

Evidence statements for ‘Overweight and obese adults – lifestyle weight management’

This document lists the evidence statements that support the recommendations in NICE’s guideline on ‘Overweight and obese adults – lifestyle weight management’. For details of which evidence statements are linked to each recommendation see section 10 of the guidance. Only evidence statements linked to a recommendation are listed in this document.

The evidence statements are short summaries of evidence in a review. Evidence statements 1.X are from evidence reviews 1a, 1b or 1c. Evidence statements 2.X are from evidence review 2.

Please note that the wording of some evidence statements has been altered slightly from those in the evidence review(s) to make them more consistent with each other and NICE's standard house style.

Evidence statement 1.0 Applicability of available data

There is a large body of evidence on behavioural weight management programs (BWMPs) that was judged to be of high quality and applicable to the UK. The evidence reviewed supported and extended the conclusions drawn by Loveman et al. 2011, that is that BWMPs can be effective and cost effective. Of the 43 RCTs identified and drawn upon in the below evidence statements, all were judged to be applicable to the UK population. Twenty-two studies were judged to be of high external validity. The remaining 21 RCTs identified were judged to be of moderate external validity due to some concern that the intervention may not be widely applicable or that the population or the study was highly selective and may not be representative. Of the RCTs identified, 26 were conducted in the USA, 3 in the UK, 2 each in the Netherlands and Sweden, and 1 each in Australia, Belgium, Brazil, Canada, Finland, Japan, New Zealand, and Portugal. The final study was multi-centre and was conducted in the UK, Germany, and Australia.

This evidence statements apply to the programmes as undertaken in the included trials. The content or format of programmes may have changed in the interim.

Evidence statement 1.1 Mid-term weight loss in BWMPs

Strong evidence from a meta-analysis trial indicates that BWMPs can lead to greater [weight loss](#) over a 12 to 18-month period than control arms (pooled mean difference -2.59 kg, 95% CI -2.78 to -2.41). The substantial between study heterogeneity indicates that the effectiveness of these programmes varies. The meta-analysis was based on 29 randomised controlled trials (RCTs), with 7540 BWMP participants and 5913 controls in the following countries: 14 USA (12 [++]¹, 2 [+]²), 3 UK (1 [++]³, 2 [+]⁴), 2 Netherlands (both [+]⁵), 2 Sweden (both [++]⁶), 1 Canada (++)⁷, 1 Australia (++)⁸, 1 New Zealand (+)⁹, 1 Finland (++)¹⁰, 1 Switzerland (-)¹¹, 1 Portugal (++)¹², 1 Belgium (+)¹³ and 1 multi-country (UK, Germany, Australia) (+)¹⁴.

¹ Appel 2011, Diabetes Prevention Programme 2002, Fitzgibbon 2010, Foster-Schubert 2012, Heshka 2003, Kuller 2012, Patrick 2011, Rock 2010, Stevens 1993, Stevens 2001, Villareal 2011, Wadden 2011

² Hersey 2012, Rejeski 2011

³ Nanchalal 2012

⁴ Jolly 2011, Penn 2009

⁵ Mensink 2003, Vermunt 2011

⁶ Bertz 2012, Eriksson 2009

⁷ Ross 2012

⁸ Morgan 2011

⁹ Dale 2008

¹⁰ Lindstrom 2003

¹¹ Munsch 2003

¹² Silva 2010

¹³ Vissers 2010

¹⁴ Jebb 2011

Evidence statement 1.2 Long term weight-loss in BWMPs.

Strong evidence from a meta-analysis of trials indicates that BWMPs can lead to greater weight-loss over 18 to 24 months (pooled mean difference -1.54 kg, 95% CI -1.79 to -1.30) and at 36 to 48 months (pooled mean difference -2.21 kg, 95% CI -2.66 to -1.75) than control arms. The substantial between-study heterogeneity indicates that the effectiveness of these programmes varies. The meta-analysis for 18 to 24-month differences was based on 15 RCTs in the following countries: 10 USA (8 [++]¹, 2[+]²), 2 Netherlands (both [+])³, 1 New Zealand (+)⁴, 1 UK (+)⁵, 1 Canada (++)⁶. The meta-analysis for 36 months differences was based on 4 studies in the following countries 2 USA (both [++])⁷, 1 Finland (++)⁸, 1 UK (+)⁹.

¹ Appel 2011, Fitzgibbon 2010, Heshka 2003, Kuller 2012, Rock 2010, Stevens 1993, Stevens 2001, Wadden 2011

² Hersey 2012, Rejeski 2011

³ Mensink 2003, Vermunt 2011

⁴ Dale 2008

⁵ Penn 2009

⁶ Ross 2012

⁷ Kuller 2012, Stevens 2001

⁸ Lindstrom 2003

⁹ Penn 2009

Evidence statement 1.3 Weight loss in programmes available in the UK

There is strong trial evidence that BWMPs available in the UK can lead to greater weight-loss over a 12–18-month period than usual care control arms. The analysis of UK available programmes included 4 studies with commercial BWMPs in the following countries, 2 USA (both [++])¹, 1 UK (+)², 1 multi-country (+)³; and 6 studies with BWMPs delivered in primary care in the following countries, 2 UK (1 [++]⁴, 1 [+]⁵), 1 Switzerland (-)⁶, 1 Canada (++)⁷, 1 Netherlands (+)⁸, 1 USA (++)⁹.

There is evidence that commercial programmes available in the UK are effective over a 12-18 month period. There was strong evidence from three trials that the Weight Watchers programme was effective (pooled -2.48 kg, 95% CI -3.05, -1.92). These trials tested the programme as delivered in the UK, Germany, the USA, and Australia. There was insufficient evidence from one trial on the effectiveness of Rosemary Conley (-1.00 kg, 95% CI -2.6, 0.6) and Slimming World (-0.8 kg 95% CI -2.21, 0.61) delivered in the UK but there was no evidence that they differed in their effect; confidence intervals for these two programmes overlapped with the confidence interval of the pooled Weight Watchers programmes. A commercial programme no longer available in the UK (Jenny Craig) was also shown to be effective (-6.83kg kg, 95% CI -8.25, -5.41).

Pooled results from 6 trials of programmes delivered by generalists in a primary care setting (e.g. GP practice or pharmacy) suggests that these led to very modest weight loss (-0.44kg, 95% CI -0.85 to -0.04).

¹ Heshka 2003, Rock 2010

² Jolly 2011

³ Jebb 2011

⁴ Nanchahal 2011

⁵ Jolly 2011

⁶ Munsch 2003

⁷ Ross 2012

⁸ Vermunt 2011

⁹ Wadden 2011

**Evidence statement 1.4 Effectiveness for different population groups:
gender**

There was inconsistent observational evidence that men have slightly more weight loss than women on BWMPs. Three of five studies that reported on weight loss split by gender found that weight loss was significantly greater in men than in women at 12 months or longer. Four studies were based in the USA (3 [++]¹, 1 [+]²) and 1 in the UK (+)³. There is no evidence that one type of BWMP suits one gender more than another.

¹ Heshka 2003, Stevens 1993, Stevens 2001

² Jeffery 1995

³ Jolly 2011

**Evidence statement 1.5 Effectiveness for different population groups:
age**

There was moderate observational evidence that BWMPs are effective in all age groups but that older participants (> 60) lose more weight than younger participants from 2 studies that reported results by age group. Both were conducted in the USA (both [++])¹. There is no evidence that one type of BWMP suits one age group more than another.

¹ Diabetes Prevention Programme 2002, Stevens 2001

Evidence statement 1.6 Effectiveness for different population groups: ethnicity

There is inconsistent observational evidence that European–Americans lose more weight than African–Americans on the same BWMP. Of the 2 studies that reported results by ethnicity, 1 found no difference between African–Americans and European–Americans and 1 found that European Americans lost more weight than African–Americans at 18 months but not at 36 months. Both studies were conducted in the USA (both [++])¹, and both tested the same intervention. There is no evidence that one type of BWMP suits one ethnic group more than another.

¹ Stevens 1993, Stevens 2001

Evidence statement 1.7 Effectiveness for different population groups: other categories

There is no evidence as to whether the effectiveness of BWMPs varies based on the sexual orientation, disability, religion, place of residence, occupation, education, socioeconomic position or social capital of participants. No studies reported results using these demographics.

Evidence statement 1.8 Diet and physical activity outcomes

There is moderate trial evidence that BWMPs influence diet and [physical activity](#) outcomes at 12 to 18 months. Relatively few studies reported on dietary or physical activity outcomes, and in those that did, reporting was variable. Selective reporting is a risk, hence results should be interpreted with caution. In the 11 studies that reported dietary data, 8 studies found energy intake to be significantly lower in BWMPs (in 4 cases, differences were statistically significant) and 8 studies reported greater improvements in BWMP groups for other dietary behaviours. In the 16 studies that reported physical activity, 14 reported improvements in physical activity with 11 observing significantly greater improvement in physical activity in BWMPs. Evidence on dietary outcomes is based on 11 studies in the following countries, 5 USA (4 [++]¹, 1 [+]²) 2 Netherlands (both [+])³, 1 Sweden (++)⁴, 1 New Zealand (+)⁵, 1 multi country (+)⁶, and 1 Finland (++)⁷. Evidence on physical activity outcomes

is based on 16 studies in the following countries, 8 USA (6 [++]⁸, 1 [+]⁹), 2 UK (both [+]¹⁰), 2 Sweden (both [++]¹¹), 1 Netherlands (+)¹², 1 New Zealand (+)¹³, 1 Finland (++)¹⁴, 1 Canada (++)¹⁵, 1 Portugal (++)¹⁶.

¹ Diabetes Prevention Programme 2002, Fitzgibbon 2010, Foster-Schubert 2012, Kuller 2012

² Jeffery 1995

³ Mensink 2003, Vermunt 2011

⁴ Bertz 2012

⁵ Dale 2008

⁶ Jebb 2011

⁷ Lindstrom 2003

⁸ Diabetes Prevention Programme 2002, Fitzgibbon 2010, Foster-Schubert 2012, Kuller 2012, Patrick 2011, Stevens 1993

⁹ Rejeski 2011

¹⁰ Jolly 2011, Penn 2009

¹¹ Bertz 2012, Eriksson 2009

¹² Vermunt 2011

¹⁴ Lindstrom 2003

¹⁵ Ross 2012

¹⁶ Jebb 2011

Evidence statement 1.9 Adverse events

There was moderate trial evidence that BWMPs cause few adverse events and no serious adverse events. A minority of studies reported on adverse events. In those that did, the adverse events likely to be a result of

participation occurred during exercise and were primarily musculoskeletal events that were not serious. Reporting varied within trials and the majority of studies did not report on adverse events. This evidence is based on 9 studies in the following countries: 3 USA (2 [++]¹, 1 [+]²), 2 Sweden (both [++])³, 1 Canada (++)⁴, 1 Netherlands (+)⁵, and 1 based in the UK, Germany and Australia (+)⁶.

¹ Appel 2011, Diabetes Prevention Programme 2002

² Rejeski 2011

³ Bertz 2012, Eriksson 2009

⁴ Ross 2012

⁵ Mensink 2003

⁶ Jebb 2011

Evidence statement 1.10 Cost effectiveness

There was weak evidence that BWMPs are cost effective. Only 3 of the 30 included studies reported cost-effectiveness analyses. These concluded that interventions were cost effective, but there is variability between costs of individual interventions and between the methods of analysis used. Of the 3 studies, 1 was based in the UK, Germany and Australia (+)¹ and 2 were based in the USA (1 [++]², 1 [+]³).

¹ Jebb 2011

² Diabetes Prevention Programme 2002

³ Hersey 2012

Evidence statement 1.11 Weight loss in programmes involving diet and exercise versus diet-only or exercise-only programmes

Strong evidence from a meta-analysis of trials indicates that BWMPs that involve both diet and exercise can lead to greater weight loss over a 12 to 18-month period than those that involve diet only or exercise only. Pooled

results showed that mean weight loss at 12 to 18 months was significantly higher in programmes that involved diet and exercise than in those that involved diet alone (mean difference -1.79 kg, 95% CI -2.86 to -0.72 , $I^2=30\%$) or in those that involved exercise alone (mean difference -6.33 kg, 95% CI -7.30 to -5.37 , $I^2=9\%$). Data in the diet-only comparison comes from 6 randomised controlled trials involving 535 participants: 4 were conducted in the USA (2 [++]¹, 2 [+]²), 1 in Sweden (++)³, and 1 in Belgium (+)⁴. Data in the exercise-only comparison comes from 5 randomised controlled trials involving 602 participants: 4 studies were conducted in the USA (2 [++]¹, 2 [+]⁵) and 1 in Sweden (++)³.

¹ Foster-Schubert 2012, Villareal 2011

² Skender 1996, Wadden 1988

³ Bertz 2012

⁴ Vissers 2010

⁵ Rejeski 2011, Skender 1996

Evidence statement 1.12 Weight loss by programme delivery type

Weight loss at 12 months did not significantly differ between individual, group or combined programmes when they were compared using random effects meta-regression. [Findings are from the 29 RCTs listed in [Evidence Statement 1.1](#)].

There was weak trial evidence to suggest that there is no difference in weight loss at 12 to 18 months between programmes delivered by in-person contact versus those delivered by remote contact only. Of 3 studies that provided direct comparisons on this variable, none detected a significant effect. Pooled results also did not detect a significant effect (mean difference -0.17 kg, 95% CI -1.23 to 0.89) but were highly heterogeneous ($I^2=65\%$). The 3 RCTs represented 624 participants and all 3 were conducted in the USA (2 [++]¹, 1 [+]²).

¹ Appel 2011, Rock 2010

² Micco 2007

Evidence statement 1.13 Weight loss by professional background of therapist

There was moderate observational evidence to suggest that interventions that involved contact with a dietitian* were associated with greater weight loss than those that did not involve dietitian contact. This variable was not significant in a single variable meta-regression, but was significant when adjusted for presence or absence of a set energy prescription (coefficient -1.5 kg, 95% CI -2.9 to -0.1). Fifteen randomised controlled trials testing interventions that involved dietitian contact were included in this comparison: 6 were conducted in the USA (all [++])¹, 2 in Sweden (both [++])², 2 in the Netherlands (+)³, and 1 each in Belgium (+)⁴, Finland (++)⁵, New Zealand (+)⁶, Portugal (+)⁷ and the UK (+)⁸. These were compared with 14 randomised controlled trials that involved interventions with no dietitian contact: 8 were conducted in the USA (6 [++]⁹, 2 [+]¹⁰), 2 in the UK (1 [+]¹¹, 1 [++]¹²), 1 was a multicentre study conducted in the UK, Germany and Australia (+)¹³, and 1 each was conducted in Australia (++)¹⁴, Canada (++)¹⁵, and Switzerland (-)¹⁶.

¹ Diabetes Prevention Programme 2002, Foster-Schubert 2012, Patrick 2011, Stevens 1993, Stevens 2001, Villareal 2011

² Bertz 2012, Eriksson 2009

³ Mensink 2003, Vermunt 2011

⁴ Vissers 2010

⁵ Lindstrom 2003

⁶ Dale 2008

⁷ Silva 2010

⁸ Penn 2009

⁹ Appel 2011, Fitzgibbon 2010, Heshka 2003, Kuller 2012, Rock 2010, Wadden 2011

¹⁰ Hersey 2012, Rejeski 2011

¹¹ Jolly 2011

¹² Nanchahal 2011

¹³ Jebb 2011

¹⁴ Morgan 2011

¹⁵ Ross 2012

¹⁶ Munsch 2003

* 'Dietitian' is a protected term in the UK and US. The above statement refers to registered dietitians or, in the case of Lindstrom 2003, to the Finnish equivalent. The majority of studies do not offer detail on the frequency, length or nature of the contact with dietitians, but 'contact with dietitians' in this statement refers to a minimum of 1 contact (face to face or telephone) in the majority of cases.

Evidence statement 1.14 Weight loss by supervised versus recommended exercise

There is inconsistent trial evidence as to whether programmes that involve supervised exercise lead to greater weight loss than those that recommend exercise only. Two randomised controlled trials provided direct comparisons between supervised and recommended exercise. One study, conducted in the USA (+)¹, found that at 18 months participants in the group without supervised exercise lost significantly more weight than those in the group with supervised exercise (supervised versus recommended mean difference 2.90 kg, 95% CI 0.09 to 5.71). In contrast, in the second study, conducted in Brazil (++)², participants in the arm with supervised exercise lost more weight at 12 months, but the difference was not statistically significant (supervised versus recommended mean difference -0.90 kg, 95% CI -4.06 to +2.26).

Subgroup analysis suggested that supervised exercise led to greater weight loss, but results were highly heterogeneous. Meta-regression did not detect a significant association.

¹ Jeffrey 1998

² Seligman 2011

Evidence statement 1.15 Weight loss by energy intake prescription

There is strong observational evidence that programmes that specify a daily energy intake are associated with greater weight loss than those that do not prescribe an energy intake. Meta-regression detected a significant association of set energy prescriptions and greater weight loss at 12 to 18 months (coefficient -3.3 kg, 95% CI -4.7 to -1.9 , $p < 0.001$). This association persisted and remained largely unchanged when adjusting for the involvement of a dietitian. These findings are consistent with a subgroup analysis on this variable. These analyses included 13 RCTs with no set daily energy intake in the following countries: 3 USA (2 [++]¹, 1 [+]²), 3 UK (1 [++]³, 2 [+]⁴), 2 Netherlands (both [+])⁵, 1 Sweden (++)⁶, 1 New Zealand (+)⁷, 1 Finland (++)⁸, 1 Switzerland (-)⁹ and 1 Canada (++)¹⁰. It also included 16 studies with set daily energy intake in the following countries: 10 USA (9 [++]¹¹, 1 [+]¹²), 1 Sweden (++)¹³, 1 multi-country (+)¹⁴, 1 UK (+)¹⁵, 1 Australia (++)¹⁶, 1 Portugal (++)¹⁷ and 1 Belgium (+)¹⁸.

¹ Diabetes Prevention Programme 2002, Patrick 2011

² Hersey 2012

³ Jolly 2011

⁴ Nanchahal 2011, Penn 2009

⁵ Mensink 2003, Vermunt 2011

⁶ Eriksson 2009

⁷ Dale 2008

⁸ Lindstrom 2003

⁹ Munsch 2003

¹⁰ Ross 2012

¹¹ Appel 2011, Fitzgibbon 2010, Foster-Schubert 2012, Kuller 2012, Rock 2010, Stevens 1993, Stevens 2001, Villareal 2011, Wadden 2011

¹² Rejeski 2011

¹³ Bertz 2012

¹⁴ Jebb 2011

¹⁵ Jolly 2011

¹⁶ Morgan 2011

¹⁷ Silva 2011

¹⁸ Vissers 2010

Evidence statement 1.16 Weight loss by programme length

The majority of included programmes (28 of those included) lasted more than 6 months; no programmes lasted less than 3 months (as evidence statement 1.1).

There is weak observational evidence from meta-regression that weight loss at 12 months is not associated with programme length. Univariate results suggested that each additional month of programme up to 12 months was associated with an additional 0.3 kg weight loss (95% CI -0.5 to -0.1, $p = 0.009$). However, this result was no longer significant when adjusted for set energy prescriptions and dietitian involvement. Results are therefore inconsistent with a subgroup analysis that found greater weight loss in programmes lasting longer than 6 months. The analyses of programme length included 3 RCTs with programmes lasting up to 3 months in the following countries: 1 Sweden (++)¹, 1 UK (+)², 1 Australia (++)³;. There were 2 studies

with programmes lasting 4 to 6 months: 1 in New Zealand (+)⁴ and 1 in Switzerland (-)⁵. There were 24 studies with programmes lasting longer than 6 months in the following countries: 14 USA (12 [++]⁶, 2 [+]⁷), 2 UK (1 [++]⁸, 1 [+]⁹), 2 Netherlands (both [+])¹⁰, 1 Sweden (++)¹¹, 1 Canada (++)¹², 1 Finland (++)¹³, 1 Portugal (++)¹⁴, 1 Belgium (+)¹⁵ and 1 multi-country (UK, Germany, Australia) (+)¹⁶.

¹ Bertz 2012

² Jolly 2011

³ Morgan 2011

⁴ Dale 2008

⁵ Munsch 2003

⁶ Appel 2011, Diabetes Prevention Programme 2002, Fitzgibbon 2010, Foster-Schubert 2012, Heshka 2003, Kuller 2012, Rock 2010, Stevens 1992, Stevens 2001, Villareal 2011, Wadden 2011

⁷ Hersey 2012, Rejeski 2011

⁸ Nanchahal 2011

⁹ Penn 2009

¹⁰ Mensink 2003, Vermunt 2011

¹¹ Eriksson 2009

¹² Ross 2012

¹³ Lindstrom 2003

¹⁴ Silva 2011

¹⁵ Vissers 2010

¹⁶ Jebb 2011

Evidence statement 1.17 Weight loss by number of sessions

The vast majority of included programmes had contact at least weekly or fortnightly. The number of sessions offered ranged from 2 to 216 sessions (median 39 sessions) (as evidence statement 1.1).

There is moderate observational evidence that weight loss at 12 to 18 months is not associated with the number of intervention sessions offered (up to 12 months). Pooled results from direct comparisons in which participants were randomised to more sessions or fewer sessions favoured providing more sessions but were not statistically significant (mean difference -0.23 kg, 95% CI -0.57 to $+0.12$, $I^2=25\%$). In a meta-regression, a significant association was found between number of sessions and weight loss at 12 months, with each additional session associated with an additional 0.03 kg weight loss in a single variable model (95% CI -0.04 to -0.01 , $p=0.004$). The association remained significant when adjusting for presence of a set energy prescription, but was no longer significant when also adjusting for involvement of a dietitian. Direct comparisons come from 6 RCTs, 5 of which were conducted in the USA (4 $[++]$ ¹, 1 $[+]$ ²) and 1 in Japan ($+$)³.

¹ Appel 2011, Kumanyika 2012, Logue 2005, Tate 2003

² Hersey 2012

³ Saito 2011

Evidence statement 1.18 Association of behavioural change techniques with weight loss

There was strong evidence from trials that the following behavioural change techniques are used in most BWMPs: goal setting and review of goals (behaviour and outcome); action planning; barrier identification and/or problem solving; graded tasks; self-monitoring of behaviour; feedback on performance; instruction on how to perform behaviour; and planning social support and/or social change. There was moderate observational evidence from meta-regression that use of a greater number of behavioural techniques (within a domain named 'comparison of behaviour' which included providing

information about others' approval; provide normative information about others' behaviour; model/demonstrate the behaviour; facilitate social comparison) was associated with greater weight loss. Addition of techniques was associated with an additional 1.5kg weight loss at 12 months (95%CI -2.9 to -0.1). There is no evidence from observational data that other behavioural techniques groups were associated with greater weight-loss. Findings are from the 29 RCTs listed in [Evidence Statement 1.1](#).

Evidence statement 1.19 Applicability of available data (weight regain)

There is a large body of evidence on BWMPs that was judged to be of high quality and applicable to the UK. Eleven RCTs provide follow-up data for weight after an active intervention (contact more frequently than once every 2 months). Of the 11 RCTs identified, all were judged to be applicable to the UK population and to be of high external validity; 3 were from the UK (1 [++]¹, 2 +[²), 2 from the USA (both [++]³) and 1 each from Australia (++)⁴, Belgium (+)⁵, Finland (++)⁶, New Zealand (+)⁷, Sweden (++)⁸ and Switzerland (-)⁹.

¹ Jolly 2011

² Nanchahal 2011, Penn 2009

³ Diabetes Prevention Programme 2002, Kuller 2012

⁴ Morgan 2011

⁵ Vissers 2010

⁶ Lindstrom 2003

⁷ Dale 2008

⁸ Bertz 2012

⁹ Munsch 2003

Evidence statement 1.20 Rate of weight-loss regain after Multicomponent behavioural weight management programmes

There is strong trial evidence that following a multicomponent behavioural weight management programme and during low contact follow-up (once every 2 months or less), weight regain is 0.047 kg/month (95 CI% 0.029 to 0.066) higher than in a control group. Meta-regression on the rate of weight regain included 11 RCTs in the following countries: 3 UK (1 [++]¹, 2 [+]²), 2 USA (2 [++]³) and 1 each from Australia (++)⁴, Belgium (+)⁵, Finland (++)⁶, New Zealand (+)⁷, Sweden (++)⁸ and Switzerland (-)⁹.

¹ Jolly 2011

² Nanchahal 2011, Penn 2009

³ Diabetes Prevention Programme 2002, Kuller 2012

⁴ Morgan 2011

⁵ Vissers 2010

⁶ Lindstrom 2003

⁷ Dale 2008

⁸ Bertz 2012

⁹ Munsch 2003

Evidence statement 1.21 Effect of Multicomponent behavioural weight management programme characteristics on the rate of weight regain after programme end

There is moderate observational evidence that the amount of weight-lost at the end of the active intervention (contact more frequently than once every 2 months), supervised exercise during the active intervention phase and behavioural technique score were not associated with rate of weight regain. There is weak observational evidence that type of contact (group, individual or combination of both), number of contacts, frequency of contacts, set energy

prescription and the professional background of the therapist during the active intervention phase were not associated with rate of weight regain. Meta-regression of programme characteristics on the rate of weight regain included 11 RCTs in the following countries: 3 UK (1 [++]¹, 2 [+]²), 2 USA (both [++]³) and 1 each from Australia (++)⁴, Belgium (+)⁵, Finland (++)⁶, New Zealand (+)⁷, Sweden (++)⁸ and Switzerland (-)⁹.

¹ Jolly 2011

² Nanchahal 2011, Penn 2009

³ Diabetes Prevention Programme 2002, Kuller 2012

⁴ Morgan 2011

⁵ Vissers 2010

⁶ Lindstrom 2003

⁷ Dale 2008

⁸ Bertz 2012

⁹ Munsch 2003

Evidence statement 1.22 Effect of ease of activity during a behavioural weight management programme on the rate of weight regain after programme end

There is moderate observational evidence that needing specific equipment or settings for physical activity sessions during the active intervention is associated with faster weight regain after the programme end (0.19 kg/month, 95% CI 0.048 to 0.33; p=0.01). Meta-regression included 11 RCTs in the following countries: 3 UK (1 [++]¹, 2 [+]²), 2 USA (both [++]³) and 1 each from Australia (++)⁴, Belgium (+)⁵, Finland (++)⁶, New Zealand (+)⁷, Sweden (++)⁸ and Switzerland (-)⁹. Of these, 3 interventions from 2 studies needed specific equipment or settings to perform activity during the active intervention: 1 New Zealand study (+)⁷ and 1 in Belgium (+)⁵.

¹ Jolly 2011

² Nanchahal 2011, Penn 2009

³ Diabetes Prevention Programme 2002, Kuller 2012

⁴ Morgan 2011

⁵ Vissers 2010

⁶ Lindstrom 2003

⁷ Dale 2008

⁸ Bertz 2012

⁹ Munsch 2003

Evidence statement 1.23 Effective weight-loss maintenance interventions

There is a lack of high quality reviews on the effectiveness of weight-loss maintenance interventions. There is weak evidence that after weight-loss, the use of a low-fat diet, an increased protein intake, and increased contact frequency and problem solving as part of a [weight maintenance](#) programme can be effective in reducing weight regain. There is weak evidence that [weight-loss maintenance](#) programmes containing diet and exercise are more effective than those containing diet alone. Increased protein intake, low fat diets, increased contact frequency and problem solving are reviewed in 1 systematic review conducted in the USA (+)¹ looking at the findings of 42 studies. Physical activity is reviewed in 2 systematic reviews conducted in the USA (1 [+]¹, 1 [-]²); these include 42 studies, of which 4 were present in both reviews.

¹ Turk 2009

² Catenacci and Wyatt 2007

Evidence statement 2.1 Motivation for weight-loss

There is moderate evidence that people in BWMPs are largely motivated to lose weight for reasons of health and appearance. There is moderate evidence that older service users tend to be more motivated by improvements in health and younger service users tend to be more motivated by improvements in appearance. Evidence on health as a motivator is from 6 studies in the UK (5 [++]¹, 1 [+]²) and 1 systematic review³. Evidence on appearance as a motivation is from 6 studies in the UK (4 [++]⁴, 1 [+]², 1 [-]⁵).

¹ Withnall 2008, Gimlin 2007, Greener 2010, Herriot 2008, Gray 2013

² Rowe 2010

³ In Press. Note: quality was not assessed for this systematic review because it was used to provide context rather than as a primary source of evidence.

⁴ Withnall 2008, Gimlin 2007, Greener 2010, Herriot 2008

⁵ Study commercial in confidence

Evidence statement 2.2 Views of group programmes

There is inconsistent evidence as to whether group support is perceived to be beneficial in BWMPs. In some studies, service users perceive group support to be one of the main benefits of attending a weight-loss programme. However, a number of studies described service users' negative responses to group support and desire for a personalised approach. Evidence in favour of group support is from 15 studies in the UK (9 [++]¹, 4 [+]², 2 [-]³). Evidence in favour of more personalised support is from 8 studies in the UK (4 [++]⁴, 2 [+]⁵, 2 [-]⁶).

¹ Ahern 2013, Gimlin 2007, Greener 2010, Herriot 2008, Hunt 2013, NHS North Somerset Doc 2 2013, Visram 2009, Gray 2013, Withnall 2008

² Study commercial in confidence

³ Hindle 2012, Study commercial in confidence

⁴ Bidgood 2005, Counterweight Project 2008, Visram 2009, Gray 2013

⁵ Study commercial in confidence

⁶ NHS SCH. Shropshire Community Health NHS Trust Doc 1 2013, Shropshire Community Health NHS Trust Doc 2. 2013, Study commercial in confidence

Evidence statement 2.3 Views of male-only interventions

There is strong evidence that male service users believe the ability to have male-oriented conversations is a benefit to men who choose to attend men-only weight-loss services. There is strong evidence that participants of men-only groups perceive an approach that feeds into the male identity and encourages competitiveness both with themselves and with other men to be more effective. This is based on 3 studies in the UK (2 [++]¹, 1 [+]²) and 1 systematic review³.

¹ Hunt 2013, Gray 2013

² Study commercial in confidence

³ In press. Note: quality was not assessed for this systematic review because it was used to provide context rather than as a primary source of evidence.

Evidence statement 2.4 Views of meeting structure and content

There is weak evidence that users perceive the routine of regular meetings as a benefit of attending a BWMP. This is based on 2 studies in the UK (1 [++]¹, 1 [-]²). There is strong evidence that a regular weigh in by a group leader or health professional is seen by service users as a strong motivator for changing their behaviour and reaching their targets. This is based on 6 studies in the UK, all (++)³.

¹ Counterweight Project 2008

² Hindle 2012

³ Ahern 2013, Allan 2010, Herriot 2008 NHS North Somerset Doc 2 2013, Penn 2008, Reed 1999

Evidence statement 2.5 Views of programme characteristics

There is strong evidence that users of BWMPs with supervised physical activity perceive this to be an effective component, and strong evidence that users of BWMPs without supervised physical activity would like it to have been incorporated. This is based on 7 studies in the UK (4 [++]⁴, 1 [+]⁵, 2 [-]⁶). There is strong evidence that users perceive the personality and approach of the group leader to affect the effectiveness of the programme. This is based on 11 studies in the UK (2 [++]¹, 3 [+]², 2 [-]³). There is strong evidence that participants of BWMPs feel that longer term support would be beneficial, regardless of initial programme length. This is based on 11 studies in the UK (6 [++]⁷, 2 [+]⁸, 3 [-]⁹).

¹ Herriot 2008, Gray 2013

² Study commercial in confidence, Weight Management Services Research 2011, Rowe 2010

³ Hindle 2012, Shropshire Community Health NHS Trust Doc 2. 2013

⁴ Ahern 2013, Allan 2010, NHS North Somerset Doc 2 2013, Withnall 2008

⁵ Study commercial in confidence

⁶ Study commercial in confidence, NHS SCH. Shropshire Community Health NHS Trust Doc 1 2013, Shropshire Community Health NHS Trust Doc 2. 2013

⁷ Bidgood 2005, Counterweight Project 2008, Gray 2013, Greener 2010, Herriot 2008, Nield 2012

⁸ Study commercial in confidence

⁹ Study commercial in confidence, NHS SCH. Shropshire Community Health NHS Trust Doc 1 2013, Shropshire Community Health NHS Trust Doc 2. 2013

Evidence statement 2.6 Views of dietary components of BWMPs

There is strong evidence that users and potential users of BWMPs prefer diets with a simple message, that do not ban particular foods, that are considered family friendly, that do not incur any extra cost and that are not perceived to be repetitive or boring. Users and potential users of BWMPs perceive these types of diet to be more successful. This is based on 6 studies in the UK (3 [++]¹, 2 [+]², 1 [-]³).

¹ Withnall 2008, Herriot 2008, Gray 2013

² Study commercial in confidence, Rowe 2010

³ Study commercial in confidence

Evidence statement 2.7 Barriers to attendance

There is strong evidence that practical issues are perceived by users to be the main barriers to attendance at BWMPs. These practical issues are childcare, work, cost and time. This is based on 12 studies in the UK (8 [++]¹, 3 [+]², 1 [-]³). There is moderate evidence that feeling judged, [stigmatised](#) or embarrassed is a further barrier to attendance. This is based on 7 studies in the UK (5 [++]⁴, 1 [+]⁵, 1 [-]³). Finally, there is weak evidence that users perceive not losing weight to be a barrier to further attendance. This is based on 2 studies in the UK (1 [++]⁶, 1 [+]⁷).

¹ Ahern 2013, Counterweight Project 2008, Gray 2013, Greener 2010, Lavin 2006, NHS North Somerset Doc 2 2013, Thompson 2000, Withnall 2008

² Study commercial in confidence, Weight Management Services Research 2011, Rowe 2010

³ Study commercial in confidence

⁴ Bidgood 2005, Counterweight Project 2008, Gray 2013, Thompson 2000, Withnall 2008

⁵ Weight Management Services Research 2011

⁶ Lavin 2006

⁷ Study commercial in confidence

Evidence statement 2.8 Facilitators to delivery: structural

There is no evidence as to what structural components facilitate BWMP delivery. However, there is moderate evidence that the following structural components are perceived to act as facilitators to provision and delivery of BWMPs: active GP and primary care staff involvement and clear routes of communication between primary care staff and BWMP providers. This is based on qualitative data from 3 UK studies (2 [++]¹, 1 [+]²).

¹ Counterweight Project 2008, Lavin 2006

² Study commercial in confidence

Evidence statement 2.9 Facilitators to delivery: opinions and attitudes

There is no evidence as to whether the opinions and attitudes of primary care staff and commissioners facilitate BWMP provision. However, there is moderate evidence that some primary care staff and commissioners hold the following positive opinions and attitudes: perceptions that BWMPs are effective at inducing weight loss; confidence among primary care staff in their ability to raise and tackle the topic of obesity with patients; and perceiving obesity treatment to fall within their role. This is based on qualitative data from 5 studies conducted in the UK (3 [++]¹, 2 [+]²), in which the majority of respondents were practitioners engaged with programme delivery.

¹ Counterweight Project 2008, Greener 2010, Hoppe 2007

² Report from the Campaign Company 2008, Study commercial in confidence

Evidence statement 2.10 Barriers to service delivery: opinions and attitudes

There is no evidence as to whether the opinions and attitudes of primary care staff and commissioners act as barriers to BWMP provision. There is moderate evidence that some people directly and indirectly involved with

provision of BWMPs hold negative attitudes about the effectiveness of these programmes. There is also moderate evidence that some healthcare providers perceive obesity management to be outside their primary role and that some believe there are issues with insufficient training, knowledge, or ability to motivate patients. Evidence on perceived lack of effectiveness comes from 7 studies conducted in the UK (4 [+]¹, 2 [+]², 1 [-]³). Evidence on perceived role and abilities comes from 5 studies conducted in the UK (4 [++]¹, 1 [-]³).

¹ Counterweight Project 2008, Epstein 2005, Greener 2010, Hoppe 2007

² Report from the Campaign Company 2008, Study commercial in confidence

³ Hindle 2012

Evidence statement 2.11 Best practice for referral to BWMPs

There was no evidence with which to judge the effect of referral programmes on subsequent take up of and adherence to BWMPs. Five studies describe processes currently in place for referral into BWMPs: 4 of these require some form of approval or referral from primary care staff. There is weak evidence that participants who are referred by a GP have an increased sense of obligation and responsibility to attend due to the use of public funding and accountability to the GP. This is based on qualitative data from 4 studies conducted in the UK, (2 [++]¹, 2 [+]²). Two studies were evaluations of the same commercial weight management programme. There is moderate evidence that some primary care staff lack adequate understanding of the referral process to BWMPs. Evidence comes from qualitative data from 4 studies conducted in the UK (1 [++]³, 2 [+]⁴, 1 [-]⁵).

¹ Counterweight Project 2008, Visram 2009

² Study commercial in confidence

³ Gray 2013

⁴ Report from the Campaign Company 2008, Study commercial in confidence

⁵ Hindle 2012

Evidence statement 2.12 Commissioning

There is no evidence that commissioning in one way rather than another leads to better outcomes for users of behavioural weight loss services. There are 4 pieces of guidance for commissioners that are derived from expert opinion informed by reviews of relevant literature, although 1 is primarily on commissioning hospital-based weight management services¹. One piece of guidance states that services should be commissioned that operate in line with NICE guidelines on the management of obesity². One states that services should report on a comprehensive range of baseline and follow-up data³, although another reflects uncertainty about the practicability of assessing changes in diet and physical activity⁴.

¹ Royal College of Physicians 2013

² Cavill 2010

³ Roberts 2009

⁴ Department of Health 2013

Evidence statement 2.13 Commissioning

One piece of guidance states that commissioned services should report data on attendance and weight loss and that these should be used as evidence that the service is effective¹. In randomised trials in which the 95% confidence intervals shows more than 2 kg difference in weight loss compared with controls at 12 months, 5 out of 5 interventions that report sufficient data (see evidence statements 1.1 to 1.3) would have met the attendance standard defined by the guidance as indicating effectiveness (that is, 60% of participants complete the intervention*) and 14 out of 14 interventions would have met at least 1 of the weight loss standards (that is, 3% mean weight loss and at least 30% of participants lose at least 5% of their initial weight)**. In randomised trials in which the 95% confidence intervals showed a less than 2 kg difference in weight loss compared with controls at 12 months, 1 out of 1 interventions would have met the attendance standard and 0 of 8 would have

met the weight loss standard defined as indicating effectiveness in the guidance. This suggests that the standards defined by the guidance are able to help identify interventions that are more likely to be effective. Findings for this statement are from the 29 RCTs listed in [Evidence Statement 1.1](#)

¹ Department of Health 2013

* This means a minimum of 60% of all engaged participants complete the intervention. Engaged participants are those who have attended at least 2 sessions. Completion is measured as participants attending at least 1 of the last 3 sessions of the intervention.

** At the end of the intervention, participants who have attended at least 1 session of the intervention have a mean weight loss of at least 3% of their initial weight, and at least 30% of all participants have a weight loss of at least 5% of their initial weight. Both these minimums are measured using baseline observation carried forward analysis (classed as all participants who have attended at least 1 session of the intervention).

Evidence statement 2.14 Training

There is no evidence that any particular type of training leads to more effective BWMPs. There is strong evidence from a meta-analysis of trials that BWMPs delivered by people who have been trained can lead to significantly greater weight loss than multiple weight management sessions delivered by people who have not received specific weight management training (mean difference -4.30 kg, 95% CI -4.66 to -3.93), although statistical heterogeneity is substantial ($I^2=94\%$). Evidence comes from 8 randomised controlled trials: 5 conducted in the USA (all [++])¹; 1 in New Zealand (+)²; 1 in Switzerland (-)³; and 1 multicentre study conducted in Germany, the UK, and Australia (+)⁴.

¹ Diabetes Prevention Programme 2002, Heshka 2003, Rock 2010, Vilareall 2010, Wadden 2011

² Dale 2009

³ Munsch 2003

⁴ Jebb 2011