NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

PUBLIC HEALTH DRAFT GUIDANCE

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Dietary interventions and physical activity interventions for weight management in pregnancy and after childbirth

NICE public health guidance X

Introduction

The Department of Health (DH) asked the National Institute for Health and Clinical Excellence (NICE) to produce public health guidance on dietary and physical activity interventions for weight management in pregnancy and after childbirth.

The guidance is for NHS and other commissioners, managers and professionals who have a direct or indirect role in, and responsibility for women who are pregnant or who are planning a pregnancy and mothers who have had a baby in the last 2 years. This includes those working in local authorities, education and the wider public, private, voluntary and community sectors.

It is particularly aimed at: GPs, obstetricians, midwives, health visitors, dietitians, community pharmacists and all those working in antenatal and postnatal services and children's centres. It will also be of interest to women before, during and after pregnancy and their partners and families, as well as other members of the public.

The guidance will complement NICE guidance on: obesity, maternal and child nutrition, antenatal care, postnatal care, physical activity, behaviour change,

antenatal and postnatal mental health and diabetes in pregnancy. (For further details, see section 7.)

The guidance does not give comprehensive dietary and food safety advice for women who are pregnant or planning a pregnancy. This advice is available at www.eatwell.gov.uk.

The Public Health Interventions Advisory Committee (PHIAC) has considered the reviews of the evidence and the economic analyses.

This document sets out the Committee's preliminary recommendations. It does not include all sections that will appear in the final guidance. NICE is now inviting comments from stakeholders (listed on our website at www.nice.org.uk).

Note that this document does not constitute NICE's formal guidance on dietary and physical activity interventions for weight management in pregnancy and after childbirth. The recommendations made in section 1 are provisional and may change after consultation with stakeholders and fieldwork.

The stages NICE will follow after consultation (including fieldwork) are summarised below.

- The Committee will meet again to consider the comments, reports and any additional evidence that has been submitted.
- After that meeting, the Committee will produce a second draft of the guidance.
- The draft guidance will be signed off by the NICE Guidance Executive.
- For further details, see 'The NICE public health guidance development process: An overview for stakeholders including public health practitioners, policy makers and the public (second edition, 2009)' available from www.nice.org.uk/phprocess

The key dates are:

Closing date for comments: 18 March 2010

Third Committee meeting: 16 April 2010

Members of PHIAC are listed in appendix A and supporting documents used to prepare this document are listed in appendix E.

This guidance was developed using the NICE public health intervention process.

Contents

1 Recommendations

When writing the recommendations, the Public Health Interventions Advisory Committee (PHIAC) (see appendix A) considered the evidence of effectiveness and cost effectiveness. Note: this document does not constitute NICE's formal guidance on these interventions. The recommendations are preliminary and may change after consultation.

The evidence statements underpinning the recommendations are listed in appendix C.

The evidence review, supporting evidence statements and economic analysis are available at http://guidance.nice.org.uk/PHG/Wave18/3

The recommendations in this guidance are based on strategies for achieving and maintaining a healthy weight and for weight-loss programmes that are proven to be effective for the whole population. The criteria for effective programmes are listed below. Programmes that do not meet these criteria are unlikely to help people maintain a healthy weight in the long term.

Achieving a healthy weight

People will be able to achieve and maintain a healthy weight if they[1]:

- Base meals on starchy foods such as potatoes, bread, rice and pasta, choosing wholegrain where possible.
- Eat plenty of fibre-rich foods – such as oats, beans, peas, lentils, grains, seeds, fruit and vegetables, as well as wholegrain bread and brown rice and pasta.
- Eat at least five portions of a variety of fruit and vegetables each day, in place of foods higher in fat and calories.
- Eat a low-fat diet and avoid increasing their fat and/or calorie intake.

[1] The first 10 criteria in this list are from a recommendation in NICE clinical guideline 43 on obesity. The last criterion is from a recommendation in NICE public health guidance 13 on physical activity in the workplace.

- Eat as little as possible of: fried foods, drinks and confectionery high in added sugars and other food and drinks high in fat and sugar, such as some take-away and fast foods.

- Eat breakfast.

- Watch the portion size of meals and snacks, and how often they are eating.

- Make enjoyable activities (such as walking, cycling, swimming, aerobics and gardening) part of everyday life.

- Minimise sedentary activities, such as sitting for long periods watching television, at a computer or playing video games.

- Build activity into the working day– for example, by taking the stairs instead of the lift or taking a walk at lunchtime.

- Walk, cycle or use another mode of transport involving physical activity to travel part or all of the way to and from work.

Effective weight-loss programmes

Effective weight-loss programmes:

- address the reasons why someone may find it difficult to lose weight
- are tailored to individual needs and personal choices
- are sensitive to people's weight concerns (this is particularly important when dealing with pregnant women who often find it difficult to come to terms with their new body shape)[2]
- are based on a balanced, healthy diet[2]
- encourage regular physical activity[2]
- expect people to lose no more than 0.5–1 kg (1–2 lb) a week[2]
- identify and address their barriers to change.

[2] This is an edited extract from a recommendation that appears in NICE clinical guideline 43 on obesity.

Recommendation 1: preparing for pregnancy

Who is the target population?

- Women who may become pregnant, including those who have had a baby.
- Their partners, families and friends.

Who should take action?

- Commissioners and managers in primary care trusts (PCTs) and NHS trusts.
- Directors of public health, planners and organisers of public health campaigns and occupational health advisers.
- GPs, health visitors, midwives, practice nurses, pharmacists and other health professionals working in weight management, fertility, pre-conceptual advice and care services, gynaecology and contraceptive services.
- Dietitians and public health nutritionists working in NHS and non-NHS settings.
- Health trainers and health and fitness advisers working in local authority leisure services and voluntary, community and commercial organisations. This includes slimming clubs and other weight management programmes.

What action should they take?

- PCTs, directors of public health and planners and organisers of public health campaigns should ensure health professionals understand the importance of achieving a healthy weight before pregnancy. Local education initiatives should also stress the health risks of being overweight, including during pregnancy.
- Health trainers and health and fitness advisers should encourage women to check their weight and waist measurement periodically or, as a simple

alternative, check the fit of their clothes. They should also encourage women to take the stairs rather than the lift, and to walk, cycle or use another mode of transport involving physical activity for part or all of any journey[3].

- Health trainers and health and fitness advisers should advise women, their partners and family to seek information and advice on healthy eating from a reputable source (such as www.eatwell.gov.uk). They should also encourage those who have weight concerns to talk to a health professional such as a GP, practice nurse, dietitian, health visitor or pharmacist[4].

- Health professionals should use any opportunity, as appropriate, to provide women, their partners and immediate family members with information on the health risks of being overweight and obese during pregnancy. This is particularly important if women have gained weight since a previous pregnancy.

- Health professionals should offer practical advice on how to eat healthily, how to be physically active and, if they are overweight, how to lose weight safely, as outlined in the introduction to this section (see 'Achieving a healthy weight' and 'Effective weight management programmes'). Advice should be tailored to women's circumstances (for example, childcare support may be needed to allow them to participate in organised physical activity sessions).

Recommendation 2: women who may become pregnant – with a BMI over 30

Who is the target population?

Women with a BMI over 30 who may become pregnant and their partners, families and friends.

[3] This is an extract from a recommendation that appears in both NICE public health guidance 13 on physical activity in the workplace and NICE clinical guideline 43 on obesity.
[4] This is an extract from a recommendation that appears in NICE clinical guideline 43 on obesity.

Who should take action?

- GPs, health visitors, midwives, practice nurses, pharmacists and other health professionals working in weight management, fertility, pre-conceptual advice and care services, gynaecology and contraceptive services and services for teenage parents.

- Dietitians and public health nutritionists.

- Health trainers and health and fitness advisers working in local authority leisure services and voluntary, community and commercial organisations. This includes slimming clubs and other weight management programmes.

What action should they take?

- Explain to women who have a BMI over 30 about the increased health risks this poses to themselves and their babies. Encourage them to lose weight before becoming pregnant again.

- GPs, dietitians and other health professionals should advise, encourage and help women to reduce their weight before becoming pregnant, ideally to a BMI between 24.9 and 18.5 kg/m^2. They should recognise that reducing weight to within this healthy BMI range may be difficult and should be supportive.

- Offer women the opportunity to join a weight-loss support programme involving diet and physical activity. The programme should follow the principles of good practice as outlined in the introduction to this section (see ‘Effective weight management programmes’).

Recommendation 3: pregnant women

Who is the target population?

- All pregnant women but, in particular, those with a BMI greater than 30.

- Their partners, families and friends.

Who should take action?

- Obstetricians, midwives, GPs and practice nurses.
- Dietitians and public health nutritionists.
- Midwifery assistants, support workers and other healthcare practitioners.
- Health trainers and health and fitness advisers working in local authority leisure services and voluntary, community and commercial organisations.

What action should they take?

- At the earliest opportunity, for example, during a pregnant woman's first visit to the GP, discuss her eating habits and how physically active she is. Find out if she has any concerns about diet and the amount of physical activity she does and try to address them.
- Advise her that a healthy diet and being physically active will benefit both her and her baby during pregnancy and will also help achieve a healthy weight after giving birth. Advise her to seek information and advice from a reputable source such as the 'The pregnancy book'[5] or the 'Eat well' website (www.eatwell.gov.uk).
- Offer those who are eligible for the Healthy Start scheme practical, tailored information, support and advice on healthy eating and how to use Healthy Start vouchers to increase their fruit and vegetable intake[6].
- Dispel any myths about what and how much to eat during pregnancy. For example, advise that there is no need to 'eat for two' or to drink full-fat milk. Explain that energy needs do not change in the first 6 months and increase only slightly in the last 3 months (and then only by around 200 calories).
- GPs and midwives should measure weight and height at the first antenatal appointment, being sensitive to any concerns women may have about their weight. Why this information is needed and how it will be used should be

[5] Department of Health (2009) The pregnancy book. London: Department of Health.
[6] This is an extract from a recommendation that appears in NICE public health guidance 11 on maternal and child nutrition.

clearly explained. Calculate BMI by dividing their weight (kg) by the square of their height (m^2), or use the BMI calculator[7] after measuring and weighing them.

- Do not weigh women repeatedly during pregnancy as a matter of routine. Only weigh those who have a clinical problem that needs to be managed[8].

- Health professionals should explain to women with a BMI over 30 how this poses a risk, both to their health and the health of the unborn baby. Do not recommend weight-loss during pregnancy. Offer a referral to a dietitian for assessment and personalised advice on healthy eating and how to be physically active. Encourage them to lose weight after pregnancy.

- Advise women that a moderate amount of physical activity will not harm them or their baby.

- Give them advice from the Royal College of Obstetrics and Gynaecology (RCOG)[9]. In summary this states that during pregnancy:
  - aerobic (recreational exercise such as swimming or running) and strength conditioning exercise is safe and beneficial
  - the aim of recreational exercise is to stay fit, rather than to reach peak fitness
  - if women have not exercised routinely and are starting an aerobic exercise programme, they should begin with no more than 15 minutes continuous exercise, three times per week, increasing gradually to 30-minute sessions, four times a week to daily
  - if women did exercise regularly before pregnancy, they should be able to participate in the same, higher intensity exercise programmes, such as running and aerobics, with no adverse effects.

[7] Visit www.eatwell.gov.uk/healthydiet/healthyweight/bmicalculator/
[8] This is an extract from a recommendation that appears in NICE clinical guideline 62 on antenatal care.
[9] Visit www.rcog.org.uk/womens-health/clinical-guidance/exercise-pregnancy

Recommendation 4: supporting women following childbirth

Who is the target population?

- Women who have recently had a baby.
- Their partners, families and friends.

Who should take action?

- Commissioners and managers in PCTs and NHS trusts.
- GPs, health visitors, midwives, practice nurses, pharmacists and other health professionals working in weight management.
- Dietitians and public health nutritionists working in NHS and non-NHS settings.

What action should they take?

- GPs or practice nurses should measure women's weight and height during the 6–8-week postnatal check. The weighing process should be sensitive to any concerns women may have about their weight or body size. Why this information is needed and how it will be used should be clearly explained. Women should be encouraged to lose any excess weight.
- GPs or practice nurses should calculate women's BMI by dividing their weight (kg) by the square of their height (m^2). Or they could use the BMI calculator[10] after measuring and weighing them.
- GPs or practice nurses should ask women who are overweight, obese (or have concerns about their weight) if they would like to be weighed again 6 months after the birth of their baby.
- Health professionals should provide women with clear, tailored, consistent, up-to-date and timely advice about weight, diet and physical activity after childbirth. Women, their partners and family should also be advised to seek

[10] Visit www.eatwell.gov.uk/healthydiet/healthyweight/bmicalculator/

information and advice from a reputable source such as the 'Birth to five' book[11] or the 'Eat well' website (www.eatwell.gov.uk).

- Health professionals should discuss the benefits of a healthy diet and regular physical activity with women after childbirth. They should also offer practical advice on how to eat healthily, how to be physically active and how to lose weight safely. (See introduction to this section, 'Achieving a healthy weight' and 'Effective weight management programmes'.)

- Advice on healthy eating and physical activity should be tailored to women's circumstances. For example, it should take into account a range of issues including the demands of caring for a baby, how tired the women are and any health problems they may have (such as pelvic floor muscle weakness or backache). It should also take into account the need to look after any other children in the family.

- Midwives, health visitors, GPs and health professionals should provide reassurance that a healthy diet and regular, moderate physical activity will not adversely affect a woman's ability to breastfeed. Similarly, they should explain that gradual weight loss will not have an adverse effect – and that none of these actions will affect the quantity or quality of breast milk.[12].

- Ensure women have a realistic expectation of the time it will take to lose weight. In addition, ensure they are aware of the importance of giving themselves time to achieve a healthy weight.

- Give advice from the Royal College of Obstetrics and Gynaecology [13]. In summary, this states that:
    - if pregnancy and delivery are uncomplicated, a mild exercise programme consisting of walking, pelvic floor exercises and stretching may begin immediately. But women should not resume high-impact activity too soon

[11] Department of Health (2009) Birth to five. London: Department of Health.
[12] This is an extract from a recommendation that appears in NICE public health guidance 11 on maternal and child nutrition.
[13] Visit www.rcog.org.uk/womens-health/clinical-guidance/exercise-pregnancy

  - after complicated deliveries, or lower segment caesareans, a medical care-giver should be consulted before resuming pre-pregnancy levels of physical activity, usually after the first check-up at 6–8 weeks after giving birth.

Recommendation 5: women with a BMI over 30 following a pregnancy and after childbirth

Who is the target population?

- Women who had a pre-pregnancy BMI over 30.
- Women with a BMI over 30 who have recently had a baby.

Who should take action?

- Commissioners and managers in PCTs and NHS trusts.
- GPs, health visitors, practice nurses, pharmacists and health professionals working in weight management.
- Dietitians and public health nutritionists working in NHS and non-NHS settings.

What action should they take?

- GPs and other health professionals should explain the increased risks that being overweight poses to women and, if they are pregnant, their babies. They should encourage them to lose weight before becoming pregnant again.
- GPs and other health professionals should offer them the opportunity to join a structured weight-loss programme that:
  - addresses the reasons why women may find it difficult to lose weight, particularly after pregnancy
  - is tailored to the needs of an individual or group
  - combines advice on healthy eating and physical exercise
  - identifies and addresses individual barriers to change

  - provides ongoing support over a sufficient period of time to allow for sustained lifestyle changes[14].

- If more appropriate, offer a referral to a dietitian for a personalised assessment and advice about diet and physical activity. Dietitians should use behaviour change strategies, such as goal setting, to help women lose weight[13].

- GPs and health professionals should advise women who are breastfeeding that losing weight by eating healthily and taking regular exercise will not affect the quantity or quality of their milk[13].

- Provide women who are not yet ready to lose weight with information about where they can get support.

Recommendation 6: community -based services for women before pregnancy and following childbirth

Who is the target population?

- Women who have recently had a baby.

- Their partners, families and friends.

Who should take action?

- Commissioners and managers in PCTs and NHS trusts.

- Managers of local authority leisure and community services including swimming pools, and parks.

- Slimming and weight management clubs.

- Children's centres.

[14] This is an extract from a recommendation that appears in NICE public health guidance 11 on maternal and child nutrition.

What action should they take?

- Local authority leisure and community services should offer women with babies and children a range of opportunities to take part in physical or recreational activities, for example, swimming, organised walks, cycling or dancing. These need to be affordable and available at times that are suitable for those with older children as well as babies. Where possible, affordable childcare (for example, a crèche) should be provided.

- Managers in PCTs, local authority leisure services and slimming clubs should work together to offer women who wish to lose weight after childbirth the opportunity to join a weight management group or slimming club.

- Weight management groups and slimming clubs should adhere to the principles outlined in the introduction to this section (see 'Effective weight management programmes'). This includes giving advice about healthy eating and the importance of physical activity.

Recommendation 7: professional skills

Who is the target population?

Health professionals and support workers who care for women who may become pregnant, are pregnant or who have recently had a baby.

Who should take action?

- Professional bodies and others responsible for setting competencies and developing continuing professional development programmes for health professionals, healthcare assistants and support staff.

- Skills councils and training boards responsible for the training of health and fitness advisers and health trainers.

What action should they take?

- Ensure health professionals, healthcare assistants and support workers have the skills to advise on the health risks of being overweight or obese

during pregnancy, after childbirth or after successive pregnancies. They should understand – and be able to explain – why women need their BMI calculated during pregnancy and after childbirth. This includes knowing how this information will be used.

- Ensure they can advise women on their nutritional needs before, during and after pregnancy. They should also be able to explain why it is important to have a balanced diet and to be moderately physically active before, during and after pregnancy.

- Ensure they can broach the subject of weight management in a sensitive manner and can give practical advice on how to make positive changes to improve their diet and become more physically active. They should be able to tailor this advice to the woman's circumstances. They should also know when to refer them for specialist care and support.

- Ensure they have appropriate knowledge and skills to help dispel common myths about keeping healthy and what to eat and what not to eat in pregnancy, and weight loss in relation to breastfeeding.

2 Public health need and practice

About half of women of childbearing age are either overweight (body mass index [BMI] 25–29.9 kg/m²) or obese (BMI greater than or equal to 30 kg/m²) (The NHS Information Centre 2008).

At the start of pregnancy, 18% of women in England are obese (The NHS Information Centre 2008).

Maternal obesity and weight retention after birth are related to socioeconomic deprivation and other inequalities among minority ethnic groups (Heslehurst et al. 2007b).

Health risks for overweight or obese women and their babies

Women who are overweight or obese before getting pregnant face an increased risk of complications during pregnancy and childbirth. These include the risk of: impaired glucose tolerance and gestational diabetes, miscarriage, pre-eclampsia, thromboembolism and maternal death.

Even a relatively small gain of 1 to 2 BMI units (kg/m^2) between pregnancies may increase the risk of gestational hypertension and gestational diabetes, even in women who are not overweight or obese. It also increases the likelihood of giving birth to a baby that is large for their gestational age. (Villamor and Cnattingius 2006).

During childbirth, an overweight or obese woman is more likely to have an instrumental delivery or caesarean section.

Obesity-related morbidity and mortality during pregnancy and labour also means that obese women who are pregnant are likely to spend longer in hospital than those with a healthy weight (Chu et al. 2008). In the longer term, weight management after pregnancy may reduce the woman's risk of obesity, coronary heart disease, some cancers and type 2 diabetes.

The babies of these women also face a number of health risks. These include a higher risk of fetal death, congenital abnormality, macrosomia and

subsequent obesity (Ramachenderan et al. 2008). Babies born to obese mothers are also three times more likely to be admitted to a neonatal intensive care unit (Chu et al. 2008).

Weight gain during pregnancy

US Institute of Medicine guidelines (Rasmussen and Yaktine 2009), based on observational data, state that healthy American women who are a normal weight for their height (BMI of 18.5 to 24.9) should gain 11.5–16 kg (25–35 pounds) during pregnancy. Overweight women (BMI of 25 to 29.9) should gain 7–11.5 kg (15–25 pounds) and obese women (BMI greater than 30) should only put on 5–9 kg (11–20 pounds).

Observational studies among American women suggest that those who gain weight within the Institute of Medicine ranges are more likely to have better maternal and infant outcomes than those who gain more or less weight. (The evidence is stronger for some outcomes (such as postpartum weight retention and birthweight) than for others (Siega-Riz et al. 2009).

There are no formal, evidence-based guidelines from the UK government or professional bodies on what constitutes appropriate weight gain during pregnancy.

The Scientific Advisory Committee for Nutrition (SACN) draft review of population energy requirements recommends that women should only have 200 calories more a day in the last trimester of pregnancy (DH 1991). Ideally, women should begin pregnancy within the healthy weight range (BMI 18.5–24.9). However, an increasing proportion of women in the UK are heavier than this when they become pregnant (SACN 2009).

UK health professionals do not, as a matter of course, give women information about the risks of obesity and the importance of weight management before or during pregnancy (Heslehurst et al. 2007a). However, pregnant women are advised not to diet, and to talk to their GP or midwife if they are concerned about their weight (Food Standards Agency 2009a).

Weight management after pregnancy

NICE's obesity guideline (clinical guideline 43 [2006] available from www.nice.org.uk/guidance/CG43) identified the period after pregnancy and childbirth as a time when women are likely to gain weight. In addition, many conceive again during this period. Hence, managing the woman's weight in the first few years after childbirth may reduce her risk of entering the next pregnancy overweight or obese.

However, after having a child, many mothers find it difficult to eat a healthy diet and take regular exercise (Hewison and Dowswell 1994). Despite this, women may receive little or no advice on weight management after childbirth.

Women who are exclusively breastfeeding their infants for the first 6 months may require around an additional 330 calories a day. An additional 400 calories a day may be required for the second 6 months if they continue to breastfeed (SACN 2009). This is because the fat content and, therefore, the energy content of breast milk increases over time.

Breastfeeding is often recommended as a strategy for promoting weight loss, but findings from studies are mixed (Gore et al. 2003). The additional energy requirements of breastfeeding may help some women return to their pre-pregnancy weight. If women do moderate physical activity on a regular basis this will not adversely affect a woman's ability to breastfeed and could aid weight management.

Neither the Department of Health (2009) nor the Food Standards Agency (2009b) make specific recommendations on weight management after childbirth. Both advise against following a restricted low calorie diet while breastfeeding and suggest that women should talk to their GP if they feel they need to lose weight. However, there is no national guidance for professionals.

3 Considerations

The Public Health Interventions Advisory Committee (PHIAC) took account of a number of factors and issues when developing the recommendations.

3.1 In the absence of UK guidelines, PHIAC discussed whether it would be appropriate to support the US Institute of Medicine (IOM) guidelines. These guidelines, which were revised during 2009, are based on observational data, and it is not known whether adhering to the recommended ranges lowers the risk of adverse outcomes for mothers and their babies. PHIAC was unable to support the use of these guidelines without more evidence and information about their applicability to the UK population.

3.2 PHIAC noted the lack of intervention studies on weight management before, during or after pregnancy. Some interventions have been found to prevent excess weight gain. However, most were pilot studies with small sample sizes and insufficient statistical power to detect differences in health outcomes for mothers and their babies. Several large-scale, randomised controlled trials are underway worldwide, but no conclusions could be drawn from them before publication of this guidance. PHIAC agreed to draw on existing NICE guidance which is based on evidence of effectiveness and cost effectiveness. This includes public health guidance on maternal and child nutrition and clinical guidelines on obesity, antenatal care and postnatal care.

3.3 A high body mass index (BMI) before pregnancy is more strongly associated with poor health outcomes than excessive weight gain during the actual pregnancy. PHIAC therefore emphasised the importance of women being a healthy weight when they conceive.

3.4 For many women, the first year or two after birth is a time when they are thinking about having another baby. Weight management during this time is vital to enable them to achieve a healthy weight when they next become pregnant – and to prevent incremental weight gain over successive pregnancies.

3.5 PHIAC noted that pregnancy and around a year after childbirth are key times when women may gain weight. The Committee also

acknowledged concerns that women may gain weight incrementally over successive pregnancies. Given the importance of being a healthy weight when starting a pregnancy, PHIAC was keen to adopt a 'life-course' approach.

3.6 Advice to restrict weight gain in pregnancy might lead some women to follow 'crash diets'. In such cases, the resulting metabolic breakdown would increase blood ketone levels. Ketonaemia could adversely affect the neuro-cognitive development of the fetus.

3.7 PHIAC noted that, for the most part, the recommendations in NICE's guideline on obesity could be applied to women after childbirth. However, the impact of breastfeeding, accessibility of childcare and risk of obesity in future pregnancies required careful consideration.

3.8 The period following childbirth is a time of great change for women and their partners, as they learn to cope with the demands of a new baby. Lack of sleep, fatigue, depression and a feeling of being unable to cope are all common experiences. These problems can escalate when they are caring for another child (or children) as well. Physical changes after childbirth can also have an impact on women's ability to be physically active (and therefore, their ability to manage their weight). These physical changes may include heavier breasts and pelvic floor muscle weakness.

3.9 Women receive a wealth of sometimes conflicting advice on what constitutes a healthy diet and how much physical activity they should do during pregnancy and after childbirth. This comes not just from health professionals and official sources but from family, friends, the media and new media (such as social networking sites). For example, the press regularly publishes celebrity claims of unrealistic rapid weight loss after pregnancy. This may create additional pressure on women to lose weight inappropriately at an already stressful time.

3.10 PHIAC was keen to ensure women are given practical advice that takes into account their particular social and economic circumstances. (This may include, for example, taking into account if they are lone parents or on a low income.)

3.11 After the postnatal check, women may not be in regular contact with health services so they may need local, community-based sources of support for weight management.

3.12 The additional energy requirements of breastfeeding may help some women return to their pre-pregnancy weight. Those who are breastfeeding and do not increase their energy intake, eat a healthy diet and are moderately active will be more likely to achieve this.

3.13 Women who breastfeed – and healthcare professionals – may have unfounded fears that weight loss, increased physical activity or dietary changes might affect the quality and quantity of the milk. They may also incorrectly assume that moderate physical activity on a regular basis will adversely affect the ability to breastfeed.

3.14 PHIAC was aware that the health risks of being overweight or obese during pregnancy, for both the mother and her baby, are not routinely discussed. Health professionals recognise the risks but they are often unsure what advice to give. In some cases, they lack the training, skills or confidence to draw attention to the woman's body size (via discussion or by weighing sensitively). In addition, they may not know how to tailor advice and support for women who are pregnant.

3.15 PHIAC was aware of some examples of good practice but, in many areas, there are no specialist services for pregnant women who are obese or overweight.

3.16 The provision of adequate and affordable childcare was considered essential to allow women to participate in weight management groups and physical activity. PHIAC noted that free or low-cost

childcare provision in children's centres, leisure centres, swimming pools and other recreational facilities may encourage and support women to gradually attain a healthy weight after childbirth.

3.17 PHIAC noted that after childbirth, women may resume smoking and drinking alcohol. These habits may also affect their weight.

3.18 PHIAC noted that weight management during pregnancy led to short-term health benefits for mother and child (either before or at the time of birth). On the balance of probabilities, the interventions were considered to be cost effective. However, the estimate of cost effectiveness was subject to considerable uncertainty. Weight management in the 6 months after the birth appeared from the modelling to be cost effective, but the results were sensitive to the assumptions made. PHIAC was mindful that most of the recommendations did not increase costs in the long term and, as they could be expected to do more good than harm, they are likely to be cost effective. Furthermore, some of the advice has been adapted from previous NICE guidance which has already been shown to be cost effective.

This section will be completed in the final document.

4 Implementation

NICE guidance can help:

- NHS organisations, social care and children's services meet the requirements of the DH's 'Operating framework for 2008/09' and 'Operational plans 2008/09–2010/11'.

- NHS organisations, social care and children's services meet the requirements of the Department of Communities and Local Government's 'The new performance framework for local authorities and local authority partnerships'.

- National and local organisations within the public sector meet government indicators and targets to improve health and reduce health inequalities.
- Local authorities fulfil their remit to promote the economic, social and environmental wellbeing of communities.
- Local NHS organisations, local authorities and other local public sector partners benefit from any identified cost savings, disinvestment opportunities or opportunities for re-directing resources.
- Provide a focus for multi-sector partnerships for health, such as local strategic partnerships.

NICE will develop tools to help organisations put this guidance into practice. Details will be available on our website after the guidance has been issued (http://guidance.nice.org.uk/PHG/Wave18/3).

5 Recommendations for research

This section will be completed in the final document.

More detail on the gaps in the evidence identified during development of this guidance is provided in appendix D.

6 Updating the recommendations

This section will be completed in the final document.

7 Related NICE guidance

Published

Venous thromboembolism – reducing the risk. NICE clinical guideline 92 (2010). Available from www.nice.org.uk/guidance/CG92

Diabetes in pregnancy. NICE clinical guideline 63 (2008). Available from www.nice.org.uk/guidance/CG63

Promoting physical activity in the workplace. NICE public health guidance 13 (2008). Available from www.nice.org.uk/guidance/PH13

Antenatal care. NICE clinical guideline 62 (2008). Available from www.nice.org.uk/guidance/CG62

Maternal and child nutrition. NICE public health guidance 11 (2008). Available from www.nice.org.uk/guidance/PH11

Physical activity and the environment. NICE public health guidance 8 (2008). Available from www.nice.org.uk/guidance/PH8

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Appendix A Membership of the Public Health Interventions Advisory Committee (PHIAC), the NICE project team and external contractors

Public Health Interventions Advisory Committee

NICE has set up a standing committee, the Public Health Interventions Advisory Committee (PHIAC), which reviews the evidence and develops recommendations on public health interventions. Membership of PHIAC is multidisciplinary, comprising public health practitioners, clinicians, local authority officers, teachers, social care professionals, representatives of the public, academics and technical experts as follows.

Professor Sue Atkinson CBE Independent Consultant and Visiting Professor, Department of Epidemiology and Public Health, University College London

Mr John F Barker Associate Foundation Stage Regional Adviser for the Parents as Partners in Early Learning Project, DfES National Strategies

Professor Michael Bury Emeritus Professor of Sociology, University of London. Honorary Professor of Sociology, University of Kent

Professor K K Cheng Professor of Epidemiology, University of Birmingham

Ms Joanne Cooke Programme Manager, Collaboration and Leadership in Applied Health Research and Care for South Yorkshire

Mr Philip Cutler Forums Support Manager, Bradford Alliance on Community Care

Ms Lesley Michele de Meza Personal, Social, Health and Economic (PSHE) Education Consultant, Trainer and Writer

Professor Ruth Hall Public Health Consultant

Ms Amanda Hoey Director, Consumer Health Consulting Limited

Mr Alasdair J Hogarth Educational Consultant and recently retired Head Teacher

Mr Andrew Hopkin Assistant Director, Local Environment, Derby City Council

Dr Ann Hoskins Director, Children, Young People and Maternity, NHS North West

Ms Muriel James Secretary, Northampton Healthy Communities Collaborative and the King Edward Road Surgery Patient Participation Group

Dr Matt Kearney General Practitioner, Castlefields, Runcorn. GP Public Health Practitioner, Knowsley PCT

CHAIR Professor Catherine Law Professor of Public Health and Epidemiology, UCL Institute of Child Health

Mr David McDaid Research Fellow, Department of Health and Social Care, London School of Economics and Political Science

Mr Bren McInerney Community Member

Professor Susan Michie Professor of Health Psychology, BPS Centre for Outcomes Research and Effectiveness, University College London

Professor Stephen Morris Professor of Health Economics, Department of Epidemiology and Public Health, University College London

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Dr Tracey Sach Senior Lecturer in Health Economics, University of East Anglia

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Dr Stephanie Taylor Reader in Applied Research, Centre for Health Sciences, Barts and The London School of Medicine and Dentistry

Dr Stephen Walters Reader in Medical Statistics, University of Sheffield

Dr Dagmar Zeuner Joint Director of Public Health, Hammersmith and Fulham PCT

Expert co-optees to PHIAC:

Professor Annie Anderson Professor of Food Choice, Centre for Public Health Nutrition Research, University of Dundee

Ms Amanda Avery Lecturer in Nutrition and Dietetics, Nottingham University and Consultant Dietitian in weight management, Slimming World

Dr Ruth Bell Clinical Senior Lecturer in Public Health, Newcastle University

Professor Debra Bick Professor of Evidence-Based Midwifery Practice, Kings College London

Mr Robert Fraser, Reader in Obstetrics and Gynaecology, Department of Reproductive and Developmental Medicine, University of Sheffield.

Dr Gail Goldberg Senior Research Scientist, Medical Research Council, Dunn Clinical Nutrition Centre, Cambridge

Janet Gordon Advanced Dietitian for Maternal Health, Birmingham Community Nutrition and Dietetic Department

Dr David Haslam General Practitioner and Chair of the National Obesity Forum

Professor Lucilla Poston Professor of Maternal and Fetal Health, Kings College London

Expert testimony to PHIAC:

Ms Jo Edwards National Childbirth Trust Volunteer, London

NICE project team

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External contractors

Reviewers: effectiveness reviews

Review one: ‘Systematic review of dietary and/or physical activity interventions for weight management in pregnancy’ was carried out by the School of Health and Related Research (ScHARR) Public Health Collaborating Centre, University of Sheffield. The principal authors were: Fiona Campbell, Josie Messina, Maxine Johnson, Louise Guillaume, Jason Madan and Elizabeth Goyder.

Review two: ‘Systematic review of weight management interventions after childbirth’ was carried out by ScHARR Public Health Collaborating Centre, University of Sheffield. The authors were: Josie Messina, Maxine Johnson, Fiona Campbell, Emma Everson Hock, Louise Guillaume, Alejandra Duenas, Andrew Rawdin, Elizabeth Goyder and Jim Chilcot.

Reviewers: economic analysis

Economic analysis one: ‘Interventions to manage weight gain in pregnancy’ was carried out by ScHARR. The principal author was Jason Madan.

Economic analysis two: ‘The cost-effectiveness of weight management interventions after childbirth’ was carried out by ScHARR Public Health Collaborating Centre, University of Sheffield. The authors were: Alejandra Duenas, Andrew Rawdin, Jim Chilcott, Josie Messina, Maxine Johnson, Fiona Campbell, Emma Everson Hock, Louise Guillaume, Elizabeth Goyder and Nick Payne.

Appendix B Summary of the methods used to develop this guidance

Introduction

The reviews and economic analyses include full details of the methods used to select the evidence (including search strategies), assess its quality and summarise it.

The minutes of the PHIAC meetings provide further detail about the Committee's interpretation of the evidence and development of the recommendations.

All supporting documents are listed in appendix E and are available at http://guidance.nice.org.uk/PHG/Wave18/3

Guidance development

The stages involved in developing public health intervention guidance are outlined in the box below.

1. Draft scope released for consultation

2. Stakeholder meeting about the draft scope

3. Stakeholder comments used to revise the scope

4. Final scope and responses to comments published on website

5. Evidence review(s) and economic analysis undertaken

6. Evidence and economic analysis released for consultation

7. Comments and additional material submitted by stakeholders

8. Review of additional material submitted by stakeholders (screened against inclusion criteria used in review/s)

9. Evidence and economic analysis submitted to PHIAC

10. PHIAC produces draft recommendations

11. Draft guidance released for consultation and for field testing

12. PHIAC amends recommendations

13. Final guidance published on website

14. Responses to comments published on website

Key questions

The key questions were established as part of the scope. (Weight management before and during pregnancy and weight management after childbirth were scoped separately, but have now been amalgamated into one piece of guidance.) They formed the starting point for the reviews of evidence and were used by PHIAC to help develop the recommendations.

The overarching questions were:

1. What is the effectiveness and cost effectiveness of weight management interventions before and during pregnancy?

2. What are the most effective and cost-effective interventions for managing women's weight after childbirth?

The subsidiary questions were:

- What types of dietary interventions and physical activity interventions are most effective and cost effective for weight management in women planning a pregnancy? Do they have any adverse effects?

- What are the most effective and cost-effective ways of measuring and monitoring weight gain in pregnancy? Are there any adverse effects?

- What are the views, perceptions and beliefs of health professionals, women actively planning a pregnancy, pregnant women, their partners and families about diet, physical activity and weight management in pregnancy and before pregnancy?

- What internal and external factors influence the effectiveness of the intervention (such as content, delivery, setting, who is delivering the intervention, intensity, duration and target setting)?

- What are the most effective and cost-effective dietary interventions for helping mothers, including breastfeeding mothers, achieve and maintain a healthy weight after childbirth?

- What are the most effective and cost-effective physical activity interventions for helping mothers, including breastfeeding mothers, achieve and maintain a healthy weight after childbirth?

- What are the most effective and cost effective interventions for helping mothers to avoid gaining more weight with each successive pregnancy?

These questions were made more specific for the reviews (see reviews for further details).

Reviewing the evidence of effectiveness

Two reviews of effectiveness were conducted.

Identifying the evidence

The following databases were searched for all types of evidence (from 1990–2008):

- ASSIA (Applied Social Science Index and Abstracts)
- British Nursing Index
- CINAHL (Cumulative Index of Nursing and Allied Health Literature)
- Cochrane Central Register of Controlled Trials
- Cochrane Database of Systematic Reviews
- DARE (Database of Abstracts of Reviews of Effectiveness)
- Econlit
- EMBASE
- HTA (Health Technology Assessment)
- Maternity and Infant Care
- MEDLINE
- NHS EED (NHS Economic Evaluation Database)
- PyscINFO
- Science Citation Index
- Social Science Citation Index

A search was also conducted of the following websites:

- American College of Obstetricians and Gynaecologists (www.acog.org/)
- British Dietetic Association (www.bda.uk.com/)
- Chartered Society of Physiotherapy (www.csp.org.uk/)
- Department of Health (www.dh.gov.uk)
- Food Standards Agency (www.food.gov.uk/)
- Institute of Medicine (www.iom.edu/)

- Joseph Rowntree Foundation (www.jrf.org.uk/)
- NHS Evidence – Women's Health (www.library.nhs.uk/womenshealth/)
- NHS Scotland (www.scotland.gov.uk/Topics/Health/NHS-Scotland)
- NICE (www.nice.org.uk/)
- Public health observatories (www.apho.org.uk/)
- Royal College of Midwives (www.rcm.org.uk/)
- Royal College of Obstetricians and Gynaecologists (www.rcog.org.uk/)
- Scientific Advisory Committee on Nutrition (www.sacn.gov.uk/)
- Scottish Intercollegiate Guidelines Network (SIGN) (www.sign.ac.uk/)
- Welsh Assembly Government (http://wales.gov.uk/)

Further details of the databases, search terms and strategies are included in the reviews.

Selection criteria

Studies were included in effectiveness review one if they involved:

- pregnant women who were expecting a single baby
- women seeking preconception advice
- women who were actively planning a pregnancy
- women in the above groups who had a history of (or who developed) impaired glucose tolerance or gestational diabetes.

Studies were excluded if they:

- were not published in English
- were conducted in non-OECD (Organisation for Economic Cooperation and Development) countries
- involved pregnant women expecting more than one baby
- involved pregnant women who were underweight (BMI less than 18.5 kg/m^2)
- involved pregnant women who had been diagnosed with pre-existing diabetes (type 1 and 2).

Studies were included in effectiveness review two if they involved women with a BMI greater than 18.5 kg/m² up to 2 years following the birth of their baby.

Studies were excluded if they involved:

- women who had been diagnosed with, or who were receiving clinical treatment for, an existing condition such as type I or type 2 diabetes
- women who had been diagnosed with postnatal depression
- women who were underweight (BMI less than 18.5 kg/m²) after childbirth
- women who had given birth more than 2 years previously
- clinical interventions (such as surgery or drug treatment) or complementary therapies (for example, hypnotherapy or acupuncture) to treat obesity.

Studies were also excluded if they were:

- not published in English
- conducted in non-OECD (Organisation for Economic Cooperation and Development) countries.

Quality appraisal

Included papers were assessed for methodological rigour and quality using the NICE methodology checklist, as set out in the NICE technical manual 'Methods for the development of NICE public health guidance' (see appendix E). Each study was graded (++, +, –) to reflect the risk of potential bias arising from its design and execution.

Study quality

++ All or most of the methodology checklist criteria have been fulfilled. Where they have not been fulfilled, the conclusions are thought very unlikely to alter.

+ Some of the methodology checklist criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are thought unlikely to alter the conclusions.

– Few or no methodology checklist criteria have been fulfilled. The conclusions of the study are thought likely or very likely to alter.

The 'Newcastle Ottawa' scale was used in effectiveness review one to assess the quality of cohort and case–control studies. Included studies were scored as follows to indicate the risk of bias:

++ Very low risk.

+ Low risk.

- High risk.

u Unclear.

Summarising the evidence and making evidence statements

The review data was summarised in evidence tables (see full reviews).

The findings from the reviews were synthesised and used as the basis for a number of evidence statements relating to each key question. The evidence statements were prepared by the public health collaborating centre (see appendix A). The statements reflect its judgement of the strength (quantity, type and quality) of evidence and its applicability to the populations and settings in the scope.

Economic analysis

For effectiveness review one, the economic analysis consisted of a cost-effectiveness analysis.

For effectiveness review two, the economic analysis consisted of a review of economic evaluations and a cost-effectiveness analysis.

Economic review

For the review of economic evaluations, studies were identified by searching EconLit and NHS EED during August 2009. Targeted searches were also undertaken where additional information was required.

Studies were included if they were cost-effectiveness, cost-benefit or cost-minimisation analyses of:

- dietary or physical activity interventions to help manage the weight of postnatal women
- any dietary or physical activity intervention following pregnancy that may impact on the woman's weight.

Studies were excluded if they:

- were not published in English
- involved pharmacological interventions, surgery or complementary therapies.

Cost-effectiveness analysis

Two economic models were constructed to incorporate data from the reviews of effectiveness and cost effectiveness. The results are summarised in Appendix C and are reported in more detail in: 'Interventions to manage weight gain in pregnancy' and 'The cost-effectiveness of weight management interventions after childbirth'.

The reports are available on the NICE website at http://guidance.nice.org.uk/PHG/Wave18/3

This section will be completed in the final document.

How PHIAC formulated the recommendations

At its meetings in November 2009 and December 2009, PHIAC considered the evidence of effectiveness and cost effectiveness to determine:

- whether there was sufficient evidence (in terms of quantity, quality and applicability) to form a judgment
- whether, on balance, the evidence demonstrates that the intervention is effective, ineffective or equivocal
- where there is an effect, the typical size of effect.

PHIAC developed draft recommendations through informal consensus, based on the following criteria.

- Strength (quality and quantity) of evidence of effectiveness and its applicability to the populations/settings referred to in the scope.
- Effect size and potential impact on the target population's health.
- Impact on inequalities in health between different groups of the population.
- Cost effectiveness (for the NHS and other public sector organisations).
- Balance of risks and benefits.
- Ease of implementation and any anticipated changes in practice.

Where possible, recommendations were linked to an evidence statements (see appendix C for details). Where a recommendation was inferred from the evidence, this was indicated by the reference ‘IDE’ (inference derived from the evidence).

Appendix C The evidence

This appendix lists evidence statements from two reviews provided by a public health collaborating centre (see appendix A) and links them to the relevant recommendations. (See appendix B for the key to quality assessments.) The evidence statements are presented here without references – these can be found in the full review (see appendix E for details). It also sets out a brief summary of findings from the economic analysis.

The two reviews of effectiveness are:

Review 1: Systematic review of dietary and/or physical activity interventions for weight management in pregnancy.

Review 2: Systematic review of weight management interventions after childbirth'.

Evidence statement 1.3 indicates that the linked statement is numbered 3 in review 1. **Evidence statement 2.3** indicates that the linked statement is numbered 3 in review 2.

Where a recommendation is not directly taken from the evidence statements but is inferred from the evidence, this is indicated by **IDE** (inference derived from the evidence).

The review and economic analysis are available at http://guidance.nice.org.uk/PHG/Wave18/3

Recommendation 1: evidence statements 1.19, 1.20, 1.21, 1.22; IDE

Recommendation 2: evidence statements 1.1, 1.18, 1.20, 1.21, 1.26; IDE

Recommendation 3: evidence statements 1.3, 1.4, 1.7, 1.12, 1.14, 1.15, 1.16, 1.17, 1.19, 1.21, 1.22; IDE

Recommendation 4: evidence statements 2.1, 2.3, 2.6, 2.12, 2.13; IDE

Recommendation 5: evidence statements 1.1, 1.18, 2.1, 2.3, 2.6, 2.12, 2.13; IDE

Recommendation 6: IDE

Recommendation 7: evidence statements 1.16, 1.17, 1.19, 1.26; IDE

Evidence statements

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

Evidence statement 1.1

There is weak evidence from one Australian-based case series that obese women trying to become pregnant but experiencing infertility can achieve a statistically significant reduction in body mass index (BMI) through a programme that includes regular physical activity, advice about healthy eating and group support.

Evidence statement 1.3

There is evidence from two USA-based and one Canadian randomised controlled trial (RCT) (one [+] and two [-]) that interventions targeted at healthy weight or overweight pregnant women, encouraging a healthy diet and increased or regular physical activity, supported by weight monitoring, reduces the proportion of women exceeding Institute of Medicine (1990) guidelines for healthy weight gain in pregnancy.

Evidence statement 1.4

There is weak evidence from two studies (one [-] and one [+]), conducted in Denmark and Sweden among obese women that interventions promoting healthy eating and/or moderate physical activity leads to a reduction in weight retained postpartum when compared with controls.

Evidence statement 1.7

There were no adverse effects reported with moderate physical activity and/or dieting during pregnancy.

Evidence statement 1.12

There is evidence from one US-based observational study (++) that overweight women who consumed three or more servings of fruit and vegetables per day gained significantly less weight than those who consumed fewer servings during pregnancy.

Evidence statement 1.14

There is evidence from one US-based observational study (+) that not receiving advice regarding appropriate weight gain was associated with weight gain outside the recommended levels among women across the BMI spectrum.

Evidence statement 1.15

UK-based qualitative evidence (+) suggests that the development and attendance in dietary interventions for young women may be facilitated by taking into account women's age, social, educational and psychological needs as well as provision of incentives such as free food and access to a midwife.

Evidence statement 1.16

One UK-based qualitative study (+) retrospectively explored mothers' views on monitoring during their pregnancy/ies.

Women reported feeling that interactions with health professionals in relation to routine weighing were not enabling, and that they felt a lack of control. Women tended to be given limited explanation or feedback on weighing practices, although they accepted professional advice and intervention.

Routine monitoring of weight may not be acceptable to any women anxious about their weight without their consent, meaningful explanation and feedback.

Evidence statement 1.17

Health professionals reported (one [++]) that routine weighing of pregnant women was dependent on the location of the initial booking session. NHS premises tended to have resources for weighing whereas this was more ad-

hoc in the community where scales may not be available and community midwives were not supplied with portable equipment. It was reported that even in NHS premises, equipment may not be suitable for weighing obese women.

Evidence statement 1.18

No UK-based qualitative evidence was identified on the views, perceptions and beliefs of health professionals, women actively planning a pregnancy and their partners and families about diet, physical activity and weight management prior to pregnancy. However, there is UK-based qualitative evidence to suggest that women's eating habits during pregnancy are related to pre-pregnancy dietary attitudes and behaviour. Weight and body shape concerns are affected by size prior to pregnancy (+). Women's dietary restraint may be continued or relaxed during pregnancy (+).

Evidence statement 1.19

Evidence from three UK-based qualitative studies (all [++]) suggests that weight management information and advice from professionals is not received or assimilated by many women during pregnancy. Available information is often vague, confusing, contradictory, and is not linked to weight management.

Overweight women may feel they are not receiving relevant, tailored information about appropriate diet and weight gain during pregnancy (+).

Evidence statement 1.20

There is evidence from UK-based qualitative research (one [+] and one [++]) that women may be unaware of the potential effects of obesity during pregnancy. However, they may avoid information about their health if they find it distressing and will only action it when they feel the time is right for the well-being of themselves, their unborn baby and their partners (+).

Evidence statement 1.21

There is evidence from UK-based qualitative research (++) that health professionals working in maternity units may feel they have insufficient time to

discuss weight issues with women during pregnancy and consider that it is too late to give advice on weight management once a woman is pregnant. Health professionals themselves report that women's access to the information and advice on weight management is often ad-hoc.

Evidence statement 1.22

Evidence from two UK-based qualitative studies (one [++] and one [+]) suggests that even relatively active women reduce their physical activity during pregnancy (although they are more likely to continue to be active at some level). One study (++) found that pregnant women decreased their activity levels based on advice from health professionals, or more commonly, on information they had read in books and magazines. Family members, friends, and even health trainers tended to discourage physical activity. Women balanced their fears of injury to themselves or harm to the baby with aims toward weight management. Women also reported reduced motivation, physical limitations due to larger size and tiredness during pregnancy and a lack of facilities. Another study reported that pregnant women may feel self-conscious when carrying out physical activity (+).

Evidence statement 1.26

Qualitative evidence from two UK-based studies (one [++] and one [+]) suggest there are communication difficulties between overweight women and health professionals. One study of health professionals found that they are often embarrassed to discuss issues of weight with overweight women, and that the women themselves were also embarrassed (++). Such experiences may not be fixed, but may change over the course of a pregnancy.

One study (++) explored the views of health professionals, some of which found it difficult to raise this issue sensitively. They reported a lack of guidance on this issue, though were aware of the risks and benefit so raising the issue. They were concerned that some women may stop attending antenatal appointments if they felt victimised.

Evidence statement 2.1

There is limited evidence from one (+) US-based RCT that dietary intervention alone (aiming for 35% energy deficit) from 12 weeks postpartum, may help women across the BMI spectrum start to lose more weight after childbirth compared to usual care. However, the short length of this intervention (11 days) makes it difficult to draw conclusions on the effectiveness of the study. Four-day weighed food records suggested that calorie intake was not lower in the intervention compared to the control arm of the trial. The setting of this study (US) makes it somewhat relevant to the UK.

Evidence statement 2.3

Four out of five US-based RCTs addressing diet and physical activity postpartum found a significant reduction in total weight among women across the BMI spectrum in the intervention group compared to control (three [+] and one [-]). Only one (+) US-based RCT found that total weight was not significantly lower in the intervention group compared to control. Results did not appear to vary based on the start dates of intervention or the length of follow-up.

Evidence statement 2.6

In line with their results for weight loss, three RCTs from the US (two [+] and one [-]) found that an intervention focusing on diet and exercise resulted in decreased calorie intake and decreased consumption of foods such as sweet beverages, desserts and snacks. Of these studies, one also found a significant increase in energy expenditure between exercise groups (-) whereas another (+) found no significant difference in total energy expenditure between groups. One (+) did not report results for physical activity.

Evidence statement 2.12

The evidence suggests weight management interventions addressing diet and physical activity had little or no adverse effects on breastfeeding outcomes, including milk volume, infant intake and weight, time and frequency of feeding (two [+]). Milk protein was observed to decrease in one short US-based trial (+). Overweight women had higher milk energy outputs and leaner women saw a decrease in milk energy output.

Evidence statement 2.13

The one high quality (+) RCT which examined correlations between monitoring and weight loss found that there was a significant correlation between number of self-monitoring records returned and weight loss ($r=0.50$, $P<0.005$). However, homework completion or telephone contact with research staff was not significantly correlated with weight loss. Women enrolled in this trial had an above average BMI bordering on obese classification at start of the intervention. None of the included studies considered the effectiveness of monitoring alone.

Cost-effectiveness evidence

For weight management during pregnancy, the model was short-term only. Because there was insufficient evidence of effect, the cost effectiveness estimation was subject to great uncertainty. For weight management after childbirth, the model utilised a study in which women's weight was measured at both 6 months and 15 years postpartum. This was compared with their pre-pregnancy weight and weight after giving birth. Using a 15-year time horizon, the estimated cost per quality-adjusted life year (QALY) gained was £44,000. Using a lifetime horizon (the usual measure of cost effectiveness) it was £9000.

Appendix D Gaps in the evidence

PHIAC identified a number of gaps in the evidence relating to the interventions under examination, based on an assessment of the evidence. These gaps are set out below.

1. There is a lack of evidence on the underlying mechanisms linking gestational weight gain and pregnancy outcomes. This is needed to help determine whether weight management is safe and appropriate for pregnant women.

2. There is a lack of evidence on how much weight should be gained during pregnancy, when is the most effective time for women to start managing their weight after childbirth and the optimal rate of weight loss.

3. There are few well-designed UK intervention studies on weight management in pregnancy and after childbirth. In particular, there is a lack of evidence on safe, effective interventions for women who are obese but who do not have diabetes, and those who are breastfeeding.

4. There is a lack of evidence about the effectiveness and cost effectiveness of weight management interventions for women before pregnancy – including for those who may be planning a pregnancy.

5. There is limited evidence about the effectiveness and cost effectiveness of weight management interventions in pregnancy and after childbirth for women from disadvantaged, low-income and minority ethnic groups.

6. Few weight management interventions include adequate and validated measures of diet and physical activity. They often rely on self-reporting.

7. Few studies of weight management before, during and after pregnancy include interventions that are evaluated using process and qualitative data to determine which components are effective.

8. There is limited evidence on the role of breastfeeding in helping women to gain or retain a healthy weight after childbirth.

Appendix E Supporting documents

Supporting documents are available at http://guidance.nice.org.uk/PHG/Wave18/3

These include the following.

- Effectiveness review one: ‘Systematic review of dietary and/or physical activity interventions for weight management in pregnancy’.
- Effectiveness review two: ‘Systematic review of weight management interventions after childbirth’.
- Economic analysis one: ‘Interventions to manage weight gain in pregnancy’.
- Economic analysis two: ‘The cost-effectiveness of weight management interventions after childbirth'.

For information on how NICE public health guidance is developed see:

- ‘Methods for development of NICE public health guidance (second edition, 2009)’ available from www.nice.org.uk/phmethods
- ‘The NICE public health guidance development process: An overview for stakeholders including public health practitioners, policy makers and the public (second edition, 2009)’ available from www.nice.org.uk/phprocess