Appendix 1. Evidence summary

Summary of new evidence from 2-year surveillance	Summary of new intelligence from 2-year surveillance	Impact
Recommendation 1: Adopt an integrated approach to preventing and managing obesity ES: EP2, EP4, IDE		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 2: Ensure services cause no harm ES: 1.9, EP1, EP2, EP3, IDE		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 3: Raise awareness of local weight management issues among commissioners ES: 2.8, 2.9, 2.10, EP2, EP4, CR, IDE		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 4: Raise awareness of local weight management services among health and social care professionals ES: 2.8, 2.9, 2.10, EP2, EP4, CR, IDE		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 5: Raise awareness of lifestyle weight management services among the local population ES: 2.1, EP2, EP4, CR, IDE		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 6: Refer overweight and obese adults to a lifestyle weight management programme		

ES: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 1.12, 2.1, 2.2, 2.3, 2.4, 2.5, 2.7, 2.8, 2.9, 2.11; EP1; EP2; CR, EM		
Eight systematic reviews[1-5,15,19,20] and 15[6-14,16-18,21-23] RCTs were identified that relate to the effectiveness of lifestyle weight management programmes (LWMPs) for overweight and obese adults. **Evidence that supports existing recommendation:** A systematic review [1] of 14 RCTs evaluated the effectiveness of combined exercise and dietary interventions in obese and overweight adults. Findings indicated an average maintained weight loss of 5.5kg after approximately 21 months with an average weight regain of 5.1kg. A systematic review [2] included 67 studies in which interventions achieved >5% weight loss from baseline and a maintenance phase during which the >5% weight loss was maintained to 12 months. Significant safe weight loss required an energy deficit, usually through reduced fat intake. Increased dietary fibre was also a component of 21% of successful interventions. Physical activity was included in 88% of successful interventions, and behaviour training such as self-monitoring was part of 92% of successful interventions. The same combination of energy and fat restriction, regular physical activity, and behavioural strategies was also required for successful weight maintenance. A systematic review [3] included 45 studies with interventions comparing weight loss among participants using commercial weight loss programmes vs either no intervention, education-only control or behavioural counselling. At 12 months: WeightWatchers™ participants achieved at least 2.6% more weight loss than those in control/education groups; and Jenny Craig™ resulted in at least 4.9% greater weight loss than control/education. A systematic review [4] of 35 studies of multi-level interventions (i.e. those that targeted both the individual and environment levels) to improve obesity-related behaviours found that overall they had the potential to: reach a large number of people; achieve the assumed	Initial intelligence gathering and 1 topic expert identified several ongoing studies which are summarised at the end of this Table. To note: several other NICE guidelines also make recommendations around referring overweight and obese adults to lifestyle weight management programmes (CG143, PH11, PH27, PH28, PH38, PH42 and PH54). Some of these guidelines use slightly different BMI thresholds to PH53 when recommending referral. The Surveillance & Methodology team have discussed these discrepancies and concluded that they arise from focusing on different sub-populations within the other guidelines (for example; pregnant women and people at risk of diabetes).	**New evidence was identified that does not impact on the recommendation** Recommendation 6 instructs health and social care professionals to identify overweight and obese adults and then refer them to a LWMP. Overall, the evidence broadly supports the recommendation that LWMPs that include components addressing diet, physical activity and behaviour change are effective at reducing weight among overweight and obese adults. However, several studies indicated that the effectiveness of LWMPs was not sustained beyond 12 months. 5 SRs[1-5] and 12 RCTs15[6-14,16-18] demonstrated that LWMPs were generally effective in achieving weight loss at 12 month follow-up. Only 1 SR[3] and 6 RCTs[6,8,11,12,13,14] demonstrated the effectiveness of LWMPs beyond 12 month follow-up. 1 SR[15] found mixed evidence of the effectiveness of LWMPs delivered in workplaces: results varied widely and in 1 study, weight loss was greater in the control group. 1 SR[19] found mixed evidence of the effectiveness of technology-assisted weight management interventions. 1 RCT[17] found evidence that a LWMP incorporating mindfulness training was no more effective that a diet/exercise-

goals; be broadly adopted; and be sustained. The highest potential public health impact was found in multi-level interventions that: 1) focused on all levels at the beginning of the planning process, 2) guided the implementation process using diffusion theory, and 3) used a website to disseminate the intervention. A systematic review[5] of 4 studies found low quality evidence that community-based interventions appeared generally effective in promoting weight reduction in South Asian people. There was limited evidence for effects on behaviour. The inclusion of individual feedback and community workers in deprived communities appeared important to the acceptability of the interventions. Overall there was a paucity of evidence around dietary and physical activity interventions for South Asian populations. A 4 year RCT [6] compared a health education control with a physical activity and diet based intervention. Weight loss was significantly higher in the intervention group at 48 month follow-up (3.4 kg vs 0.2kg; p<0.001). An RCT[7] compared a 2.5 year intervention consisting of visits to a dietician and participation in physical activity classes with a control group (not described). Weight loss was initially higher in the intervention group but this difference decreased and became non-significant by 24 month follow-up. Participants in the intervention group demonstrated higher levels of physical activity up to 6.6 years post-intervention but this difference was non-significant when observed in per-protocol analyses. 1 RCT [8] evaluated SHINE, a weight loss intervention based on the Diabetes Prevention Program; participants either took part individually or in groups. After a 1 year intervention, participants received some continued contact in the form of monthly educator and coach calls. At 24 months, solo participants showed overall reductions in weight and waist circumference but with some weight regain between 12 and 24 months; group participants had further weight loss at 24 months.		only control. 1 RCT[21] compared 3 different modes of self-monitoring during an LWMP and weight loss was only significant in 1 group at 24 month follow-up. **Evidence around the long-term effectiveness of LWMPs may be an area of focus for a future update/surveillance review as per research recommendation 2.** Recommendation 6 includes an instruction to refer people to a group rather than an individual programme if they express no preference because, on average, group programmes tend to be more cost-effective; effectiveness/cost-effectiveness of group-based interventions is supported by evidence from 2 RCTs[823] There is some evidence from 2 SRs[19.20] and 1 RCT[21] of the effectiveness of LWMPs that include the use of digital or mobile phone technology (e.g. PDAs, SMS messages or apps). **This may be an area of research to look out for in a future update/surveillance review – this is discussed in more detail under Recommendation 9.**

Participants in 1 RCT [9] either received 12 months of Weightwatchers or 'standard care' as defined by national guidelines. There was a significant difference in weight loss between the 2 groups at 12 months (favouring the Weightwatchers group) but this was not sustained at 24 months. Both groups reported similar increases in physical activity during the study so the observed differences in weight loss are unlikely to be due to the PA component of the programmes. An RCT[10] in Finland compared a 12 month structured lifestyle counselling intervention with a delayed control among long-distance professional drivers. At 12 months, the intervention group had lost more weight but the reduction was modest and the difference became non-significant at 24 months. In 1 RCT[11], participants received either usual care, or a 3 month intervention delivered either in small groups led by lifestyle coaches or via a home-based DVD. During the maintenance phase, both intervention groups received lifestyle change coaching, remote support via email and access to a website for weight and PA goal setting/self-monitoring. At 15 month follow-up, the coach-led group and self-directed groups had both lost significantly more weight than the usual care control. Both interventions also achieved greater improvements in waist circumference. 1 RCT [12] evaluated weight loss maintenance following participation in a 20 session group LWMP: intervention participants were instructed to meet as self-sustaining groups for 18 months post-treatment while control participants received assessment only. No group differences or time X group interactions were observed. All participants achieved significant weight loss post-treatment with no significant regain at 18 month follow-up. Participants also experienced sustained changes in waist circumference, dietary and PA behaviour. A UK RCT [13] compared outcomes for men who attended a 12 week gender-tailored LWMP delivered through football clubs with men in a waitlist control group. Retention rates were > 80% throughout the		

12 week intervention and 76% intervention participants attended >80% of programme sessions. At 12 weeks, the intervention group lost significantly more weight than the comparison group (4.6% c.f. -0.6%, p<.001) and many maintained this to 12 months (intervention group baseline-12 month weight loss: 3.5%, p<.001). There were also improvements in self-reported physical activity and diet, many sustained long term. A pooled analysis of 2 RCTs[14] found that men participating in a commercial weight loss programme lost significantly more weight at 12 months than men who received limited support from healthcare professionals. Significantly better reductions in BMI and waist circumference were also observed. **Mixed or unclear findings (including non-significant results)** A systematic review [15] included 23 studies of workplace weight management interventions. The majority were multicomponent interventions. Intervention effectiveness was highest in 6-12 month trials although results ranged widely – in one trial, weight loss was higher in the control group. Some interventions achieved clinically significant benefits. An RCT[16] compared LWMPs with the same dietary and PA advice but of different intensity: the intervention group received more extensive advice and were followed up more frequently. Weight loss at 12 months favoured the intervention group but the difference was non-significant. Weight reduction again favoured the intervention group at 24 months (assumed to be non-significant) although it was modest in both groups. 1 RCT[17] compared a LWMP that included a mindfulness training component to a diet/exercise-only control. Weight loss in the mindfulness group was greater at both 12 and 18 months but these differences were not statistically significant. Differences in other risk factors such as waist circumference were also non-significant. 1 RCT [18] compared an intervention that included diet and exercise advice plus 32 group sessions of motivational interviewing with a		

control group who received diet/exercise advice every 3 months. 23.5% of non-diabetic patients in the intervention group lost >5% body weight at 12 months compared with 15.6% in the control group (p= not reported). 7.5% of non-diabetic patients in the intervention group lost >10% body weight at 12 months compared with 2.5% in the control group (p= not reported). Data for diabetic patients in both groups are not reported although authors conclude that the MI intervention was more effective for obese and overweight participants without diabetes that participants with diabetes. **Mode of delivery** A systematic review [19] evaluated trials of technology-based interventions aimed at reducing weight or maintaining weight loss in overweight and obese people. 27 studies were included with 13 studies showing significant effects on weight loss compared to controls. Interventions that demonstrated a combination of 4 or 5 of the following factors showed significant decreases in weight compared to controls: self-monitoring, counsellor feedback and communication, group support, use of a structured programme, and use of an individually tailored programme. No significant associations between programme adherence and weight loss found. Overall, evidence is lacking about the optimal use of technology in weight loss interventions. A meta-analysis[20] of 12 studies compared mobile phone apps with 'other approaches' to promoting weight loss and physical activity. Compared with control groups, use of an app was associated with significant changes in body weight and BMI. Findings were robust under sensitivity analysis and no publication bias was detected. A 3-arm RCT[21] compared 3 different versions of a cognitive-behavioural weight management programme complemented by an interactive website and brief telephone/email coaching. RCT1 group received written materials and basic web access, RCT2 received the same plus an interactive website, and RCT 3 received the same as RCT1/2 plus brief telephone/email coaching support. Participants in all 3 groups experienced significant weight loss after 15-18 months as well as increased physical activity and improvements in		

blood pressure. Weight loss was highest in the RCT3 group but the significance of between-group differences isn't reported. ICERs indicated that RCT1 and RCT2 were more cost-effective than RCT3. All participants in 1 RCT[22] received a multicomponent LWMP but were randomised to 3 types of self-monitoring: a paper diary, a Personal Digital Assistant (PDA) only or a PDA + daily tailored feedback. The mean percentage weight loss at 24 months was not different between groups and only the PDA+feedback group achieved a significant loss compared to baseline. Across all groups, weight loss was greater among participants with higher adherence to self-monitoring. 1 trial[23] compared 2 modes of delivering a LWMP: a face to face (F2F) clinic versus group conference calls. Weight change and maintenance was similar between the FTF and conference groups over 18 months but the telephone-delivered intervention cost $789.58 (p=NR) less per person to deliver.		
Recommendation 7: Address the expectations and information needs of adults thinking about joining a lifestyle weight management programme ES: 1.1, 1.3, 1.23, 2.1, 2.7, 2.8, 2.9; EP1, EP2, EP3, EP4; EM		
One RCT[10] was identified relating to addressing the expectations and information needs of adults thinking about joining a LWMP. An RCT[10] in Finland compared a 12 month structured lifestyle counselling intervention with a delayed control among long-distance professional drivers. At 12 months, the intervention group had lost more weight but the reduction was modest and the difference became non-significant at 24 months. The authors concluded that the long and irregular working hours of the target population may prevent them from making healthy lifestyle choices: this indicates a need for providers of LWMPs to discuss any concerns or barriers people may have to joining the programme as specified within this recommendation.	No evidence identified.	**New evidence was identified that does not impact on the recommendation** Recommendation 7 includes an instruction to LWMP providers to discuss any concerns or barriers that participants may have about joining the programme. 1 RCT[10] reinforced this aspect of the recommendation.

Recommendation 8: Improve programme uptake, adherence and outcomes ES: 2.1, 2.2, 2.4, 2.5, 2.7, 2.8, 2.11; EP2, CR		
One systematic review[19] and 1 RCT[22] were identified relating to aspects of this recommendation. All participants[22] in this trial received a multicomponent LWMP but were randomised to 3 types of self-monitoring: a paper diary, a PDA only or a PDA + daily tailored feedback. The mean percentage weight loss at 24 months was not different between groups and only the PDA+feedback group achieved a significant loss compared to baseline. Across all groups, weight loss was greater among participants with higher adherence to self-monitoring. 1 systematic review[19] evaluated trials of technology-based interventions aimed at reducing weight or maintaining weight loss in overweight and obese people. 27 studies were included with 13 studies showing significant effects on weight loss compared to controls. Interventions that demonstrated a combination of 4 or 5 of the following factors showed significant decreases in weight compared to controls: self-monitoring, counsellor feedback and communication, group support, use of a structured programme, and use of an individually tailored programme. No significant associations between programme adherence and weight loss was found. Overall, evidence is lacking about the optimal use of technology in weight loss interventions.	No evidence identified.	**New evidence was identified that does not impact on the recommendation** Recommendation 8 recommends that providers of LWPS should, from the outset, discuss programme content, goal setting, explore any issues that may affect participants' likelihood of benefiting from the programme; use regular weigh-in as an opportunity to monitor and review progress toward individual goals. One RCT[22] indicated that adherence was associated with positive weight loss outcomes. A SR[19] highlighted that self-monitoring, counsellor feedback and communication, group support, use of a structured programme, and use of an individually tailored programme is associated with significant decreases in weight; but did not find a significant association between programme adherence and weight loss.
Recommendation 9: Commission programmes that include the core components for effective weight loss ES: 1.2, 1.8, 1.9, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.22, 2.5, 2.6, 2.14; EP1, EP2, EP3; CR; EM		
Six systematic reviews[2,4,5,19,20,25] and 11[8,9,11,13,16-18,21-24] RCTs were identified that relate to the core components required for effective lifestyle weight management programmes (LWMP). **Evidence that supports existing rec:** A systematic review [2] included 67 studies in which interventions	Initial intelligence gathering and 1 topic expert identified several ongoing studies which are summarised at the end of this Table	**New evidence was identified that does not impact on the recommendation** Recommendation 9 provides guidance on the core components of a lifestyle

achieved >5% weight loss from baseline and a maintenance phase during which the >5% weight loss was maintained to 12 months. Significant safe weight loss required an energy deficit, usually through reduced fat intake. Increased dietary fibre was also a component of 21% of successful interventions. Physical activity was included in 88% of successful interventions, and behaviour training such as self-monitoring was part of 92% of successful interventions. The same combination of energy and fat restriction, regular physical activity, and behavioural strategies was also required for successful weight maintenance. A systematic review [19] evaluated trials of technology-based interventions aimed at reducing weight or maintaining weight loss in overweight and obese people. 27 studies were included with 13 studies showing significant effects on weight loss compared to controls. Interventions that demonstrated a combination of 4 or 5 of the following factors showed significant decreases in weight compared to controls: self-monitoring, counsellor feedback and communication, group support, use of a structured programme, and use of an individually tailored programme. No significant associations between programme adherence and weight loss found. Overall, evidence is lacking about the optimal use of technology in weight loss interventions. A systematic review[5] of 4 studies found low quality evidence that community-based interventions appeared generally effective in promoting weight reduction in South Asian people. The inclusion of individual feedback and community workers in deprived communities appeared important to the acceptability of the interventions. 1 RCT [18] compared an intervention that included diet and exercise advice plus 32 group sessions of motivational interviewing with a control group who received diet/exercise advice every 3 months. 23.5% of non-diabetic patients in the intervention group lost >5% body weight at 12 months compared with 15.6% in the control group (p= not reported). 7.5% of non-diabetic patients in the intervention group lost >10% body weight at 12 months compared with 2.5% in the control group (p= not reported). Data for diabetic patients in both		weight management programme required for effective weight loss. These include: a focus on life-long lifestyle change and the prevention of future weight gain, dietary targets, increasing physical activity, decreasing sedentary behaviour, behaviour change techniques, tailoring to needs of different groups and individuals, providing ongoing support and regular weighing. Six systematic reviews[2,4,5,19,20,25] and 11[8,9,11,13,16-18,21-24] RCTs were identified that relate to the core components required for effective lifestyle weight management programmes (LWMP). Overall, the evidence supported the importance of these core components and tailoring LWMPs to support the needs of different groups. Only 1 study was identified that does not support the recommendation that people should receive at least weekly or fortnightly LWMP sessions. This RCT[16] compared LWMPs with the same dietary and PA advice, but differing in intensity: the intervention group received more extensive advice and were followed up more frequently. Differences in weight loss were not significant between groups, perhaps indicating that more intensive support is not effective. There is mixed new evidence regarding the effectiveness of LWMPs that include a technology-based component (e.g. websites, mobile phone apps). One SR[4]

groups are not reported although authors conclude that the MI intervention was more effective for obese and overweight participants without diabetes that participants with diabetes. A UK RCT [13] compared outcomes for men who attended a 12 week gender-tailored LWMP delivered through football clubs with men in a waitlist control group. Retention rates were > 80% throughout the 12 week intervention and 76% intervention participants attended >80% of programme sessions. At 12 weeks, the intervention group lost significantly more weight than the comparison group (4.6% c.f. -0.6%, p<.001) and many maintained this to 12 months (intervention group baseline-12 month weight loss: 3.5%, p<.001). There were also improvements in self-reported physical activity and diet, many sustained long term. **Mode of delivery:** A systematic review[4] of multi-level interventions (i.e. those that targeted both the individual and environment levels) to improve obesity-related behaviours found that the included interventions (n=35) generally had the potential to: reach a large number of people; achieve the assumed goals; be broadly adopted; and be sustained. The highest potential public health impact was found in multi-level interventions that: 1) focused on all levels at the beginning of the planning process, 2) guided the implementation process using diffusion theory, and 3) used a website to disseminate the intervention. This may add some additional content to this recommendation (which is concerned with the core components for effective weight loss) although it is difficult to assess from the review abstract alone how strong the evidence is for the effectiveness of using diffusion theory and an intervention website. A meta-analysis [20] of 12 studies compared mobile phone apps with 'other approaches' to promoting weight loss and physical activity. Compared with control groups, use of an app was associated with significant changes in body weight and BMI. Findings were robust under sensitivity analysis and no publication bias was detected. All participants [22] in 1 RCT received a multicomponent LWMP but		found that obesity interventions with the highest impact tended to use websites to disseminate the intervention. A meta-analysis[20] found that the use of mobile phone apps was associated with positive weight outcomes, however it is not clear if these apps were used as part of a broader LWMP. 1 SR[25] reported that the use of technology-assisted behavioural interventions, particularly those that incorporate text messaging or email, may be effective for producing weight loss among overweight and obese adults although conclusions could not be drawn about the optimal use of technology. One RCT[22] found that there was no difference in weight loss between a group using a paper diary for self-monitoring during an LWMP and groups using a PDA. One RCT[21] found that weight loss was highest in a group receiving access to an interactive website + telephone/email coaching but this intervention was less cost-effective than less intensive versions of the intervention. **This may be an area of emerging research to focus on in a future update/surveillance review.** There was new evidence regarding the mode of delivering LWMPs. One RCT[23] found that weight change and maintenance was similar between groups receiving a LWMP in face to face clinics or group conference calls; however, the telephone-delivered intervention was cheaper. One RCT[8]

were randomised to 3 types of self-monitoring: a paper diary, a PDA only or a PDA + daily tailored feedback. The mean percentage weight loss at 24 months was not different between groups and only the PDA+feedback group achieved a significant loss compared with baseline. Across all groups, weight loss was greater among participants with higher adherence to self-monitoring. A 3-arm RCT[21] compared 3 different versions of a cognitive-behavioural weight management programme complemented by an interactive website and brief telephone/email coaching. RCT1 group received written materials and basic web access, RCT2 received the same plus an interactive website, and RCT 3 received the same as RCT1/2 plus brief telephone/email coaching support. Participants in all 3 groups experienced significant weight loss after 15-18 months as well as increased PA and blood pressure. Weight loss was highest in the RCT3 group but the significance of between-group differences isn't reported. ICERs indicated that RCT1 and RCT2 were more cost-effective than RCT3. 1 trial [23] compared 2 modes of delivering a LWMP: a face to face (F2F) clinic versus group conference calls. Weight change and maintenance was similar between the FTF and telephone groups over 18 months but the telephone-delivered intervention was cost $789.58 (p=NR) less per person to deliver. In 1 weight maintenance trial[24], participants who had participated in a LWMP in year one then went on to either continue receiving monthly counselling letters or to receive no further intervention. At 12 months follow-up, about 75% of weight loss was maintained by participants although there were no significant between-group differences in percentage weight regain. 1 RCT [8] evaluated SHINE, a weight loss intervention based on the Diabetes Prevention Program; participants either took part individually or in groups. After a 1 year intervention, participants received some continued contact in the form of monthly educator and coach calls. At 24 months, solo participants showed overall reductions in weight and waist circumference but with some weight		found that people participating in a group version of a LWMP maintained better weight loss than solo participants. One RCT[11] found that participants receiving either a group LWMP or a home-based LWMP both lost significantly more weight than a usual care control. **The most effective and cost-effective modes of delivering LWMPs (e.g. group vs individual or face-to-face vs remote) may be an area to focus on in a future update/surveillance review.**

regain between 12 and 24 months; group participants had further weight loss at 24 months. In 1 RCT[11], participants received either usual care, or a 3 month intervention delivered either in small groups led by lifestyle coaches or via a home-based DVD. During the maintenance phase, both intervention groups (group and DVD) received lifestyle change coaching, remote support via email and access to a website for weight and PA goal setting/self-monitoring. At 15 month follow-up, the coach-led group and self-directed groups had both lost significantly more weight than the usual care control. Both interventions also achieved greater improvements in waist circumference. 1 RCT[17] compared a LWMP that included a mindfulness training component to a diet/exercise-only control. Weight loss in the mindfulness group was greater at both 12 and 18 months but these differences were not statistically significant. **Unclear impact on recommendation:** A systematic review [25]of 39 articles indicates that the use of technology-assisted behavioural interventions, particularly those that incorporate text messaging or email, may be effective for producing weight loss among overweight and obese adults. Participants in 1 RCT [9] either received 12 months of Weightwatchers™ or 'standard care' as defined by national guidelines. There was a significant difference in weight loss between the 2 groups at 12 months (favouring the Weightwatchers™ group) but this was not sustained at 24 months. Both groups reported similar increases in physical activity during the study so the observed differences in weight loss are unlikely to be due to the PA component of the programmes. **Evidence that may conflict with existing recommendation:** An RCT[16] compared LWMPs with the same dietary and PA advice but of different intensity: the intervention group received more extensive advice and were followed up more frequently. Weight loss		

at 12 months favoured the intervention group but the difference was non-significant. Weight reduction again favoured the intervention group at 24 months (assumed to be non-significant) although it was modest in both groups.		
Recommendation 10: Commission programmes that include the core components to prevent weight regain ES: 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 2.5; EP2, EP3; EM		
Three SRs[1,2,26] and 8 RCTs[7,8,11-13,16,24,27] were identified relating to LWMP components required to prevent weight regain. This area was also prioritised for a search for evidence of effective weight maintenance interventions which might form part of a LWMP **or** follow completion of a LWMP. **Evidence that supports existing recommendation:** A systematic review and meta-analysis[26] of 45 RCTs evaluated interventions to maintain weight loss provided to initially obese adults who had lost >5% of their body weight. Behavioural interventions focusing on both food intake and physical activity resulted in an average difference of -1.56kg in weight regain compared with controls at 12 months. A systematic review[2] included 67 studies in which interventions achieved >5% weight loss from baseline and a maintenance phase during which the >5% weight loss was maintained to 12 months. Overall, for significant safe weight loss, an energy deficit was required, which was commonly achieved by reduced fat intake. Increased dietary fibre was also a component of 21% of successful interventions. Physical activity was included in 88% of successful interventions, and behaviour training such as self-monitoring was part of 92% of successful interventions. The same combination of energy and fat restriction, regular physical activity, and behavioural strategies was also required for successful weight maintenance. A systematic review[1] of 14 RCTs evaluated the effectiveness of combined exercise and dietary interventions in obese and overweight adults. Findings indicated a weight loss of 11.1 kg (about 13%) after an average of about 4 months from baseline; and an	Initial intelligence gathering and 1 topic expert identified several ongoing studies which are summarised at the end of this Table	**New evidence was identified that does not impact on the recommendation** Recommendation 10 provides guidance on the core components of a LWMP required to prevent weight regain. These include: fostering independence and self-management; discussing opportunities for ongoing support; stressing the importance of new dietary and activity habits; and promoting sustainable ways of maintaining weight in the long term. This evidence largely supports the existing recommendation. Two SRs[2,26] found that behavioural interventions focusing on both food intake and physical activity were more effective at reducing weight regain than controls among participants who had previously lost >5% of their body weight up to 12 months following an intervention; and 1 SR[1] reported that 21 months following a combined intervention, weight loss was still evident, but adults had regained an average of nearly half the weight they had initially lost at 4 months after the intervention. 1 RCT[7] found that a LWMP was more effective for weight loss than

average maintained weight loss of 5.5kg after approximately 21 months with an average weight regain of 5.1kg, i.e. weight loss was successful, but almost half of it was regained,. This potentially reinforces the evidence gap around what works for longer-term weight maintenance. An RCT[7] compared a 2.5 year intervention consisting of visits to a dietician and participation in physical activity classes with a control group (not described). Weight loss was initially higher in the intervention group but this difference decreased and became non-significant by 24 month follow-up. Participants in the intervention group demonstrated higher levels of physical activity up to 6.6 years post-intervention but this difference was non-significant when observed in per-protocol analyses. A UK RCT [13] compared outcomes for men who attended a 12 week gender-tailored LWMP delivered through football clubs with men in a waitlist control group. At 12 weeks, the intervention group lost significantly more weight than the comparison group (4.6% c.f. -0.6%, p<.001) and many maintained this to 12 months (intervention group baseline-12 month weight loss: 3.5%, p<.001). There were also improvements in self-reported physical activity and diet, many sustained long term. **Evidence that adds to rec:** In 1 weight maintenance trial[24], participants who had participated in a LWMP in year one then went on to either continue receiving monthly counselling letters or to receive no further intervention. At 12 months follow-up, about 75% of weight loss was maintained by participants although there were no significant between-group differences in percentage weight regain. 1 RCT [8] evaluated SHINE, a weight loss intervention based on the Diabetes Prevention Program; participants either took part individually or in groups. After a 1 year intervention, participants received some continued contact in the form of monthly educator and coach calls. At 24 months, solo participants showed overall reductions in weight and waist circumference but with some weight		a control group at 12 months but the difference was non-significant at 24 months, however, participants in the intervention group did maintain higher levels of physical activity up to 6.6 years post-intervention. 1 RCT[13] found that a gender-tailored LWMP produced better maintained weight loss at 12 months than a waitlist control but longer-term follow-up data are yet to be published. There is some new evidence from 5 RCTs around what may or may not work to maintain weight loss, but findings are mixed. 1 RCT[24] indicated that monthly counselling letters did not result in better weight maintenance than no intervention among participants who had initially lost weight via a LWMP. 1 RCT[8] indicated that participants who received a group LWMP maintained better weight loss at 24 months than participants who took part individually. 1 RCT[11] indicated that receiving lifestyle coaching and remote support via email during a maintenance phase resulted in greater weight loss than a usual-care control. However, another RCT[12] found that participants who met in self-directed groups post-LWMP did not lose/maintain significantly more weight than participants who received no further support post-LWMP. 1 RCT[27] seems to indicate weight maintenance strategies involving personal counselling/the internet are effective in older adults but findings are limited by lack of effect sizes and post-hoc analyses. **Interventions to maintain**

regain between 12 and 24 months; group participants had further weight loss at 24 months. In 1 RCT[11], participants received either usual care, or a 3 month intervention delivered either in small groups led by lifestyle coaches or via a home-based DVD. During the maintenance phase, both intervention groups (group and DVD) received lifestyle change coaching, remote support via email and access to a website for weight and PA goal setting/self-monitoring. At 15 month follow-up, the coach-led group and self-directed groups had both lost significantly more weight than the usual care control. Both interventions also achieved greater improvements in waist circumference. 1 RCT [12] evaluated weight loss maintenance following participation in a 20 session group LWMP: intervention participants were instructed to meet as self-sustaining groups for 18 months post-treatment while control participants received assessment only. All participants achieved significant weight loss post-treatment with no significant regain at 18 month follow-up. All participants also experienced sustained changes in waist circumference, dietary and PA behaviour. In 1 RCT[27], participants who had lost at least 4kg in an initial 6 month behavioural WLP were randomised to a 30 month maintenance phase of either 'self-directed control (SD), monthly personal counselling (PC), or unlimited access to an internet-based intervention (IT). In a secondary analysis, adults age >60 had greater initial weight loss and greater sustained weight loss over 3 years compared to younger adults. Older adults had greater weight loss maintenance where personal counselling or an internet-based intervention was used. **Unclear impact on rec:** An RCT[16] compared LWMPs with the same dietary and PA advice but of different intensity: the intervention group received more extensive advice and were followed up more frequently. Weight loss at 12 months favoured the intervention group but the difference was		**weight post-LWMP may be an area to focus on in a future update/surveillance review.**

non-significant. Weight reduction again favoured the intervention group at 24 months (assumed to be non-significant) although it was modest in both groups.		
Recommendation 11: Provide lifestyle weight management services based on the core components for effective weight loss and to prevention weight regain ES: 1.2, 1.8, 1.9, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21, 1.22, 1.23, 2.5, 2.6, 2.14; EP1, EP2, EP3; CR; EM		
See recommendations 9&10	See recommendations 9&10	**New evidence was identified that does not impact on the recommendation** This recommendation is directly linked to recommendations 9 &10 and has therefore been considered in line with both when assessing the impact of new evidence.
Recommendation 12: Provide a national source of information on effective lifestyle weight management programmes ES: 1.3, 2.13		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 13: Ensure contracts for lifestyle weight management programmes include specific outcomes and address local needs ES: 1.3, 1.4, 1.5, 1.6, 1.7, 1.10, 1.20, 1.23, 2.12, 2.13; EP2, EP4; CR		
No evidence identified.	One topic expert indicated that there have been large cuts to public health budgets which have certainly impacted on weight management services in some areas. They indicated that this could impact upon this recommendation (specifically the instruction to CCGs, health &	**New intelligence was identified that does not impact on the recommendation**

	wellbeing boards and local authorities to 'commission a range of lifestyle weight management programmes') as obesity prevention is not one of the statutory public health responsibilities of local authorities.	
Recommendation 14: Provide continuing professional development on lifestyle weight management for health and social care professionals ES: 2.9, 2.10, 2.11, 2.14; EP1, EP2, EP3		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 15: Provide training and continuing professional development for lifestyle weight management programme staff ES: 2.9, 2.10, 2.11, 2.14; EP1, EP2, EP3		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 16: Improve information sharing on people who attend a lifestyle weight management programme ES: 2.8; EP4; CR		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 17: Monitor and evaluate programmes ES: 2.8, 2.9, 2.11, 2.12, 2.13		
No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Recommendation 18: Monitor and evaluate local provision ES: 2.9, 2.10, 2.14; EP4		

No evidence identified.	No evidence identified.	**No new evidence was identified, no changes required**
Research recommendations		
Research recommendation 1: How effective are lifestyle weight management programmes available in the UK, when directly compared using high-quality trials? In particular, what effect do specific components of a multicomponent lifestyle weight management programme have on adherence, effectiveness and cost effectiveness?		
No evidence identified.	No evidence identified.	**No evidence identified**
Research recommendation 2: How effective and cost effective are lifestyle weight management programmes available in the UK over at least 3 to 5 years, and ideally beyond 10 years?		
Two RCTs[6,7] were identified that assessed the effectiveness of LWMPs (presumed to be available in the UK) over at least 3 to 5 years. A 4 year RCT [6] compared a health education control with a physical activity and diet based intervention. Weight loss was significantly higher in the intervention group at 48 month follow-up (3.4 kg vs 0.2kg; p<0.001). An RCT[7] compared a 2.5 year intervention consisting of visits to a dietician and participation in physical activity classes with a control group (not described). Weight loss was initially higher in the intervention group but this difference decreased and became non-significant by 24 month follow-up. Participants in the intervention group demonstrated higher levels of physical activity up to 6.6 years post-intervention but this difference was non-significant when observed in per-protocol analyses.	Initial intelligence gathering identified several ongoing studies which are summarised at the end of this Table	**New evidence was identified that does not have an impact on the guideline** Two RCTs were identified that assessed the effectiveness of LWMPs (presumed to be available in the UK) over at least 3 to 5 years. One RCT[6] demonstrated that a LWMP was more effective than an education-only control at 4 year follow-up. However, another RCT[7] found that a LWMP did not produce significantly better long-term weight loss than a control group, although there was evidence that physical activity levels remained higher in the intervention group at up to 6.6 years follow-up.
Research recommendation 3: What is the effect of lifestyle weight management programmes available in the UK on: Changes to dietary habits and choices, physical activity level and sedentary behaviour? Wider lifestyle factors, such as sleeping patterns or stress management? Psychological issues, such as body confidence or attitude, depression, anxiety or self-esteem? Health conditions, such as changes to blood pressure or lipids? Unintended outcomes such as musculoskeletal injuries, symptoms of an eating disorder; increased anxiety or depression?		

User adherence and satisfaction? Quality of life?		
One systematic review[5] and 4 RCTs[11,12,17,21] were identified that demonstrated the effect of LWMPs on a range of outcomes other than weight loss including behaviour, CVD risk factors, adherence and quality of life. A systematic review[5] of 4 studies found low quality evidence that community-based interventions appeared generally effective in promoting weight reduction in South Asian people with some positive changes also observed in blood pressure and biochemical outcomes such as cholesterol. In 1 RCT[11], participants received either usual care, or a 3 month intervention delivered either in small groups led by lifestyle coaches or via a home-based DVD. During the maintenance phase, both intervention groups received lifestyle change coaching, remote support via email and access to a website for weight and PA goal setting/self-monitoring. At 15 month follow-up, the coach-led group and self-directed groups had both achieved greater improvements in fasting plasma glucose level. 1 RCT [12] evaluated weight loss maintenance following participation in a 20 session group LWMP: intervention participants were instructed to meet as self-sustaining groups for 18 months post-treatment while control participants received assessment only. All participants achieved significant weight loss post-treatment with no significant regain at 18 month follow-up. Participants also experienced sustained changes in waist circumference, dietary and PA behaviour, quality of life, and CVD risk factors such as cholesterol levels. A 3-arm RCT[21] compared 3 different versions of a cognitive-behavioural weight management programme complemented by an interactive website and brief telephone/email coaching. RCT1 group received written materials and basic web access, RCT2 received the same plus an interactive website, and RCT 3	Initial intelligence gathering identified several ongoing studies which are summarised at the end of this Table	**New evidence was identified that does not have an impact on the guideline** There was limited evidence regarding the impact of LWMPs on outcomes other than weight loss/BMI. One SR[5] observed that LWMPs led to improvements in blood pressure and biochemical outcomes such as cholesterol levels. One RCT[11] found that coach-led and self-directed LWMPs both led to improvements in fasting plasma glucose level. In another RCT[12], all LWMP participants experienced sustained changes in waist circumference, dietary and physical activity behaviours, quality of life and cholesterol levels regardless of whether they received a weight maintenance intervention or not. All participants in a 3-arm RCT[21] achieved increased physical activity and improvements in blood pressure regardless of the version of a cognitive-behavioural LWMP they received. In 1 RCT[17] that compared a LWMP that included a mindfulness training component to a diet/exercise-only control, some observed improvements in biochemical outcomes (e.g. fasting glucose, cholesterol) favoured the intervention group, but it is not clear if these were significant.

received the same as RCT1/2 plus brief telephone/email coaching support. Participants in all 3 groups experienced significant weight loss after 15-18 months as well as increased physical activity and improvements in blood pressure. 1 RCT[17] compared a LWMP that included a mindfulness training component to a diet/exercise-only control. Some observed improvements in biochemical outcomes (e.g. fasting glucose, cholesterol) favoured the intervention group but it is not clear if these were significant.		
Research recommendation 4: How can referrals to other services after involvement in a lifestyle weight management service be as effective and cost effective as possible? This includes: re-referrals to a lifestyle weight management service, referrals to other tiers of weight management services or referrals to other specialist services (such as alcohol or substance misuse).		
No evidence identified.	No evidence identified.	**No evidence identified**
Research recommendation 5: What effect does lifestyle weight management training for health professionals and lifestyle weight management staff have on: The referral process, including patient satisfaction? Programme outcomes (weight loss and prevention of weight regain), adherence to the programme and participants' satisfaction with it? Staff confidence in discussing weight issues and any concerns about their own weight? Staff ability to deliver the programme? General approach of staff (that is, whether they adopt a 'respectful and non-judgemental' approach as a result)?		
No evidence identified.	No evidence identified.	**No evidence identified**

Ongoing research

Ongoing research was identified through the initial intelligence gathering and feedback from topic experts. If this was within the scope of PH53 it has been included. Ongoing research was identified relating to LWMPs, including those delivered to specific sub-populations such as men and people with learning disabilities, weight maintenance interventions, and technology-based interventions for weight management.

- A trial of brief interventions in primary care has recently been completed in which participants were randomized to receive either the offer of help by referral to a weight management service and follow-up to assess progress, or advice to lose weight on medical grounds. Publication is due in the next 12 months.

- The LIMIT study is an RCT of a brief behavioural intervention delivered by non-specialist staff to promote regular self-weighing to prevent weight regain after intentional weight loss. The trial is due to end in March 2017.
- Weight loss referrals for adults in primary care (WRAP) is a multicentre RCT that will present data on the effectiveness of a commercial weight loss programme for different durations of free provision. The findings could potentially affect recommendation 9 (specifically in relation to duration of provision). Publication date unknown.
- ImpulsePal: a feasibility study V1 is a feasibility study that will aid the planning of an RCT and refinement of a smartphone app-based intervention to support weight loss. It will pilot the feasibility of delivering the intervention alongside several existing weight loss programmes. Publication date unknown.
- The Aberdeen behaviour change study will test the feasibility of an RCT for a behaviour change intervention in a sample of obese adults with additional risk factors for disease. Participants in the intervention group will attend 6 nurse-led group sessions focusing on behaviour change to support weight loss. The intervention includes techniques for relapse prevention. Publication date unknown.
- The WELLDO study will determine the feasibility of a full RCT of a multi-component LWMP for adults with learning disabilities. The intervention comprises a weight loss phase and a weight maintenance phase. Future findings may address some gaps in the evidence around effectiveness of LWMPs among sub-groups. Trial ends September 2016.
- Skills for weight loss maintenance (SkIM) will be used to develop a feasible weight management programme that specifically addresses weight loss maintenance. The intervention involves group based or one-to-one support, alongside a self-help manual to help the participants develop and practice skills required for weight loss maintenance, while also being on a weight loss programme. Trial ends October 2016.
- Peer-Support Weight Action Programme (SWAP) is a weight loss intervention developed through client feedback and testing in deprived communities. It provides people with tools to maintain a healthy lifestyle, with weekly individualized tasks and peer support group sessions. The current study has been designed to establish whether SWAP maintains its effects long term, and whether it helps people more than current best practice GP advice. Publication due October 2016.
- An RCT of POWeR+ (Positive Online WEight Reduction) will assess the effect of an obesity management website to support both practice nurses and obese patients in weight loss and weight management. Publication due November 2016.
- The Football Fans in Training (FFIT) follow up study is a 3.5 year follow-up of a published study identified in the surveillance review. This will provide follow-up data on men who participated in the FFIT intervention (e.g. long term weight loss, improvements to physical activity and diet, factors predicting successful weight loss maintenance) and economic data. Publication due January 2017.
- Healthy Dads, Healthy Kids UK is a group-based weight management and healthy lifestyle programme for obese fathers and their children, adapted for use in an ethnically diverse population. A feasibility RCT commenced in May 2016 and is due to publish in February 2019.
- NU:LEVEL is a UK RCT of a scalable, digital weight loss maintenance intervention for 288 people who were initially obese but have lost >5% of their body weight in the previous 12 months. Publication date unknown.