leaflets, and booklets, alone or in conjunction with other interventions.

ii) Targeted at the population level.

k) Other (Other categories to be agreed in consultation with the EPOC editorial team.)

2) Financial interventions

i) *Provider interventions*

(1) Fee-for-service (provider has been paid for number and type of service delivered)

(2) Prepaid (no other description)

(3) Capitation (provider was paid a set amount per patient for providing specific care)

(4) Provider salaried service (provider received basic salary for providing specific care)

(5) Prospective payment (provider was paid a fixed amount for healthcare in advance)

(6) Provider incentives (provider received direct or indirect financial reward or benefit for doing specific action)

(7) Institution incentives (institution or group of providers received direct or indirect financial rewards or benefits for doing specific action)

(8) Provider grant/allowance (provider received direct or indirect financial reward or benefit not tied to specific action)

(9) Institution grant/allowance (institution or group of providers received direct or indirect financial reward or benefit not tied to specific action)

(10) Provider penalty (provider received direct or indirect financial penalty for inappropriate behaviour)

(11) Institution penalty (institution or group of providers received direct or indirect financial penalty for inappropriate behaviour)

(12) Formulary (added or removed from reimbursable available products)

(13) Other (other categories to be agreed in consultation with the EPOC editorial team)

ii) Patient interventions

(1) Premium (Patient payment for health insurance. It is important to determine if the patient paid the entire premium, or if the patient's employer paid some of it. This includes different types of insurance plans.)

(2) Co-payment (Patient payment at the time of healthcare delivery in addition to health insurance e.g., in many insurance plans that cover prescription medications the patient may pay 5 dollars per prescription, with the rest covered by insurance.)

(3) User-fee (Patient payment at the time of healthcare delivery.)

(4) Patient incentives (Patient received direct or indirect financial reward or benefit for doing or encouraging them to do specific action.)

(5) Patient grant/allowance (Patient received direct or indirect financial reward or benefit not tied to specific action.)

(6) Patient penalty (Patient received direct or indirect financial penalty for specified behaviour e.g., reimbursement limits on prescriptions.)

(7) Other (other categories to be agreed in consultation with the EPOC editorial team)

3) *Organisational interventions*

a) *Provider orientated interventions*

i) Revision of professional roles (Also known as 'professional substitution', 'boundary encroachment' and includes the shifting of roles among health professionals. For example, nurse midwives providing obstetrical care; pharmacists providing drug counselling that was formerly provided by nurses and physicians; nutritionists providing nursing care; physical therapists providing nursing care. Also includes expansion of role to include new tasks.)

ii) Clinical multidisciplinary teams (Creation of a new team of health professionals of different disciplines or additions of new members to the team who work together to care for patients.)
iii) Formal integration of services (Bringing together of services across sectors or teams or the organisation of services to bring all services together at one time also sometimes called 'seamless care'.)
iv) Skill mix changes (Changes in numbers, types or qualifications of staff.)
v) Continuity of care (including one or many episodes of care for inpatients or outpatients).
vi) Arrangements for follow-up.
vii) Case management (including co-ordination of assessment, treatment and arrangement for referrals).
viii) Satisfaction of providers with the conditions of work and the material and psychic rewards (e.g., interventions to 'boost morale').
ix) Communication and case discussion between distant health professionals (e.g., telephone links; telemedicine; there is a television/video link between specialist and remote nurse practitioners).
x) Other (other categories to be agreed in consultation with the EPOC editorial team).

b) Patient orientated interventions

i) Mail order pharmacies (e.g., compared to traditional pharmacies).
ii) Presence and functioning of adequate mechanisms for dealing with patients' suggestions and complaints.
iii) Consumer participation in governance of healthcare organisation.
iv) Other (other categories to be agreed in consultation with the EPOC editorial team).

4) Structural interventions

a) Changes to the setting/site of service delivery (e.g., moving a family planning service from a hospital to a school).
b) Changes in physical structure, facilities and equipment (e.g., change of location of nursing stations, inclusion of equipment where technology in question is used in a wide range of problems and is not disease specific, for example an MRI scanner).
c) Changes in medical records systems (e.g., changing from paper to computerised records, patient tracking systems).
d) Changes in scope and nature of benefits and services.
e) Presence and organisation of quality monitoring mechanisms.
f) Ownership, accreditation, and affiliation status of hospitals and other facilities.
g) Staff organisation.
h) Other (other categories to be agreed in consultation with the EPOC editorial team).

5) *Regulatory interventions*

a) Any intervention that aims to change health services delivery or costs by regulation or law. (These interventions may overlap with organisational and financial interventions.)
b) Changes in medical liability.
c) Management of patient complaints.
d) Peer review.
e) Licensure.
f) Other (other categories to be agreed in consultation with the EPOC editorial team).

Appendix 2. Search strategies

MEDLINE (OVID)

Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) 1946 to Present

No.	Search terms	Results
1	exp obesity/	169108
2	(obes* or overweight*).tw.	239802
3	1 or 2	279271
4	exp health personnel/	427919

(*Continued*)

5	(professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?).ti,ab	1449309
6	4 or 5	1654717
7	exp managed care programs/	39529
8	exp national health programs/	83497
9	primary health care/	61982
10	exp general practice/	69567
11	office visits/	6163
12	ambulatory care facilities/ or outpatient clinics, hospital/	30647
13	((standard or usual or routine or regular or traditional or conventional or pattern or managed) adj2 care).tw	69908
14	(primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care).ti,ab	141829
15	((office? or clinic or clinics) adj3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*)).ti,ab	64531
16	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	443040
17	6 or 16	1912882
18	randomized controlled trial.pt.	429552
19	controlled clinical trial.pt.	91634
20	randomized.ab.	368786
21	placebo.ab.	178430
22	clinical trials as topic.sh.	179204
23	randomly.ab.	262645
24	trial.ti.	161272

(*Continued*)

25	18 or 19 or 20 or 21 or 22 or 23 or 24	1064299
26	exp animals/ not humans.sh.	4306043
27	25 not 26	981409
28	3 and 17 and 27	3149

Embase (OVID)
Embase 1974 to 2016 September 02

No.	Search terms	Results
1	exp obesity/	380880
2	(obes* or overweight*).tw.	333931
3	1 or 2	450562
4	exp *health care personnel/	432199
5	(professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?).ti,ab	1840686
6	4 or 5	2061808
7	*health care organization/ or *national health organization/ or *national health service/ or *public health service/	97156
8	*primary health care/	26896
9	*general practice/	39459
10	*ambulatory care/	12395
11	*outpatient department/	12959
12	((standard or usual or routine or regular or traditional or conventional or pattern or managed) adj2 care).tw	98289
13	(primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care).ti,ab	173602

(*Continued*)

14	((office? or clinic or clinics) adj3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*)).ti,ab	97806
15	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	491237
16	6 or 15	2359002
17	randomized controlled trial/	418791
18	single blind procedure/ or double blind procedure/	155455
19	crossover procedure/	48531
20	random*.tw.	1120729
21	((singl* or doubl*) adj (blind* or mask*)).tw.	191957
22	17 or 18 or 19 or 20 or 21	1279373
23	(exp animals/ or nonhuman/) not human/	6049671
24	22 not 23	1127436
25	3 and 16 and 24	6029

The Cochrane Library

No.	Search terms
#1	[mh obesity]
#2	(obes* or overweight):ti,ab,kw
#3	#1 or #2
#4	[mh "health personnel"]
#5	(professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?):ti,ab,kw
#6	#4 or #5
#7	[mh "managed care programs"]
#8	[mh "national health programs"]

(*Continued*)

#9	[mh "primary health care"]
#10	[mh "general practice"]
#11	[mh "office visits"]
#12	[mh "ambulatory care facilities"]
#13	[mh "outpatient clinics, hospital"]
#14	((standard or usual or routine or regular or traditional or conventional or pattern or managed) near/2 care):ti,ab,kw
#15	(primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care):ti,ab,kw
#16	((office? or clinic or clinics) near/3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*)):ti,ab,kw
#17	{or #7-#16}
#18	#6 or #17
#19	#3 and #18

Cinahl (EBSCO)

No.	Search terms	Results
S1	(MH "Obesity+")	41,829
S2	TI (obes* or overweight) OR AB (obes* or overweight)	37,474
S3	S1 OR S2	53,957
S4	(MH "Health Personnel+")	341,529
S5	TI (professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?) OR AB (professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?)	421,728

(*Continued*)

S6	S4 OR S5	651,246
S7	(MH "Managed Care Programs+")	14,178
S8	(MH "National Health Programs")	43,829
S9	(MH "Primary Health Care")	33,369
S10	(MH "Family Practice")	11,851
S11	(MH "Office Visits")	2,627
S12	(MH "Ambulatory Care Facilities")	3,605
S13	TI (((standard or usual or routine or regular or traditional or conventional or pattern or managed) N2 care)) OR AB (((standard or usual or routine or regular or traditional or conventional or pattern or managed) N2 care))	26,270
S14	TI (primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care) OR AB (primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care)	52,533
S15	TI (((office? or clinic or clinics) N3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*))) OR AB (((office? or clinic or clinics) N3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*)))	5,491
S16	S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15	154,024
S17	S6 OR S16	742,696
S18	S3 AND S17	7,666
S19	(MH "Clinical Trials+") or (MM "Random Assignment") or (MM "Placebos")	136,876
S20	PT "Clinical trial"	52,805
S21	TI (Clinical* trial*) or AB (Clinical* trial*)	40,268
S22	TI (singl* N1 blind*) or TI (doubl* N1 blind*) or TI (trebl* N1 blind*) or TI (tripl* N1 blind*) or TI (singl* N1 mask*) or TI (doubl* N1 mask*) or TI (trebl* N1 mask*) or TI (tripl* N1 mask*) or AB (singl* N1 blind*) or AB (doubl* N1 blind*) or AB (trebl* N1 blind*) or AB (tripl* N1 blind*) or AB (singl*	18,297

(*Continued*)

	N1 mask*) or AB (doubl* N1 mask*) or AB (trebl* N1 mask*) or AB (tripl* N1 mask*)	
S23	TI (Randomised control* trial*) or TI (Randomized control* trial*) or AB (Randomised control* trial*) or AB (Randomized control* trial*)	42,617
S24	TI (Random* N2 allocat*) or AB (Random* N2 allocat*)	3,574
S25	TI (placebo*) or AB (placebo*)	24,987
S26	S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25	175,129
S27	S18 AND S26	542

PsycINFO (OVID)
2002 to July Week 4 2016

No.	Search terms	Results
1	overweight/ or obesity/	16480
2	(obes* or overweight).tw.	28062
3	1 or 2	28283
4	exp health personnel/ or exp counselors/ or exp therapists/	84279
5	(professional? or worker? or staff or provider? or clinician? or doctor? or physician? or paediatrician? or pediatrician? or intern or interns or resident or residents or practitioner? or gp or nurse? or health visitor? or pharmacist? or dieti?ian? or nutritionist? or therapist? or physiotherapist? or counsellor? or counselor? or team?).ti,ab	420064
6	4 or 5	433697
7	exp managed care/	2078
8	primary health care/	12128
9	health care services/	27717
10	outpatient treatment/	2459
11	exp clinics/	4035

(*Continued*)

12	((standard or usual or routine or regular or traditional or conventional or pattern or managed) adj2 care).tw	11083
13	(primary care or primary health care or primary healthcare or general practice or family practice or ambulatory care).ti,ab	24093
14	((office? or clinic or clinics) adj3 (visit* or outpatient? or hospital? or practice or pediatric* or paediatric*)).ti,ab	9419
15	7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	72664
16	6 or 15	465176
17	((clinical adj3 trial*) or (controlled adj3 trial*) or (randomi* adj3 trial*) or (random* adj3 allocat*) or placebo*).tw	66472
18	((singl* or doubl*) adj (blind* or mask*)).tw.	14183
19	17 or 18	68733
20	3 and 16 and 19	374

Appendix 3. Data extraction form

THE DATA COLLECTION CHECKLIST
July 2008
DATA COLLECTION
For brevity, obese and overweight participants in the trials are referred to as patients in this checklist, although it is recognised that they might not be symptomatic at the time of the study.
Once potentially relevant studies have been identified for a review, the following data should be extracted **independently** by two reviewers.
Please record your name and the Study ID (first author and year of publication) in the header of this document.
For most items reviewers should mark an X against the appropriate response in each case in the column labelled Relevant supporting text and location. In addition it will be helpful if you cut and paste relevant supporting text and state its original location in the paper (page/column/paragraph). This facilitates later comparisons of extracted data. Any other comments can also be recorded in this column. The column will expand to fit the amount of text you insert. Where appropriate add additional rows.
Data which is missing or UNCLEAR in a published report should be marked clearly on the data collection form (usually in the far right hand column). KD will contact the study authors for any necessary clarification or additional information.
Items in the data extraction sheet which are clearly not applicable to the study in question should be marked accordingly (i.e. N/A).
1. **INCLUSION CRITERIA**
1.1. Reviews scope

	1.1 Reviews scope: Any intervention that aims to improve the way health professionals work to reduce the weight of overweight or obese people. That is the effect(s) of a behavioural/ educational, financial, organisational or regulatory intervention (s) is evaluated	RELEVANT SUPPORTING TEXT AND LOCATION (page/column/paragraph)
YES	The effect of intervention(s) that aims to improve the way health professionals work to reduce the weight of overweight or obese people is evaluated. NB the population must be overweight or obese OR the overweight or obese population's results are segregated for at least one of our significant outcomes (weight loss or objective measure of health professional's behaviour change)	
NO		
UNCLEAR	The intervention does not appear to be clearly described. Discuss the paper with KD before beginning data extraction	

If you scored NO for item 1.1, the study should not be included in the review.
COLLECT NO FURTHER DATA

1.1. **Study design:**

	1.2 Randomised controlled trial (RCT)	RELEVANT SUPPORTING TEXT AND LOCATION (page/column/paragraph)
YES	Statement of random allocation of health professionals, patients, episodes of care, locations of care, etc given by authors	
NO	No statement of random allocation of health professionals, patients, episodes of care, locations of care, etc	
UNCLEAR	Discuss the paper with KD before beginning data extraction	

If you scored NO for the above criteria in item 1.2, the study should not be included in the review.
COLLECT NO FURTHER DATA.

1.2. **Methodological inclusion criteria:**

	1.3.1 Paper reports objective measurement of provider performance/behaviour or patient outcome(s)	RELEVANT SUPPORTING TEXT AND LOCATION (page/column/paragraph)
YES	E.g., *Primary outcome* : Patient weight loss, OR *Secondary Patient outcomes:* psychological outcomes (depression, dietary restraint); morbidity (measures of disease status, sick leave); fat or BMI measures; effects on risk factors (differences in cholesterol levels, blood pressure); patient behaviour (attendance levels at weight management or physical exercise programmes); and number of withdrawals from treatment OR *Secondary Health professional outcomes:* measures of health practitioners behaviour, knowledge.	
NO	E.g., self-report data, measures of attitudes or beliefs or perceptions or satisfaction. Studies reporting only knowledge or attitudes of health professionals or patient satisfaction with no objective measure of professional performance or patient outcomes are to be excluded	
UNCLEAR	Discuss the paper with KD before beginning data extraction	

	1.3.2 Relevant and interpretable data presented or obtainable (e.g., by reading points off a graph)
YES	Data is presented or obtainable
NO	Relevant data is not presented and is clearly unobtainable
UNCLEAR	Discuss the paper with KD before beginning data extraction

If you scored NO for either of the above criteria in item 1.3, the study should not be included in the review. COLLECT NO FURTHER DATA.

A study must meet the minimum criteria for scope, design, and methodology for inclusion in the reviews. If it does not, COLLECT NO FURTHER DATA. If you are unclear whether a paper meets any of the inclusion criteria please contact Katherine Deane.

2.0 METHODS

2.1 Units of allocation and analysis:

2.1.1 Unit of allocation (i.e., who or what was allocated to study groups, and was it cluster or individual randomisation)	**Relevant supporting text and location. (page/column/paragraph)**
Patient	
Episode of care	
Clinic Day	
Provider	
Firm	
Practice	
Institution	
Community	
Other: (Please specify)	
UNCLEAR	

2.1.2 Unit of analysis (e.g., results analysed as events per practice)	**Relevant supporting text and location. (page/column/paragraph)**
Patient	
Episode of care	
Clinic Day	
Provider	
Firm	
Practice	
Institution	
Community	
Other: (Please specify)	
UNCLEAR	

2.2 Sample size calculation:

	2.2 Sample size calculation:	Relevant supporting text and location. (page/column/paragraph)
YES	Study has sufficient statistical power to detect clinically important effects as statistically significant	
	Number expected to be recruited / number actually recruited	
NO	No Sample size calculation	
UNCLEAR		

2.3 Risk of Bias Assessment:

2.3.1 SEQUENCE GENERATION **Was the allocation sequence adequately generated?** Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups	**Relevant supporting text and location. (page/column/paragraph)**
The unit of allocation was health professional, patient or episode of care and the investigators describe a random component in the sequence generation process such as: · Referring to a random number table · Using a computer random number generator · Coin tossing · Shuffling cards or envelopes · Throwing dice · Drawing of lots · Minimization* **Minimization may be implemented without a random element, and this is considered to be equivalent to being random.*	
The unit of allocation was health professional, patient or episode of care and the investigators describe a quasi-random component in the sequence generation process such as: · Sequence generated by odd or even date of birth; · Sequence generated by some rule based on date (or day) of admission; · Sequence generated by some rule based on hospital or clinic record number	
The investigators describe a non-random component in the sequence generation process. E.g., · Allocation by judgement of the clinician;	

(*Continued*)

· Allocation by preference of the participant; · Allocation by availability of the intervention.	
Insufficient information about the sequence generation	

	2.3.2 ALLOCATION CONCEALMENT **Was allocation adequately concealed?** Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment	**Relevant supporting text and location. (page/column/paragraph)**
YES	The unit of allocation was health professional, patient or episode of care and participants and investigators enrolling participants could not foresee assignment because one of the following, or an equivalent method, was used to conceal allocation: · Central allocation (including telephone, web-based, and pharmacy-controlled, randomization); · Sequentially numbered, opaque, sealed envelopes. For cluster randomisation where it is possible that randomisation of all units happens once. Id usually look to have some statement of allocation by an independent statistician	
NO	Participants or investigators enrolling participants could possibly foresee assignments and thus introduce selection bias, such as allocation based on: · Using an open random allocation schedule (e.g., a list of random numbers); · Assignment envelopes were used without appropriate safeguards (e.g., if envelopes were unsealed or nonopaque or not sequentially numbered); · Alternation or rotation; · Date of birth; · Case record number; · Any other explicitly unconcealed procedure. Again for cluster randomisation the judgement is whether a study where allocation was performed by the study statistician is regarded as biased	
UNCLEAR	Insufficient information to permit judgement of Yes or No. This is usually the case if the method of concealment is not described or not described in sufficient detail to allow a definite judgement ? E.g., if the use of assignment envelopes is described, but it remains unclear whether en-	

(*Continued*)

	velopes were sequentially numbered, opaque and sealed	

2.3.3.1 BLINDING OF OUTCOME ASSESSORS: **Was knowledge of the allocated interventions adequately prevented during the study?** Describe all measures used, if any, to blind the outcome assessors from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective			
YES	Any one of the following: · No blinding, but the review authors judge that the outcome and the outcome measurement are not likely to be influenced by lack of blinding; · Blinding of the outcome assessors ensured, and unlikely that the blinding could have been broken		
NO	Any one of the following: · No blinding or incomplete blinding, and the outcome or outcome measurement is likely to be influenced by lack of blinding; · Blinding of the outcome assessors attempted, but likely that the blinding could have been broken		
UNCLEAR	Any one of the following: · Insufficient information to permit judgement of Yes or No; · The study did not address this outcome.		
Reported Outcome(s) (Add rows as necessary)		**Low Risk of Bias: YES/NO/ UNCLEAR**	

2.3.4.1 INCOMPLETE OUTCOME DATA: **Were incomplete outcome data adequately addressed?** Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/ exclusions where reported, and any re-inclusions in analyses performed by the review authors			
YES	Any one of the following: · No missing outcome data; · Reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias);		

(*Continued*)

	· Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; · For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate; · For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size; · Missing data have been imputed using appropriate methods
NO	Any one of the following: · Reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups; · For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk enough to induce clinically relevant bias in intervention effect estimate; · For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size; · As-treated analysis done with substantial departure of the intervention received from that assigned at randomization; · Potentially inappropriate application of simple imputation
UNCLEAR	Any one of the following: • Insufficient reporting of attrition/exclusions to permit judgement of Yes or No (e.g., number randomized not stated, no reasons for missing data provided); • The study did not address this outcome.

Reported Outcome(s) (Add rows as necessary)	**Low Risk of Bias: YES/NO/ UNCLEAR**

	2.3.5 SELECTIVE OUTCOME REPORTING **Are reports of the study free of suggestion of selective outcome reporting?** State how the possibility of selective outcome reporting was examined by the review authors, and what was found NB. KD will try to find study protocols if not present in your paper, you dont need to do this	**Relevant supporting text and location. (page/column/ paragraph)**
YES	Any of the following: · The study protocol is available and all of the studies pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way;	

(*Continued*)

	· The study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon)	
NO	Any one of the following: · Not all of the studies pre-specified primary outcomes have been reported; · One or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g., sub-scales) that were not pre-specified; · One or more reported primary outcomes were not prespecified (unless clear justification for their reporting is provided, such as an unexpected adverse effect); · One or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; · The study report fails to include results for a key outcome that would be expected to have been reported for such a study	
UNCLEAR	Insufficient information to permit judgement of Yes or No. It is likely that the majority of studies will fall into this category	

NB. We do not expect data extractors to go find the study protocols, the Newcastle base will try to find these down along with any other queries for the study authors that arise from the data extraction.

2.3.6 Other sources of bias.

2.3.6 BASELINE MEASUREMENT	**Relevant supporting text and location. (page/column/paragraph)**
Performance or patient outcomes measured prior to the intervention, and no substantial differences present across study groups in main outcome measures and also in possible confounding variables (e.g., sex, age)	
Differences at baseline in main outcome measures or confounding variables (e.g., sex, age) likely to undermine the post intervention differences, e.g., differences between groups before the intervention similar to those found post intervention or had extreme baseline imbalance	
Baseline measures not reported, or unclear whether baseline measures are different across study groups	

2.3.7 RELIABLE PRIMARY OUTCOME MEASURE(S)	
YES	Two or more raters with agreement ≥ 90% or kappa ≥ 0.8 OR outcome assessment is objective, e.g., length of hospital stay, drug levels assessed by a standardised test
NO	Two or more raters with agreement < 90% or kappa < 0.8.
UNCLEAR	Reliability not reported for outcome measures obtained by chart extraction or collected by an individual

Reported Outcome(s) (Add rows as necessary)	**Low Risk of Bias: YES/NO/ UNCLEAR**

	2.3.8 PROTECTION AGAINST CONTAMINATION	Relevant supporting text and location. (page/column/ paragraph)
YES	Allocation by community, institution or practice and unlikely that control group received the intervention	
NO	Likely that control group received the intervention, e.g. , cross-over trials or if patients rather than professionals were randomised	
UNCLEAR	Professionals allocated within a clinic or practice and possible that communication between experimental and control group professionals could have occurred	

2 PARTICIPANTS

2.1 Characteristics of participating healthcare providers:

2.1.1 Profession (mark all appropriate)**: Please state the numbers of each profession involved. Also please note if the numbers come from baseline, the remaining population at the endpoint, or other time period (e.g., sequential accrual)**	**Relevant supporting text and location. (page/column/paragraph)**
Physicians	
Nurses	

(*Continued*)

Pharmacists	
Physiotherapists	
Dietitianss/Nutritionists	
Psychologists	
Other: (Please specify)	
UNCLEAR	

3.1.2 Level of training:	**Relevant supporting text and location. (page/column/paragraph)**
In post-graduate training (House Officer/Intern, Registrar/Resident)	
Fully trained (Consultant/Attending)	
Mixed	
Other (Specify i.e., copy all information available in paper)	
UNCLEAR (information not available)	

3.1.3 Age of health professional:	**Relevant supporting text and location. (page/column/paragraph)**
Mean age	
UNCLEAR (information not available)	

3.1.4 Years since graduation or in practice:	Relevant supporting text and location. (page/column/paragraph)
Mean	
UNCLEAR (information not available)	

3.1.5 Proportion of eligible providers (or allocation units) who participated in the evaluation:	Relevant supporting text and location. (page/column/paragraph)
Report the numbers or the percentage of providers in target population who were allocated to study groups	
UNCLEAR (information not available)	

3.2 Characteristics of the participating patients.

3.2.1 Clinical problem(s) of participating patients: Please give information on the authors definitions of the conditions e.g., over 5lbs over the recommended maximum weight for their height. Please also note the numbers with each condition and if they come from baseline, the remaining population at the endpoint, or other time period (e.g., sequential accrual)	Relevant supporting text and location. (page/column/paragraph)
3.2.1.1 Overweight (BMI over 25 but less than 30)	
UNCLEAR (information not available)	
3.2.1.2 Obese (BMI 30 or over)	
UNCLEAR (information not available)	
3.2.1.3 Diabetes	
UNCLEAR (information not available)	
3.2.1.4 Ischemic heart disease	
UNCLEAR (information not available)	

3.2.2 Other characteristics of participating patients: Please note if the numbers come from baseline, the remaining population at the endpoint, or other time period (e.g., sequential accrual)	**Relevant supporting text and location. (page/column/paragraph)**
3.2.2.1 Age:	
Mean	
Range	
UNCLEAR (information not available)	
3.2.2.2 Gender	
UNCLEAR (information not available)	
3.2.2.3 Ethnicity	
UNCLEAR (information not available)	
3.2.2.4 Other (Please specify)	
UNCLEAR (information not available)	

3.2.3 The number randomised into the trial (i.e., all those who actually entered the study)	**Relevant supporting text and location. (page/column/paragraph)**
3.2.3.1 Episodes of care:	
UNCLEAR (information not available)	
3.2.3.2 Patients	
UNCLEAR (information not available)	
3.2.3.3 Providers	
UNCLEAR (information not available)	
3.2.3.4 Practices	
UNCLEAR (information not available)	
3.2.3.5 Hospitals	

(*Continued*)

UNCLEAR (information not available)	
3.2.3.6 Communities or regions	
UNCLEAR (information not available)	

3.3 SETTING
3.3.1 Reimbursement system:

3.3.1 Reimbursement system:	**Relevant supporting text and location. (page/column/paragraph)**
Fee for service (provider paid for number and type of services delivered)	
Capitation (provider paid set amount per patient for providing specific care)	
Prospective payment	
Global budget	
Mixed	
UNCLEAR	

3.4 Setting of care

3.4 Setting of care:	**Relevant supporting text and location. (page/column/paragraph)**
Inpatient	
Outpatient (e.g., ambulatory care provided by hospitals, specialists etc.)	
General practice or community-based	
Mixed	
UNCLEAR	

3.5 Academic status:

3.5 Academic status of the setting of care:	Relevant supporting text and location. (page/column/paragraph)
University (teaching) hospital	
Non-teaching or university affiliated	
Mixed	
Other (please specify)	
UNCLEAR	

3.6 Country

3.6 Country:	Relevant supporting text and location. (page/column/paragraph)
USA	
Canada	
UK	
Australia	
Netherlands	
Other (Please specify)	
UNCLEAR (information not available)	

4.0 CHARACTERISTICS OF THE INTERVENTIONS

4.1 Professional interventions:

4.1 Professional interventions: Record the intervention(s) aimed at the health professionals for each study group or period. If there is more than one form of intervention add rows		Location of text (page/column/ paragraph)
	Describe intervention (Report this in the words of the paper)	
	Describe intervention (Report this in the words of the paper)	

4.2 Timing of intervention:

	4.2 Timing: For each intervention aimed at the health professionals, state the following (for each score UNCLEAR if information not available)	**Relevant supporting text and location. (page/column/paragraph)**
Proximity to clinical decision-making (this item may be particularly relevant to audit and feedback and reminder interventions)	Describe.	
	UNCLEAR	
Frequency/number of intervention events	Describe	
	UNCLEAR	
Duration of intervention	Describe	
	UNCLEAR	

4.3 Recipient

4.3 Healthcare professional recipient: State whether each intervention was delivered to an individual, a group or was not stated (UNCLEAR)		**Relevant supporting text and location. (page/column/paragraph)**	
Intervention Group	**Describe whether delivered to individual, group, or UNCLEAR** (Report this in the words of the paper)		
Control Group	**Describe whether delivered to individual, group, or UNCLEAR** (Report this in the words of the paper)		

	4.4 Intervention deliverer: State who (or what) delivered the intervention (if not stated code as UNCLEAR) e.g., local expert, computer system		Relevant supporting text and location. (page/column/paragraph)
Intervention Group		**Describe who (or what) delivered the intervention** (Report this in the words of the paper)	
Control Group		**Describe who (or what) delivered the intervention** (Report this in the words of the paper)	

4.5 Types of targeted behaviour of the health professionals:

4.5 Type(s) of targeted behaviour of the health professionals e.g., increased rates of referral. Report this in the words of the paper	**Location of text in paper. (page/column/paragraph)**

4.6 Development of the intervention:

	4.6.1 Consultation with professional recipients: Was the intervention aimed at the health professional developed through consultation with the professional recipient(s)?	**Relevant supporting text and location. (page/column/paragraph)**
YES	Specified in the paper that recipients were involved in development of intervention. Describe the method of involvement e.g., formal consensus process	
NO	Specified in the paper that recipients were not involved in development of intervention	
UNCLEAR	Not specified	

	4.6.2 Evidence base of intervention: Was the intervention based on good evidence?	Relevant supporting text and location. (page/column/paragraph)
YES	Intervention based on good evidence e.g., clear reference to a systematic review or RCT. Describe	
NO	Explicitly not evidence-based.	
UNCLEAR	Not specified	

4.7 Consumer Involvement

	4.7 Consumer Involvement: Were consumers (i.e., potential patients) involved at any point of the design, conduct or interpretation of the study? (E.g., consumers involved in clinical practice guideline development, or their views collected.)		Relevant supporting text and location. (page/column/paragraph)
YES		Specified in the paper that consumers were involved in the design, conduct or interpretation of the study. Describe	
NO		Specified in the paper that consumers were not involved in the design, conduct or interpretation of the study	
UNCLEAR		Not specified	

4.8 Barriers to change

4.8 Barriers to change: Did the investigators prospectively identify specific barriers to change in the target population, which were addressed by the intervention		Relevant supporting text and location. (page/column/paragraph)
	Describe.	
	Not done	
	Not clear	

4.9 Source of funding for study

4.9 Source of funding for study		Relevant supporting text and location. (page/column/paragraph)
	Describe.	
	Not clear	

4.10 Ethical Approval

	4.10 Ethical Approval	Relevant supporting text and location. (page/column/paragraph)
YES	Ethical approval sought and obtained for study	
UNCLEAR	Not reported	

5.0 CHARACTERISTICS OF OUTCOMES

	5.1 Economic variables	Relevant supporting text and location. (page/column/paragraph)
Were costs of the intervention reported?	YES (describe costs)	
	NO (not reported)	
Were changes in direct healthcare costs as a result of the intervention reported (e.g., drugs, hospital stays, etc.)?	YES (describe costs)	
	NO (not reported)	
Were changes in non-healthcare costs as a result of the intervention reported (e.g., patient travel or time off work for hospital visits)?	YES (describe costs)	
	NO (not reported)	
Were costs associated with the intervention linked with provider or patient outcomes in an economic evaluation (e.g., net cost per unit change in rate of prescribing, or	YES (describe ratio)	

(*Continued*)

cost per life year saved)?		
	NO (no economic evaluation reported)	
	UNCLEAR (not adequately described in the paper)	

5.2 For how long were outcomes measured after initiation of the intervention? (State all time points relevant)	**Relevant supporting text and location. (page/column/paragraph)**

5.3 Losses to follow-up: NB please give all information provided (add rows as needed) e.g., numbers of practices and numbers of patients	**Relevant supporting text and location. (page/column/paragraph) CONTROL GROUP**	**Relevant supporting text and location. (page/column/paragraph) INTERVENTION GROUP**
Number randomised		
Number completing follow-up (note when)		
Reasons for loss to follow-up		

5.4 Has a possible ceiling effect been identified? (e.g., there was little room for improvement in provider performance, because it was adequate without the intervention, based on baseline measurements or control group performance)		**Relevant supporting text and location. (page/column/paragraph)**
	YES	
	NO	
	UNCLEAR	

(*Continued*)

	YES	
	NO	
	UNCLEAR	

6.0 RESULTS

Record results. Use extra forms for additional outcomes and/or comparisons. State the results as they will be entered in the review, and describe how calculated (e.g., relative percentage differences attributable to the intervention).

a) State the main results of the main outcome(s), for each study group, in natural units

b) For each available comparison, report the baseline and post intervention differences between study and control groups, in natural units. Include statistical significance if reported. Indicate whether the units of allocation and analysis were different and, if so, whether appropriate adjustment was made (e.g., the intra-practice correlation coefficient indicates the independence of the event analysed).

In all cases, report a more favourable provider/patient outcome in the more active intervention group as a positive (+) finding (i.e., where differences in the groups are in the intended direction).

Finally if the results are presented in the paper in a different format to that provided by us, please just cut and paste their whole results table(s) into this section.

6.0 Results

Comparison no. ……

Groups compared (use same labelling as intervention and effect modifiers table):

Describe comparison (e.g., intervention [specify type] versus no intervention):

Outcome no. …… Type of outcome: Process / Patient / Cost

Describe outcome measure: ……

Was the outcome adjusted for baseline covariates?

Was the data extracted from a graph (i.e., measured with a ruler). YES/NO/not applicable

NB If YES please enlarge the graph in order to maximise accuracy of measurements.

EVENT DATA Results in natural units (report intervention group first):

	Baseline period		Post-intervention period	Location (page/column/ paragraph or table)	
No. with event	Total observed	No. with event	Total observed		Intervention
					Control

Total observed: no. of cases in group who were completely monitored for that outcome.

No. with event: no. of cases in group in which specified outcome occurred.

NB. if process data e.g., number of referrals within intervention period, only complete post-intervention period data block.

CONTINOUS DATA Results in natural units (report intervention group first):

	Baseline period		Post-intervention period		Location (page/column/paragraph or table)		No.
Mean	SD	No.	Mean	SD		Authors report of which average and variance used (e.g., mean and SD)	
						Intervention	
						Control	

Statistical significance: ……
Statistical test used: …… Comments (e.g., one / two-tailed test)
Unit of analysis error: Yes / No
If No, was appropriate adjustment made (e.g., measure of intra-cluster correlation): Yes / No
Further comments:

FEEDBACK

Suggested change in title, 10 November 2010

Summary

Given the exclusion criteria for this review exclude trials of interventions targetting health professionals who are working solely with children, should the title for this review maybe refer to 'adults' instead of 'people'? I think you found very few, if any studies that were excluded solely on the basis of the age of participating patients, but do you think there might be scope for a similar review that focuses on similar interventions aimed ultimately on improving care for children and young people in particular? Maybe you are planning one?
Submitter has modified conflict of interest statement:
I am currently conducting a review of the views of young people in the UK about obesity, body size shape and weight and have published another on the same topic but including studies of children aged 4-11. I work for a University Social Sciences Research Department that has received funding to conduct a programme of research work in the area of obesity.
I have no other potential conflicts of interest

Reply

Thank you for your suggestion. We have changed the title as suggested to more clearly indicate the scope of this review.

Contributors

Rebecca Rees
Martin Eccles
Alain Mayhew

WHAT'S NEW

Date	Event	Description
5 September 2016	New search has been performed	This is the third update of the original review. We revised the review title and expanded the inclusion criteria to include studies in which healthcare professionals treated adults or children and adolescents with overweight or obesity, or both. We updated the methods to comply with new EPOC and MECIR standards. There were changes to the author team, with 3 members leaving the team and 1 joining
5 September 2016	New citation required and conclusions have changed	We added 6 new studies to this update. The total included studies in the review is now 12

HISTORY

Date	Event	Description
10 November 2010	Amended	Title changed.
10 November 2010	Feedback has been incorporated	See comment in feedback section; title changed.
17 March 2010	Amended	Minor edits.
16 February 2010	New search has been performed	New search up to June 2009. Revised inclusion criteria and new team of authors
16 February 2010	New citation required but conclusions have not changed	The searches were updated, and the criteria was changed to only include randomised trials. There are now six studies in the review and it is very difficult to make any conclusions about the effectiveness of the interventions due to methodological weaknesses or heterogeneity
25 July 2008	Amended	Converted to new review format.
13 January 2001	New citation required and conclusions have changed	Substantive amendment.

CONTRIBUTIONS OF AUTHORS

GF screening, data extraction, grading of the evidence, analysis, and write up

DGB screening, data extraction, grading of the evidence

CS screening, data extraction, grading of the evidence

All authors read and approved the final version for submission.

DECLARATIONS OF INTEREST

GF: none known

DGB: none known

CS: was an advisor to the BiO Project (Moore 2003) - a study mentioned in this review. She was an author of one of the studies; but was not involved in data extraction or assessment (risk of bias, GRADE, analysis) for that study.

SOURCES OF SUPPORT

Internal sources

- University of York, UK.
- University Dental Hospital of Manchester, UK.
- Nuffield Institute for Health, Leeds, UK.
- Leeds Metropolitan University, UK.
- University of Teesside, UK.
- Newcastle University, Newcastle upon Tyne, UK.

External sources

- UK NIHR Cochrane Programme Grant, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We changed the title, which was originally " Improving health professionals' management of obesity"' to better describe that the review now includes both adults and children.

As we previously identified a number of randomised studies, and since randomised studies provide the best available evidence, we changed the inclusion criterion for study design, restricting it to randomised trials and cluster-randomised trials; the protocol also included quasi-randomised trials, controlled before-after studies, and interrupted time series.

We changed the main outcome to participant's body weight (adults) and BMI z-score (children).

We expanded the review to include studies of healthcare professionals and care organisations providing care to children and adolescents with overweight or obesity.

There were changes to the author team, with three members leaving the team and one joining.

We changed the search strategy (for details see Methods section).

We updated the Methods to comply with new EPOC and MECIR standards.

We added two main 'Summary of findings' tables, and an additional seven 'Summary of findings' tables (one for each comparison) to the review.

NOTES

We excluded 15 of the previously included studies, due to changed inclusion criteria. We include six new studies in this review update. The conclusions have been changed in issues of detail, but the overall message of the review has not changed.

INDEX TERMS

Medical Subject Headings (MeSH)

Body Weight; Controlled Clinical Trials as Topic; Delivery of Health Care [organization & administration; standards]; Obesity [psychology; *therapy]; Overweight [psychology; therapy]; Patient Education as Topic; Professional Practice [organization & administration; *standards]; Randomized Controlled Trials as Topic; Weight Loss

MeSH check words

Adult; Female; Humans; Male