

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

# **PUBLIC HEALTH PROGRAMME DRAFT GUIDANCE**

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## **Guidance to improve the nutrition of pregnant and breastfeeding mothers and children in low-income households**

NICE public health programme guidance 3

### **Introduction**

The Department of Health asked the National Institute for Health and Clinical Excellence (NICE or the Institute) to produce public health guidance to improve the nutrition of pregnant and breastfeeding mothers and children in low-income households. This guidance focuses on low-income and other disadvantaged groups.

The guidance is for NHS and non-NHS professionals who have a direct or indirect role in – and responsibility for – the nutrition of pregnant and breastfeeding mothers and pre-school children. This includes midwives, health visitors and pharmacists, and those working in local authorities and the community, voluntary and private sectors.

The guidance complements and supports, but does not replace, NICE clinical guidelines on: antenatal care (update in progress), diabetes in pregnancy (in progress) intrapartum care (in progress) and postnatal care (for further details, see section 8).

The Programme Development Group has considered the reviews of the evidence and the economic analysis.

This document sets out the preliminary recommendations developed by the Group. It does not include all the sections that will form part of the final guidance. The Institute is now inviting comments from stakeholders (listed on the NICE website at: [www.nice.org.uk](http://www.nice.org.uk)).

**Note that this document does not constitute the Institute's formal guidance on maternal and child nutrition. The recommendations made in section 4 are provisional and may change after consultation with stakeholders and fieldwork.**

The process the Institute will follow after the consultation period (which includes fieldwork) is summarised below. For further details, see 'The public health guidance development process: an overview for stakeholders including public health practitioners, policy makers and the public' (this document is available on the Institute's website at: [www.nice.org.uk/phprocess](http://www.nice.org.uk/phprocess)).

- The Group will meet again to consider the consultation comments, the fieldwork reports and the stakeholder evidence.
- After that meeting, the Group will produce a second draft of the guidance.
- The draft guidance goes to the NICE Guidance Executive for final sign off.

**The key dates are:**

Closing date for comments: 8 August 2007.

Next Group meeting: 10 and 11 September 2007.

Details of membership of the Programme Development Group are given in appendix A and key supporting documents used in the preparation of this document are listed in appendix E.

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## 1 Key priorities

This section will be completed in the final document.

## 2 Public health need and practice

The nutritional status of a pregnant woman influences the development of her fetus and thus forms the foundations for later health (Godfrey et al. 2007). Ensuring that a woman is well-nourished before, during and after pregnancy is also important for the mother's own health. For the child, adequate nutritional provision in the early years of life is fundamental to achieving optimal growth and development, and impacts on the incidence of many common childhood conditions such as diarrhoeal disease, dental caries, and iron and vitamin D deficiencies. It may also reduce the risk in adult life of conditions such as coronary heart disease and obesity.

In 1998 Acheson's 'Independent inquiry into inequalities in health' recognised the impact of poverty on the health and nutritional status of women and children. A number of specific recommendations were made, including formulating policies, which would improve the nutritional health of women of childbearing age and their children, and increase the prevalence of breastfeeding.

The infant feeding survey 2005 (Bolling et al. 2007) has also shown that other factors, including low maternal age, educational attainment and socioeconomic position, have an impact on patterns of infant feeding. The lower a mother's socioeconomic position and the shorter the duration of her education, the less likely she is to initiate and maintain breastfeeding. Other aspects of a child's nutritional status are similarly influenced; for example, less privileged mothers are more likely to introduce solid foods inappropriately early. Furthermore, children from such families are also at a greater risk of both growth faltering in infancy and obesity in later childhood (Armstrong et al. 2003).

Breastfeeding makes a clear short and long-term contribution to the health of both mother and child. For example, babies who are not breastfed are many times more likely to acquire infections such as gastroenteritis in their first year. They are also more likely to become obese in later childhood. It is estimated that if all UK infants were exclusively breastfed, the number hospitalised each month with diarrhoea would be halved, and the number hospitalised with respiratory infection cut by a quarter (Quigley et al. 2007). Mothers who do not breastfeed have an increased risk of breast and ovarian cancer and are less likely to return to their pre-pregnancy weight.

In 2000 the Committee on Medical Aspects of Food and Nutrition Policy (COMA) undertook a scientific review of the Welfare Food Scheme (WFS), a system which had, in various forms since 1940, provided eligible pregnant women, mothers and children with vouchers exchangeable for milk or infant formula. Using data from a range of UK sources, particularly the 'National diet and nutrition survey: children aged 1½ to 4½ years' (Gregory et al. 1995), COMA drew attention to a range of adverse nutritional outcomes among women and young children that were associated with lower social class, low income, low maternal age, low educational attainment and minority ethnic group origin. It also recognised the contribution made by benefits in kind to the household economies of poor families (Dobson et al. 1994; Dowler and Calvert 1995).

COMA recommended a number of modifications to the WFS, in particular, ending the provision of vouchers for milk or formula to pregnant women of all ages, and providing a broader range of foods instead (DH 2002).

Replacement of the WFS by Healthy Start in 2006 implemented these measures, along with others including an emphasis on health professionals giving health and lifestyle advice, covering diet during pregnancy, breastfeeding and the importance of fresh fruit, vegetables and vitamins for mothers.

Since 2000, other policy measures have influenced the number and nature of settings at local level in which nutritional advice may be offered to mothers

and others with responsibility for young children. These include the establishment of Sure Start initiatives and children's centres with increased opportunity for multidisciplinary involvement outside the traditional healthcare setting. In order to achieve change that will also support the delivery of national policy set out in key documents (DH 2004a; DH 2004b; DH 2004c; DfES 2004), NICE recommendations must recognise this increased range of settings and diversity of practice.

### **3 Considerations**

The PDG took account of a number of factors and issues in making the recommendations.

- 3.1 Dietary interventions specifically tailored to low-income families, teenage parents and mothers from minority ethnic or disadvantaged groups are likely to be more effective than generic interventions. The PDG wishes to emphasise the importance of monitoring and evaluating interventions, particularly with regard to uptake and effectiveness in vulnerable groups.
- 3.2 It is important that universal services (for example, health visiting and midwifery) continue to be provided. It is also important to ensure these services identify the health needs of mothers and children to determine what services and support each family requires. Such services must be easily accessible to all families with infants and young children. Health visitors should proactively engage all mothers, parents and carers of infants and pre-school children, visiting them at home when appropriate. However, a universal service does not imply that every family has the same needs; rather that those who need intensive support should receive it (Blair et al. 2006).
- 3.3 There is a shortage of controlled studies describing the impact of interventions intended to improve the nutritional status of young children, and pregnant and breastfeeding women. Much of the existing work does not apply to the UK. In the absence of relevant

evidence, observational data (from UK cohorts and national surveys) coupled with colloquial evidence at the PDG's disposal, can form a valid basis for recommendations.

- 3.4 The PDG noted that some dietary advice given by those responsible for the care of mothers and pre-school children is not evidence-based and that information provided by health professionals is not always consistent. Confusion about national nutrition policy relating to mothers, infants and children needs to be addressed. It is also necessary to help women who are preparing for pregnancy to understand the long-term consequences of poor nutrition during pregnancy on their child's health. There is a need to address professional education in these areas and agree competencies for practice.
- 3.5 Interventions which ensure that a woman is nutritionally equipped for pregnancy are likely to have the greatest effect if delivered before conception and during the first 12 weeks, but healthy eating throughout pregnancy and after the birth is important for both the baby and the mother.
- 3.6 Women who are overweight or obese before they conceive have an increased risk of complications during pregnancy and birth which poses health risks to both the mother and baby (Morin 1998).
- 3.7 One of the biggest challenges in improving the diets of women, children and families is changing behaviour, rather than changing knowledge and attitudes. The PDG emphasises that behavioural change is best facilitated through multidisciplinary programmes that involve users and communities and are delivered by workers who provide non-judgemental, non-stigmatising, friendly and individualised care.
- 3.8 The PDG welcomes the introduction of Healthy Start vouchers which enable eligible pregnant women and eligible families with a child

aged under 4 years to buy fruit and vegetables. The vouchers are likely to have a greater impact, however, if their monetary value is increased, and if they can be used in community-based food initiatives, including cooperatives. Where community-based food initiatives are available to exchange the vouchers, there is greater potential for reaching more eligible families.

- 3.9 The PDG also welcomes the provision made in Healthy Start for vitamin supplements provided free of charge and suitably formulated for women and young children. Broadening provision and increasing uptake beyond those eligible for the Healthy Start Programme would have the potential to reduce further the prevalence of rickets and incidence of neural tube defects (NTDs).
- 3.10 Folic acid supplements reduce the risk to the fetus of NTDs such as anencephaly and spina bifida. They need to be taken daily (400 micrograms [ $\mu\text{g}$ ]) before conception and throughout the first 12 weeks of pregnancy. Higher doses (5 mg daily) are recommended for women who have had a previous NTD pregnancy or who have a family history of NTD. Higher doses are also recommended for women who have (or whose partner may have) a neural tube defect and those who have diabetes mellitus. Up to 50% of pregnancies are likely to be unplanned, so many women do not start taking folic acid supplements until they are pregnant. To reduce the risks of NTDs, all women of child-bearing age who may become pregnant should be encouraged to take folic acid supplements. Increasing their intake of foods fortified with folic acid (for example, breakfast cereals, yeast extract) and those rich in natural folates (for example, peas, beans, lentils, and orange juice) is also important. However, these foods alone are not enough to reduce the risk of NTDs.
- 3.11 There have been reports that rickets associated with vitamin D deficiency is re-emerging in the UK. Dietary sources of vitamin D are limited and exposure of the skin to sunlight is the main source. At UK



latitudes there is limited sunlight of the appropriate wavelength, particularly during the winter to stimulate production of sufficient vitamin D. Those who are dark-skinned, or who remain covered when outside, are at particular risk. The Department of Health and the Chief Medical Officer (CMO) (DH 2005) state that pregnant and breastfeeding women, breastfed babies from the age of 6 months, formula fed babies receiving less than 500 ml formula a day and all children aged 1–4 years should receive vitamin D supplements to reduce the risk of deficiency. The PDG is aware of widespread confusion in relation to this policy among health professionals and is concerned that this advice is not being followed.

- 3.12 Breastfeeding provides the reference diet for young infants and promotes their health and the health of their mother in both the short and long term. Exclusive breastfeeding should be actively supported until the infant is aged 6 months and should continue, alongside the introduction of appropriate solid foods, for as long as mother and baby wish. Women from routine and manual groups are less likely to initiate breastfeeding and more likely to discontinue within 6 months. Actively promoting breastfeeding, and protecting and supporting breastfeeding mothers, would reduce the health inequalities experienced by mothers and children in low-income families.
- 3.13 Interventions that successfully increase breastfeeding initiation and duration among those least inclined to breastfeed are likely to be highly cost effective.
- 3.14 Mothers who breastfeed need clear and consistent advice on how to maintain lactation and store expressed breast milk hygienically for times when they are away from their babies.
- 3.15 The PDG is concerned to note in the national 'Infant feeding survey 2005' (Bolling et al. 2007) that almost half of all mothers who had prepared powdered infant formula in the previous 7 days had not followed key recommendations intended to reduce risk of infection

and over-concentrated feeds. There is a need for parents to be better advised by independent qualified professionals in this area.

- 3.16 The way a baby's weight is measured and monitored varies considerably. This variation in practice includes the type of equipment used, the way data is documented and interpreted, and the way it is communicated to parents. Routine and frequent monitoring of the weight of newborn babies (in their first 2 weeks of life) is important as part of an overall assessment of their needs. However, ongoing weekly weighing is unnecessary for healthy babies who give no cause for concern.

The PDG is concerned that existing guidance from the Coventry consensus (Hall 2000) is not widely implemented. This states that weighing older babies unnecessarily frequently may lead to an inappropriate intervention and undermine parents' confidence. Weight monitoring alone, as currently practised, is not a sufficient basis to recommend supplementation of breastfeeding. Parents may need advice about infant feeding from a multidisciplinary team, if appropriate. Effective advice and support will take the parents' views into account.

- 3.17 The current advice of health departments in England, Wales and Northern Ireland is that babies should receive solid foods of appropriate consistency and texture from 6 months of age. Weaning too early and weaning too late are both undesirable. National infant feeding surveys have consistently shown that very early introduction of solid foods is associated with lower socioeconomic position and educational attainment. The PDG, therefore, welcomes recent evidence that the introduction of current policy has been associated with a significant reduction (from 85% to 51%) in the proportion of infants weaned by 4 months. There is no indication to suggest the number of infants weaned after 6 months has increased. The proportion of mothers in lower socioeconomic groups giving solids

very early (before 3 months) has more than halved (falling from 31% to 14%) but inequalities are still evident in this area.

3.18 Cultural beliefs may be a barrier to acceptance of professional advice. A parent may perceive such advice as inconsistent for many reasons, some of which relate to a lack of support and training for the health professional. Mothers may also be subjected to conflicting advice from literature, media sources and product labelling.

## 4 Recommendations

When writing the recommendations, the PDG (see appendix A) considered the evidence of effectiveness and cost effectiveness. Note: this document does not constitute the Institute's formal guidance on this programme. The recommendations are preliminary and may change after consultation.

The recommendations support local implementation of national policy on maternal and child nutrition. As set out in the scope for the guidance (see [www.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain](http://www.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain)), they do not cover the following areas:

- population-based screening programmes
- complementary therapy approaches
- national maternal and child nutrition policies that are the responsibility of the DH and the Food Standards Agency (advised by the Scientific Advisory Committee for Nutrition). These include policies on population-based dietary recommendations, food safety, the nutritional content of infant formula and the fortification of foods.

The recommendations are particularly for pregnant women, breastfeeding mothers and children from low-income and other disadvantaged backgrounds. They are, however, also relevant for pregnant women, breastfeeding mothers and children in the general population.

The evidence statements that underpin the recommendations are listed in appendix C. The evidence reviews, supporting evidence statements and

economic analysis are available on the Institute's website at [www.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain](http://www.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain)

## ***Nutrition in pregnancy***

### **Recommendation 1**

#### ***Who is the target population?***

Women of childbearing age

#### ***Who should take action?***

- Planners and organisers of public health campaigns at a national and local level, strategic health authorities (SHAs) and primary care trusts (PCTs).
- Manufacturers of goods for women of childbearing age.

#### ***What action should they take?***

- Promote and increase the uptake of folic acid supplements and the intake of dietary folic acid and folate (for example, fortified breakfast cereals and green vegetables). This should be supported by local initiatives that include education of health professionals and the provision of Healthy Start vitamin supplements for women.
- Manufacturers of goods specifically for women of childbearing age, for example, pregnancy tests, sanitary products and oral contraceptives, should consider including information on the importance of folic acid supplements before and during pregnancy.

### **Recommendation 2**

#### ***Who is the target population?***

Women of childbearing age.

***Who should take action?***

- GPs, hospital doctors and nurses, particularly those working in gynaecology, sexual health, contraceptive services, fertility clinics and school health services.
- Pharmacists.

***What action should they take?***

- Advise all women who may become pregnant that they can reduce the risk of having a baby with a neural tube defect (for example, anencephaly and spina bifida) by taking folic acid supplements. Advise them to take 400 micrograms (µg) daily before pregnancy and throughout the first 12 weeks, even if they are already eating foods fortified with folic acid and/or rich in folate.
- GPs should prescribe 5 milligrams of folic acid a day for women who may become pregnant if they:
  - (or their partner) have a neural tube defect
  - have had a previous baby with a neural tube defect
  - (or their partner) have a family history of neural tube defect
  - have diabetes mellitus.

(NICE is also developing a guideline on diabetes in pregnancy, see <http://guidance.nice.org.uk/page.aspx?o=guidelines.inprogress.diabetespregnancy> and updating its antenatal care guideline, see <http://guidance.nice.org.uk/page.aspx?o=321982>)

**Recommendation 3*****Who is the target population?***

Pregnant women.

***Who should take action?***

Midwives, obstetricians, GPs and health visitors.

***What action should they take?***

- Discuss with pregnant women, at the first opportunity, their diet and eating habits. Help them to voice any concerns they may have about their diet. Provide information and advice on healthy eating that is tailored to their needs.
- Offer information and advice on the benefits of eating a varied diet during pregnancy, including five portions of fruit and vegetables a day.
- Encourage pregnant women to eat one portion of oily fish (for example, mackerel, sardines, pilchards, herring, trout or salmon) per week.

**Recommendation 4*****Who is the target population?***

Pregnant women and parents of infants and children under 4 years who may be eligible for Healthy Start benefit.

***Who should take action?***

- Commissioners in SHAs and PCTs.
- GPs, obstetricians, paediatricians, midwives and health visitors.

***What action should they take?***

- PCTs should ensure Healthy Start vitamin supplements are readily available for GPs and health visitors to give to all eligible women and young children.
- At the first contact, health professionals should encourage pregnant women who may be eligible for the Healthy Start scheme to register.
- Health professionals should, at every opportunity, offer those parents who are (or who may be) eligible for the Healthy Start scheme practical and personalised information, support and advice on:
  - how to maximise the use of Healthy Start vouchers and increase their fruit and vegetable intake

- how to initiate and maintain breastfeeding
  - how to introduce foods other than milk as part of a progressively varied diet when infants are 6 months old.
- GPs, midwives and health visitors should offer Healthy Start vitamin supplements (folic acid, vitamins C and D) to women who are planning a pregnancy and who receive Healthy Start benefit for a child under 4 years.
- GPs, midwives and health visitors should offer Healthy Start vitamin supplements (Vitamins A, C and D) to all eligible children.

## **Recommendation 5**

### ***Who is the target population?***

Pregnant women, particularly those at greater risk of vitamin D deficiency (those who have limited exposure to sunlight and/or have dark skin).

### ***Who should take action?***

Midwives, obstetricians and GPs.

### ***What action should they take?***

- At the woman's first appointment, offer information and advice on the benefits of taking a vitamin D supplement (10 micrograms [ $\mu\text{g}$ ] per day) during pregnancy. Ensure she is aware of the longer term benefits for herself and her baby.
- Advise all women who have limited exposure to sunlight and/or have dark skin to take a vitamin D supplement during their pregnancy. The aim is to increase their body's vitamin D stores and reduce the risk of their baby developing rickets.
- Encourage women who are not eligible for Healthy Start benefit to take a suitable vitamin D supplement.

(NICE is also updating its antenatal care guideline, see

<http://guidance.nice.org.uk/page.aspx?o=321982>)

## Recommendation 6

### ***Who is the target population?***

Women who may become – or who are – pregnant.

### ***Who should take action?***

Midwives, obstetricians and GPs.

### ***What action should they take?***

- At the earliest opportunity, encourage women not to drink alcohol while trying to conceive or when pregnant and advise them about the risks to their baby.
- At the earliest opportunity and, as appropriate throughout their pregnancy, advise women who choose to drink alcohol not to drink more than one or two units once or twice a week. (Examples of one unit include one half pint of lager or cider or a small glass of wine. One alcopop equals two units).

(NICE is also updating its antenatal care guideline, see <http://guidance.nice.org.uk/page.aspx?o=321982>)

## Recommendation 7

### ***Who is the target audience?***

Women who have a body mass index (BMI) over 30, particularly those who may become pregnant and those who have had a baby.

### ***Who should take action?***

Obstetricians, gynaecologists, GPs, midwives, health visitors, nurses, dietitians and those working in family planning.

### ***What action should they take?***

- Encourage women to reduce their BMI to below 30 before becoming pregnant and/or after pregnancy, by informing them (as appropriate) about the risks and providing a structured programme of support. This programme should:



- be tailored to the needs of an individual or group
  - combine advice on healthy eating with regular, moderate physical activity (for example, brisk walking)
  - identify and address barriers to change
  - provide ongoing support over a sufficient period of time to allow for sustained lifestyle changes.
- Advise breastfeeding women that losing weight through a combination of healthy eating and regular exercise will not affect the quantity or quality of their milk.

(NICE is also updating its antenatal care guideline, see <http://guidance.nice.org.uk/page.aspx?o=321982>)

## ***Infant feeding***

### **Recommendation 8**

#### ***Who is the target population?***

Pregnant women and breastfeeding mothers.

#### ***Who should take action?***

Managers responsible for providing maternity and children's services in primary and secondary care.

#### ***What action should they take?***

- Adopt a multifaceted approach and/or a coordinated programme of interventions across settings to increase breastfeeding rates. This approach or programme may include:
  - raising awareness of the benefits and barriers to breastfeeding
  - training for health professionals
  - breastfeeding peer support programmes
  - joint working between health professionals and peer supporters

- education during pregnancy about how to breastfeed combined with information and proactive voluntary support during the postnatal period.
- Implement an externally evaluated, structured programme that encourages breastfeeding, using the Baby Friendly Initiative (BFI) as a minimum standard. ([www.babyfriendly.org.uk](http://www.babyfriendly.org.uk))
- Ensure there is a written breastfeeding policy that includes provision for staff who may be breastfeeding. This should be communicated to all staff and parents. Each provider should identify a lead health professional responsible for implementing this policy.
- Provide effective breastfeeding peer support programmes in areas where breastfeeding initiation and duration rates are low.

(See also NICE guideline 37 on postnatal care at [www.nice.org.uk/CG37](http://www.nice.org.uk/CG37))

## **Recommendation 9**

### ***Who is the target population?***

Pregnant women and breastfeeding mothers.

### ***Who should take action?***

Managers responsible for providing maternity services in primary and secondary care.

### ***What action should they take?***

- Ensure health professionals who provide information and advice to breastfeeding mothers have the required knowledge and skills.
- Ensure support workers receive training in breastfeeding management from a skilled knowledgeable person before they support mothers who are breastfeeding.

- Ensure all those who work in maternity services, including receptionists, volunteers and ancillary staff, are informed of the importance of breastfeeding and help to promote a supportive environment for breastfeeding.

### **Recommendation 10**

#### ***Who is the target population?***

GPs, paediatricians, obstetricians, surgeons and physicians, midwives, midwifery support workers, health visitors, community nurses, nursery nurses, pharmacists and dentists.

#### ***Who should take action?***

Professional bodies and those responsible for setting competencies and continuing professional development (CPD) programmes for health professionals, nursery nurses and support workers.

#### **What action should they take?**

- Ensure health professionals have knowledge, skills and competencies in:
  - the nutritional needs of women before and during pregnancy
  - the health benefits of providing pregnant women with folic acid and vitamin D supplements
  - the nutritional needs of infants and young children
  - breastfeeding management (using BFI training as a minimum standard)
  - strategies for behaviour change.
- Train all midwives, health visitors and support workers in breastfeeding management, using BFI training as a minimum standard, as part of their continuing professional development ([www.babyfriendly.org.uk](http://www.babyfriendly.org.uk)).
- Train doctors, dietitians and pharmacists, as part of their continuing professional development, to take every opportunity to promote and support breastfeeding, using the principles of BFI training as a minimum standard ([www.babyfriendly.org.uk](http://www.babyfriendly.org.uk)).

**Recommendation 11*****Who is the target population?***

Pregnant women.

***Who should take action?***

- NHS trusts responsible for maternity care.
- Midwives, obstetricians, GPs and health visitors.

***What action should they take?***

- Provide pregnant women and their partners with individual or group antenatal support. This should be led by someone trained in breastfeeding management and delivered in a setting and style that best meets the women's needs.
- Encourage breastfeeding, as appropriate and whenever possible, during individual antenatal consultations. Pay particular attention to women who are least likely to breastfeed (for example, young single women from disadvantaged groups).
- Provide an informal group session in the last trimester of pregnancy to focus on breastfeeding: this should cover positioning for mother and baby and how to attach the baby to the breast to ensure effective breastfeeding.

**Recommendation 12*****Who is the target population?***

Breastfeeding mothers.

***Who should take action?***

Midwives.

***What action should they take?***

- Ensure that mothers know how to breastfeed before leaving the hospital or birth centre (or before they leave the mother after a home birth). The

mother should be able to position and attach her baby to the breast and identify signs that the baby is feeding well.

- Advise mothers that a healthy diet is important for everyone and reassure them that they do not need to eat a special diet to breastfeed.
- Do not provide written materials in isolation, rather, use them to reinforce verbal advice about breastfeeding.

### **Recommendation 13**

#### ***Who is the target population?***

Breastfeeding mothers.

#### ***Who should take action?***

- Managers of maternity services in primary and secondary care.
- Midwives, health visitors, paediatric nurses, nurses working in special-care baby and neonatal units, and nursery nurses.

#### ***What action should they take?***

- Offer information on how to hand-express breast milk. Advise women who are expressing in place of breastfeeding that expressing both breasts simultaneously with an electric pump produces more milk in less time.
- Advise mothers who wish to store expressed breast milk to obtain a fridge thermometer.
- Advise mothers who wish to store expressed breast milk for less than 5 days that storing breast milk in the fridge preserves its properties more effectively than freezing.
- Advise mothers that expressed milk should be stored for:
  - up to 5 days in the main part of a fridge, at 4°C or lower
  - up to 2 weeks in the freezer compartment of a fridge
  - up to 6 months in a domestic freezer, at minus 18°C or lower.

- Advise mothers who freeze their expressed breast milk to defrost it in the fridge and not to re-freeze it once thawed. Advise them never to use a microwave oven to warm or defrost breast milk.

#### **Recommendation 14**

##### ***Who is the target population?***

Pregnant women and mothers.

##### ***Who should take action?***

- NHS trusts, health centres, GP surgeries, children's trusts and centres.
- GPs, midwives, health visitors and pharmacists.

##### ***What action should they take?***

- Avoid promoting or advertising infant formula. Do not display, distribute or use leaflets, posters, charts, educational materials or any other materials and equipment produced by infant formula manufacturers.
- Ensure all mothers have access to independent advice on the use of infant formula, including any associated risks.
- Ensure mothers who choose to use infant formula are shown how to make up a feed before leaving hospital or the birth centre (or before the mother is left after a home birth). This advice should follow the most recent guidance from the DH and the Food Standards Agency.
- Ensure mothers who choose to use infant formula know how to obtain ongoing independent information and advice from a qualified health professional.

(See also NICE guideline 37 on postnatal care at [www.nice.org.uk/CG37](http://www.nice.org.uk/CG37))

## Recommendation 15

### ***Who is the target population?***

Pregnant women and new mothers, particularly those who are least likely to start and continue to breastfeed – for example, the young, less well-educated women and those from disadvantaged groups.

### ***Who should take action?***

NHS trusts responsible for maternity care.

### ***What action should they take?***

- Provide local, easily accessible breastfeeding peer support programmes.
- Ensure peer supporters:
  - are trained to give breastfeeding support
  - contact new mothers directly within 48 hours of their transfer home (or within 48 hours of a home birth)
  - offer mothers ongoing, flexible support at home via telephone and/or through local groups
  - are part of a multidisciplinary team, are able to consult a health professional, and are provided with ongoing support
  - gain appropriate child protection clearance.
- Consider training peer supporters and link workers to provide mothers, parents and carers with support to help them follow professional advice on feeding infants aged 6 months and over. They should promote an increasingly varied diet using different textures of food in appropriate amounts.

## Recommendation 16

### ***Who is the target population?***

Pregnant women and mothers whose first language is not English, their partners and extended family.

***Who should take action?***

NHS trusts responsible for maternity care, GP surgeries and community health centres.

***What action should they take?***

- Where possible, train link workers to provide information and support on breastfeeding, weaning and healthy eating in the mother's first language.
- Where link workers are not available, ensure women whose first language is not English have access to interpreting services and information in a format and language they can understand.
- Encourage women from minority ethnic communities who speak English as a second language to train as peer supporters.

***Prescribing*****Recommendation 17*****Who is the target population?***

Hospital doctors, GPs, obstetricians, pharmacists, specialist nurses and dentists.

***Who should take action?***

NHS trusts responsible for maternity care, GP surgeries, community health centres and pharmacies.

***What action should they take?***

Ensure those who prescribe or dispense drugs to a breastfeeding mother consult supplementary sources and only use the 'British national formulary' as a guide. They should discuss the benefits and risks associated with the prescribed medication and encourage the mother to continue breastfeeding for as long as she chooses.



## ***Child nutrition***

### **Recommendation 18**

#### ***Who is the target population?***

Parents and carers of infants and pre-school children.

#### ***Who should take action?***

Health visitors, managers and community nursery nurses.

#### ***What action should they take?***

- Health visitors should assess the needs of all mothers, parents, and carers with young children. They should provide intensive and early support at home for those parents and children who have the greatest needs.
- Health visitors should:
  - support mothers to continue breastfeeding for as long as they choose
  - provide mothers and other family members with support to introduce a variety of nutritious foods (other than milk) to ensure the child has a progressively varied diet from 6 months of age
  - encourage and support parents and carers in making home-prepared foods for infants and young children, without adding salt or sugar
  - encourage families to eat together when children are ready to join in family meals
  - advise parents and carers not to leave infants alone when they are drinking from a feeding bottle.

### **Recommendation 19**

#### ***Who is the target population?***

Infants and pre-school children.

***Who should take action?***

- SHAs, PCTs and NHS trusts.
- GPs, paediatricians, midwives, health visitors and community nursery nurses.

***What action should they take?***

- Ensure health professionals receive training on weighing and measuring infants. This training should include: how to use equipment, how to document and interpret the data and how to communicate the results and give dietary advice to parents and carers.
- Ensure support staff are trained to a demonstrable level of competency in weighing infants and young children.
- Ensure infants are weighed using digital scales which are maintained and calibrated annually, in line with the medical devices standards (spring scales should not be used as they are inaccurate).
- As a minimum, ensure babies are weighed (naked) at birth and at 5 and 10 days, as part of an overall assessment of feeding. Thereafter, babies who are growing normally should be weighed (naked) at 2, 3, 4 and 8 months in their first year – and no more than fortnightly.

(NICE is also developing a guideline on intrapartum care, see <http://guidance.nice.org.uk/page.aspx?o=guidelines.inprogress.intrapartumcare>)

**Recommendation 20*****Who is the target population?***

Pregnant women, mothers and their partners who have a family history of allergy (including eczema, asthma and hay fever).

***Who should take action?***

Midwives, health visitors, GPs, paediatricians, community dietitians and pharmacists.

***What action should they take?***

Provide pregnant women, mothers and their partners with information and advice on how to reduce their baby's risk of developing allergies. This advice should include: feed the baby only on breast milk until he or she is 6 months old and introduce solid foods, one at a time when the infant is 6 months old.

**Recommendation 21*****Who is the target population?***

Parents and carers of infants and pre-school children.

***Who should take action?***

Health visitors, GPs, dentists, dental hygienists/assistants, community and day care nursery nurses, home-based child carers and others who work with young children.

***What action should they take?***

- Encourage parents and carers to:
  - use a feeding bottle only for breast milk, infant formula and cooled boiled water
  - offer infants aged 6 months and over drinks in a non-valved, free-flowing cup
  - limit foods with a high sugar content to mealtimes
  - offer only low-sugar snacks between meals (such as fruit and vegetables)
  - provide milk and water to drink between meals (diluted fruit juice can be provided with meals).

**Recommendation 22*****Who is the target population?***

Parents and carers of infants and pre-school children.

***Who should take action?***

Nursery nurses, home-based child carers and others working in pre-school day care settings such as nurseries, creches and playgroups.

***What action should they take?***

- Support breastfeeding mothers by:
  - offering the opportunity to breastfeed if they need to
  - encouraging them to bring expressed breast milk in a cool bag
  - ensuring expressed breast milk is labelled with the date and name of the infant and stored in the main body of the fridge.
- Reduce the risk of infection to infants in care settings by implementing the FSA's guidance on the preparation and use of powdered infant formula feeds.

**Recommendation 23*****Who is the target population?***

Infants and pre-school children up to the age of 5 years.

***Who should take action?***

Teachers, teaching assistants, nursery nurses, home-based child carers and those working in pre-school day care settings such as nurseries, creches and playgroups.

***What action should they take?***

- Implement a food policy which takes a 'whole settings' approach to healthy eating, so that foods and drinks made available during the day reinforce teaching about healthy eating.

- Take every opportunity to encourage children to handle and taste a wide range of fruit and vegetables by:
  - providing classroom-based activities
  - ensuring healthy choices (for example, fruit and vegetables) are offered at meal and snack times
  - ensuring carers eat with children wherever possible
  - encouraging similar activities with parents at home.

### ***Family nutrition***

#### **Recommendation 24**

##### ***Who is the target population?***

Low-income families.

##### ***Who should take action?***

- Commissioning agencies, local authorities and local strategic partnerships that fund or provide community projects.
- Public health nutritionists.

##### ***What action should they take?***

- Introduce and maintain healthy eating and lifestyle programmes to help parents on a low income develop their skills in planning meals, cooking, shopping and budgeting.
- Work with local retailers to improve the way that fresh fruit and vegetables are displayed and promoted.
- Provide support (both practical and financial) to develop and maintain community-based initiatives which aim to make a balanced diet more accessible to people on a low income. Examples include food cooperatives and 'cook and eat' clubs.

## 5 Implementation

NICE guidance can help:

- NHS organisations meet DH standards for public health as set out in the seventh domain of '[Standards for better health](#)' (updated in 2006). These include core standards C22 and C23 and developmental standard D13. Performance against these standards is assessed by the Healthcare Commission.
- NHS organisations and local authorities (including social care and children's services) meet the requirements of the government's 'National standards, local action, health and social care standards and planning framework 2005–2008'.
- 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 children's trusts, health and wellbeing partnerships and other multi-sector partnerships working on health within a local strategic partnership.

NICE has developed tools to help organisations implement this guidance.

These will be available on our website ([www.nice.org.uk/PHP3](http://www.nice.org.uk/PHP3)) 1 month after this guidance is issued. For provisional details see below.

- Costing tools:
  - costing report to estimate the national savings and costs associated with implementation

- costing template to estimate the local costs and savings involved.
- Other tools:
  - slides highlighting key messages for local discussion
  - practical advice on how to implement the guidance and details of national initiatives that can provide support
  - audit criteria to monitor local practice.

## 6 Recommendations for research

This section will be completed in the final guidance. More detail on the evidence gaps identified during the development of this guidance is provided in appendix D.

## 7 Updating the recommendations

This section will be completed in the final guidance.

## 8 Related NICE guidance

### *Published*

Antenatal and postnatal mental health: clinical management and service guidance NICE clinical guideline 45 (2007). Available from:

[www.nice.org.uk/CG45](http://www.nice.org.uk/CG45)

Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children. NICE clinical guideline 43 (2006). Available from: [www.nice.org.uk/CG43](http://www.nice.org.uk/CG43)

Postnatal care: routine postnatal care of women and their babies. NICE clinical guideline 37 (2006). Available from: [www.nice.org.uk/CG37](http://www.nice.org.uk/CG37)

Fertility: assessment and treatment for people with fertility problems. NICE clinical guideline 11 (2004). Available from: [www.nice.org.uk/CG11](http://www.nice.org.uk/CG11)

Division of ankyloglossia (tongue-tie) for breastfeeding. NICE interventional procedure guidance 149 (2005). Available from: [www.nice.org.uk/IPG149](http://www.nice.org.uk/IPG149)

### ***Under development***

Intrapartum care: management and delivery of care to women in labour. NICE clinical guideline (due September 2007).

Generic and specific interventions to support attitude and behaviour change at population and community levels. NICE public health programme guidance (due October 2007).

Management of atopic eczema in children from birth up to the age of 12 years. NICE clinical guideline (due December 2007).

Antenatal care: routine care for the healthy pregnant woman. Update of NICE clinical guideline 6 (due March 2008).

Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period. NICE clinical guideline (due March 2008).

## **9 Glossary**

### **Artificial feed**

Artificial feed is infant formula, a modified cow's milk or modified soya liquid used for feeding infants who are not breastfed. See also infant formula.

### **Complementary feeding**

Complementary feeding is defined as the process during which other foods are offered alongside breast milk to meet the nutritional requirements of infants.

### **Diet**

In this guidance, the term 'diet' refers to the habitual eating patterns of individuals and groups of people who are not slimming or eating to manage or treat a medical condition.

### **Dietary reference values (DRVs)**

DRVs are a collective term for: reference nutrient intake, estimated average requirement and lower reference nutrient intakes. These terms were



introduced into the UK in 1991 to replace the term 'recommended daily amount'. DRVs reflect the amount of energy and nutrients needed by different groups of healthy people according to their age and gender. For certain nutrients, set increments reflect the increased demands associated with pregnancy and lactation.

### **Duration of breastfeeding**

Duration of breastfeeding refers to the length of time that mothers continue to breastfeed, even if they are also giving their baby other milk and/or solid food.

### **Exclusive breastfeeding**

Exclusive breastfeeding means an infant receives breast milk only and no other liquids or solids. The only exceptions are drops or syrups containing vitamins, mineral supplements or medicines.

### **Food allergy**

A food allergy is an adverse reaction. It occurs when the immune system reacts to a particular food. Common allergic reactions include itchy skin or a rash and wheezing or shortness of breath. Severe allergic reactions can be life-threatening. This should not be confused with food intolerance (see below).

### **Food intolerance**

Food intolerance is an adverse reaction to a particular food that does not involve the body's immune system. It is not generally life-threatening, but may cause unpleasant symptoms. This should not be confused with a food allergy (see above).

### **Food poverty**

A person living in food poverty is unable to obtain affordable food to help them maintain a healthy, balanced diet. Such people tend to spend a higher proportion of their income on food and have a more restricted diet (often they can't access or afford certain foods, including fruit and vegetables).

**Healthy eating**

There is no standardised definition. However, it is widely accepted that 'healthy eating' means following a diet which is low in fat (particularly saturated fat), sugar and salt, and high in fruit, vegetables and fibre-rich, starchy foods. More details are available from the Food Standards Agency [www.food.gov.uk/](http://www.food.gov.uk/)

**Healthy foods/healthier foods**

There is no standard definition, but these terms are widely accepted to mean foods that are low in fat (particularly saturated fat), sugar and salt and/or high in fibre and starchy carbohydrates. Examples include: fruit, vegetables, fish, wholegrain cereals, lean meat and reduced fat or low-fat dairy products. It also includes composite dishes with reduced levels of fat, sugar and salt and/or increased levels of fibre and starchy carbohydrates.

**Inadequate nutrient intake**

If a group has an inadequate nutrient intake, it means that their average intake of protein, vitamins and minerals falls below the level of the reference nutrient intake (RNI). If the group's average intakes are close to the lower reference nutrient intake (LRNI), more individuals within the group will have nutritional needs which are unmet. Inadequate nutrient intake among individuals means that an individual's habitual intake of a nutrient regularly falls below the LRNI.

**Infant formula**

Under UK law, infant formula is the term used to describe a food intended to satisfy, by itself, the nutritional needs of infants during the first 4 to 6 months of life. See also artificial feed.

**Initiation of breastfeeding**

Breastfeeding initiation means a mother has fed her baby from the breast or given expressed breast milk at least once.

**Low birth weight (LBW)**

Low birth weight is defined by the World Health Organization as less than 2500 grams (Kramer 1987).

**Lower reference nutrient intake (LRNI)**

Most people need more than the LRNI of any given nutrient on a regular basis. The amount needed varies by gender, age and physiological status (examples of the latter include pregnancy and lactation).

**Maternal nutrition**

Maternal nutrition in this context refers to a woman's nutritional status, including her diet, before and during pregnancy and for the first 6 weeks after giving birth.

**Mixed feeding**

Mixed feeding is the practice of feeding an infant both breast milk and infant formula.

**Neural tube defects (NTDs)**

The neural tube in the fetus develops into the brain and spinal cord. Neural tube defects occur when the brain and skull and/or the spinal cord and its protective spinal column do not develop properly within the first 4 weeks after conception. The most common NTDs are anencephaly (which results in stillbirth or death soon after delivery), and spina bifida (which may lead to a range of physical disabilities including partial or total paralysis).

**Nutrient deficiency**

Nutrient deficiency occurs when the intake of a nutrient (or nutrients) is too low to meet an individual's needs. It can be confirmed through clinical, biochemical or anthropometric symptoms or indicators.

**Nutritional status**

Nutritional status describes an individual's nutritional wellbeing. It is a more comprehensive measure than dietary intake alone as it takes account of body shape and size together with measures of body function.

**Postpartum**

Postpartum generally refers to the first 6 weeks after the birth of a baby. However, in the review of 'postpartum' women for this guidance, it refers to the first year after the baby's birth.

**Recommended daily amounts (RDAs)**

RDA is a term that was used in the UK up to 1991. It was replaced by 'dietary reference values' (see above).

**Recommended dietary allowance (RDA)**

RDA is the American equivalent of the UK reference nutrient intake (RNI) – see below. It describes the amount of a nutrient needed to meet the needs of around 98% of individuals within a group. Although RDA and RNI do, in theory, meet the needs of the same individuals, the amounts themselves may differ.

**Reference nutrient intake (RNI)**

RNI is the amount of a nutrient required to meet the needs of around 97% of individuals within a group. The amounts needed vary by gender, age and physiological status (examples of the latter include pregnancy and lactation). The RNI is not a minimum target.

**Supplementary feeding**

Supplementary feeding means infants who mainly receive breast milk, receive some additional infant formula.

**Weaning**

Weaning or 'complementary feeding' is the transition from an exclusively milk-based diet to a diet based on solid foods.

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## **Appendix A: membership of the Programme Development Group, the NICE Project Team and external contractors**

### ***The Programme Development Group***

PDG membership is multidisciplinary. It comprises researchers, practitioners, stakeholder representatives and members of the public as follows:

**Professor Annie Anderson** Professor of Food Choice and Director of the Centre for Public Health Nutrition Research, University of Dundee

**Kathy Cowbrough** Freelance Dietitian, Registered Public Health Nutritionist. Coordinator of the National Network of Dietitians and Nutritionists working in Sure Start Early Years Programmes

**Dr Helen Crawley** Registered Public Health Nutritionist and Dietitian

**Claire Davis** Community Member, Supporter and Tutor with the Breastfeeding Network

**Dr Elizabeth Dowler** Reader in Food and Social Policy at the University of Warwick, Registered Public Health Nutritionist

**Lorna Farr** Service Manager, Northumberland, Tyne and Wear NHS Trust. Former Health Visitor and Strategic Health Lead across Sure Start programmes in Newcastle

**Janet Fyle** Professional Policy Adviser, Royal College of Midwives

**Pam Heslop** Community Nursery Nurse, Peterborough PCT

**Cindy Hutchinson** Research Midwife specialising in teenage pregnancy

**Dr Wendy Jones** Primary Care Pharmacist, Pharmacist Independent Prescriber with a special interest in the safety of drugs in breast milk

**Professor Paul Little** General Practitioner, Professor of Primary Care Research, University of Southampton

**Alison Lloyd** Community Member, National Childbirth Trust Antenatal Teacher, Joint Project Coordinator for 'Yummy mummies' (community 'cook and eat' project aimed at low-income and vulnerable pregnant women and families with children under 5 years)

**Jenny McLeish** Community Member, formerly Policy Officer at the Maternity Alliance

**Ruth Moore** Development Manager, North Division, National Childminding Association

**Professor Richard Watt** Professor in Dental Public Health, University College, London

**Dr Anthony Williams (Chair)** Reader in Child Nutrition and Consultant in Neonatal Paediatrics at St George's, University of London

***Expert cooptees to the PDG***

**Dr Bob Fraser** Reader in Obstetrics and Gynaecology, University of Sheffield

**Dr Ian Mathers** Consultant in Public Health, Heart of Birmingham PCT (meeting 6)

**Samantha Montel** Policy and Advice Branch, Nutrition Division, Food Standards Agency (meeting 5)

**Oma Ramroop** Health Visitor, Children's Centre Westminster PCT

**Dr Sian Robinson** Senior Research Fellow, MRC Epidemiology Resource Centre, University of Southampton

**Aparna Srivastava** British Dietetic Association Special Interest Group on Black and Minority Ethnic Groups (meeting 5)



**Dr Alison Tedstone** Head of Nutrition Science Unit, Food Standards Agency  
(meeting 4)

***NICE Project Team***

**Professor Mike Kelly**

CPHE Director

**Tricia Younger**

Associate Director

**Christine Carson**

Analyst

**Dr Caroline Mulvihill**

Analyst

**Susan Murray**

Analyst

**Karen Peploe**

Analyst

**Dr Anthony Threlfall**

Analyst

**Dr Alastair Fischer**

Health Economics Adviser

***External contractors***

**External reviewers: effectiveness reviews**

Review 1: 'The effectiveness of public health interventions to promote nutrition of pre-conceptual women'. This review was carried out from June–September 2006 by the Mother and Infant Research Unit at the University of York. The principal authors were: Alison McFadden and Sarah King. The review was updated in March 2007 by the University of York and NICE.

Review 2: 'Review of the effectiveness of interventions to improve the nutrition of pregnant women with a focus on the nutrition of pregnant women in low-income households'. This review was carried out from September 2005–March 2006. A supplementary review was carried out from March–May 2006. Both were conducted by the Mother and Infant Research Unit at the University of York. The principal authors were: Lalitha D'Souza and Sarah King. These two reviews were integrated and updated in March 2007 by the University of York and NICE.

Review 3: 'The effectiveness of public health interventions to improve the nutrition of postpartum women'. This review was carried out from February–April 2006 by the Mother and Infant Research Unit at the University of York. The principal authors were: Felicia McCormick and Jennifer Moreton. The review was updated in March 2007 by the University of York and NICE.

Review 4: 'The effectiveness of public health interventions to promote safe and healthy milk feeding practices in babies'. This review was carried out from February–May 2006 by the Mother and Infant Research Unit at the University of York. The principal authors were: Sarah King and Lalitha D'Souza. The review was updated in March 2007 by the University of York and NICE.

Review 5: 'The effectiveness of public health interventions to improve the nutrition of young children aged 6–24 months'. This review was carried out from April–June 2006 by the Mother and Infant Research Unit at the University of York. The principal authors were: Felicia McCormick and Sarah King. The review was updated in March 2007 by the University of York and NICE.

Review 6: 'The effectiveness of public health interventions to improve the nutrition of 2 to 5 year old children'. This review was carried out from April–July 2006 by the Mother and Infant Research Unit at the University of York. The principal authors were: Lalitha D'Souza and Sarah King. The review was updated in March 2007 by the University of York and NICE.

Review 7: 'The effectiveness and cost-effectiveness of interventions to promote an optimal intake of vitamin D to improve the nutrition of pre-conceptual, pregnant and postpartum women and children in low-income households'. This review was carried out from April–July 2006 by the National Collaborating Centre for Women's and Children's Health. The principal authors were: Irene Kwan and Paul Jacklin.

Review 8: 'Supplementary evidence review on the effectiveness of public health interventions to improve the nutrition of infants/children aged 6 months to 5 years'. This review was carried out from July–September 2006 by the National Collaborating Centre for Women's and Children's Health. The principal authors were: Irene Kwan and Anuradha Sekhri.

**External reviewers: expert reports**

'Growth monitoring of infants and young children in the United Kingdom'. This was prepared from September–October 2006 by Magda Sachs and Fiona Dykes from the Maternal and Infant Nutrition and Nurture Unit at the University of Central Lancashire.

'Handling and storage of expressed breast milk'. This was prepared from October–November 2006 by Paul Cook from the Food Hazards and Consumer Protection Branch, Microbiological Safety Division, at the Food Standards Agency.

'Nutrition and breastfeeding'. This was prepared from September–October 2006 by Gail Goldberg from MRC Human Nutrition Research, Cambridge.

**External reviewers: cost-effectiveness reviews**

'Rapid economic review of public health interventions designed to improve the nutrition of pre-conceptual, pregnant and postpartum women.' This review was carried out from April–July 2006 by the National Collaborating Centre for Women's and Children's Health. The principal authors were: Paul Jacklin, Penny Retsa and Irene Kwan.

'Rapid economic review of public health interventions designed to improve the nutrition of children aged 0–5 years.' This review was carried out from April–July 2006 by the National Collaborating Centre for Women's and Children's Health. The principal authors were: Paul Jacklin, Penny Retsa and Irene Kwan.

The economic appraisal 'Modelling the cost-effectiveness of breastfeeding support' was carried out by the National Collaborating Centre for Women and Children's Health. The principal author was: Paul Jacklin.

## **Appendix B: summary of the methods used to develop this guidance**

### ***Introduction***

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

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

All supporting documents are listed in appendix E and are available from the NICE website at:

<http://guidance.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain>

### ***The guidance development process***

The stages of the guidance development process are outlined in the box below:

1. Draft scope
2. Stakeholder meeting
3. Stakeholder comments
4. Final scope and responses published on website
5. Reviews and cost-effectiveness modelling
6. Synopsis report of the evidence (executive summaries and evidence tables) circulated to stakeholders for comment
7. Comments and additional material submitted by stakeholders
8. Review of additional material submitted by stakeholders (screened against inclusion criteria used in reviews)
9. Synopsis, full reviews, supplementary reviews and economic modelling submitted to the PDG
10. The PDG produces draft recommendations
11. Draft recommendations published on website for comment by stakeholders and for field testing
12. The PDG amends recommendations
13. Responses to comments published on website
14. Final guidance published on website

## ***Key questions***

The key questions were established as part of the scope. They formed the starting point for the reviews of evidence and facilitated the development of recommendations by the PDG.

The overarching question was: 'What nutritional interventions are effective in improving the health of pre-conceptual, pregnant and postpartum mothers and children (up to 5 years) and reducing nutrition-related health inequalities?'

The subsidiary questions relating to each intervention/programme studied were:

1. What is the aim/objective?
2. What is the content and how does it influence effectiveness?
3. How does the way that it is carried out influence its effectiveness?
4. Does effectiveness depend on the job title/position of the person delivering the intervention? What are the significant features of an effective leader?
5. How does effectiveness vary according to factors such as the age, sex, class or ethnicity of the target audience?
6. Does the intensity (or length or frequency) of the intervention influence effectiveness or duration of effect?
7. How much does the intervention cost (in terms of money, people, time)?
8. Does the site/setting influence effectiveness?
9. What are the facilitators and barriers to implementation?
10. How acceptable is the intervention to the recipients?
11. What evidence is there on cost effectiveness and does the intervention offer value for money?

These questions were refined further in relation to the topic of each review (see reviews for further details).

## ***Reviewing the evidence of effectiveness***

Eight reviews of effectiveness and three expert papers were conducted to inform the development of this guidance.

### **Identifying the evidence**

The following searches were carried out for each effectiveness review, as follows.

#### ***Review 1***

The following databases were searched for systematic reviews (from 1995 onwards): the Cochrane Database of Systematic Reviews (CDSR), and the Database of Abstracts of Reviews of Effects (DARE), the Health Technology Assessment Database and the Ongoing Reviews Register. A number of websites were also scanned/searched to identify relevant reviews. Where no relevant systematic reviews existed, the following databases were searched for randomised controlled trials (RCTs) (from 1990 onwards): CENTRAL, EMBASE, PsycINFO, CINAHL and MEDLINE. For other types of UK study, the following databases were searched: MEDLINE, EMBASE, CINAHL and PsycINFO.

#### ***Review 2***

The following databases were searched for systematic reviews (from 1995 onwards): CDSR and DARE. Where no relevant systematic reviews existed, the following databases were searched for RCTs (from 1990 onwards): the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL and PsycINFO. For other types of UK study (from 1990 onwards) the following databases were searched: MEDLINE, EMBASE, CINAHL and PsycINFO databases were searched.

#### ***Review 3.***

The following databases were searched for systematic reviews (from 1995 onwards): CDSR, DARE, National Research Register (including CRD Ongoing Reviews), Health Technology Assessment Database, SIGN Guidelines, National Guideline Clearinghouse, National Coordinating Centre



for Health Technology Assessment, HSTAT, the DH Research Findings Electronic Register, TRIP, Clinical Evidence, and Health Evidence Bulletins Wales. The following databases were searched for RCTs and UK studies of other types (from 1990 onwards): CENTRAL, EMBASE, PsycINFO, CINAHL and MEDLINE. A search was also conducted of NICE web pages (published appraisals).

#### ***Review 4***

The following databases were searched for systematic reviews (from 1995 onwards): CDSR (Issue 2 2006), DARE, the Health Technology Assessment Database and Ongoing Reviews Register. The following databases were searched for RCTs (from 1990 onwards): MEDLINE, EMBASE, CENTRAL, CINAHL and PsycINFO.

#### ***Review 5***

The following databases were searched for systematic reviews (from 1995 onwards): CDSR, DARE, National Research Register (including CRD Ongoing Reviews), National/Health Technology Assessment Database, SIGN Guidelines, National Guideline Clearinghouse, DH Research Findings Electronic Register, TRIP Clinical Evidence and Health Evidence Bulletins Wales. The following databases were searched for RCTs (from 1990 onwards): CENTRAL, EMBASE, PsycINFO, CINAHL and MEDLINE. In addition, a search was carried out of the National Coordinating Centre for Health Technology Assessment NICE web pages (published appraisals).

#### ***Review 6***

The following databases were searched for systematic reviews (from 1995 onwards): CDSR, DARE, National Research Register (including CRD Ongoing Reviews), National/Health Technology Assessment Database, SIGN Guidelines, National Guideline Clearinghouse, DH Research Findings Electronic Register, TRIP Clinical Evidence and Health Evidence Bulletins Wales. The following databases were searched for RCTs (from 1990 onwards): CENTRAL, EMBASE, PsycINFO, CINAHL and MEDLINE. In

addition, a search was carried out of the National Coordinating Centre for Health Technology Assessment NICE web pages (published appraisals).

### ***Review 7***

The following databases were searched from 1966 to 2006: MEDLINE, EMBASE, CINAHL, CCTR, CDSR, DARE and AMED. The search was not limited by study type, but was restricted to studies in developed countries and published in English language. Reference lists of identified articles were also checked.

### ***Review 8***

A non-systematic review was conducted. Studies of corroborative evidence such as surveys, qualitative studies, cohort studies, case-control studies, case-series and expert opinions were identified. The following databases were searched (from 1966 to 2006): MEDLINE, EMBASE, CINAHL, CCTR, CDSR, DARE and AMED. In addition, a 'snowball' search of the internet was carried out and included the websites run by the following: DH, Health Education Authority, MAFF, FCA, DEFRA, WHO and UNICEF. A hand/document search from reference studies and a search of the grey literature was also conducted.

### ***Expert papers***

The two expert papers on the safe storage of expressed breast milk and growth monitoring draw on published research in addition to expert opinion.

The expert paper on nutrition and breastfeeding draws on nationally published data from surveys and published scientific evidence on maternal nutrition and breast milk volume and composition.

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

### **Selection criteria**

Inclusion and exclusion criteria for each review varied and details can be found at

<http://guidance.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain>

However, in general:

- Review 1 included: systematic reviews from 1990 onwards, RCTs from 1990 onwards published worldwide in English and non-randomised studies (cohorts, qualitative studies and surveys) conducted from 1990 and published in the UK. It focused on interventions for non-pregnant women of childbearing age who were planning a pregnancy or who might become pregnant. The interventions had to start prior to conception but could continue or stop at any time during the pregnancy.
- Review 2 included: systematic reviews published since 1995; RCTs from 1990 onwards published worldwide in English and non-randomised UK studies from 1990 onwards, with a particular focus on nutrition interventions aimed at low-income women during pregnancy.
- Review 3 included: systematic reviews from 1995 onwards, RCTs from 1990 onwards published worldwide in English, and UK studies of all interventions aiming to improve the nutrition of women during the first year after birth. Studies had to examine women up to 6 weeks after giving birth (postpartum) and living in developed countries, from any socio-economic background. Where data were available, the review also considered interventions on disadvantaged population subgroups.
- Review 4 included: systematic reviews from 1995 onwards, RCTs from 1990 onwards published worldwide in English, and other UK studies. It focused on interventions to:
  - promote the initiation, and increase the duration of, breastfeeding
  - reduce the risk of contamination of feeding equipment
  - ensure breast milk is safely stored and reheated
  - reduce the risks associated with the reconstitution of formula milk.

- Review 5 included: systematic reviews from 1995 onwards, RCTs from 1990 onwards and non-randomised studies conducted in the UK and published from 1990 onwards. It focused on interventions to promote safe and healthy feeding practices for infants and young children who are moving from an exclusively milk-based diet to solid food.
- Review 6 included: systematic reviews from 1995 onwards published worldwide in English, RCTs from 1990 onwards conducted in developed countries, and other study types conducted in the UK and published from 1990 onwards. It focused on interventions aimed at children aged 2–5 years old, their parents and carers, and staff looking after 2–5 year olds in nurseries and other day care settings.
- Review 7 included: all types of studies conducted in the UK, and systematic reviews and RCTs carried out in developed countries. Only papers published in English between 1966–2006 were considered. It focused on interventions promoting vitamin D intake, in line with the Committee on Medical Aspects of Food and Nutrition Policy (COMA) recommendations on vitamin D. The interventions had to be aimed at one of the following:
  - women who were planning a pregnancy, were pregnant or had given birth in the previous year
  - infants and young children (from birth up to age 5 years)
  - vulnerable groups (with a particular emphasis on black and minority ethnic groups).
- Review 8 included: primary studies (cohort and case-control studies, case-series and expert opinions). It focused on corroborative evidence on interventions to improve the nutrition of infants/children aged 6 months to 5 years. (The corroborative evidence related to the process and context of interventions.)

### **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 development of NICE public health guidance' (see appendix E). Each study was described by study type and graded (++, +, -) to reflect the risk of potential bias arising from its design and execution.

### ***Study type***

- Meta-analyses, systematic reviews of randomised controlled trials (RCTs) or RCTs (including cluster RCTs).
- Systematic reviews of, or individual, non-RCTs, case-control studies, cohort studies, controlled before-and-after (CBA) studies, interrupted time series (ITS) studies, correlation studies.
- Non-analytical studies (for example, case reports, case series).
- Expert opinion, formal consensus.

### ***Study quality***

- ++ All or most of the criteria have been fulfilled. Where they have not been fulfilled the conclusions are thought very unlikely to alter.
- + Some 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 criteria fulfilled. The conclusions of the study are thought likely or very likely to alter.

The studies were also assessed for their applicability to the UK.

### **Summarising the evidence and making evidence statements**

The review data was summarised in evidence tables (see evidence tables and the synopsis).

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 reflect the strength (quantity, type and quality) of evidence and its applicability to the populations and settings in the scope.

## ***Economic appraisal***

The economic appraisal consisted of two economic effectiveness reviews and an economic appraisal.

### **Reviews of economic evaluations**

The following databases were searched: MEDLINE, EMBASE, CINAHL, CCTR, CDSR, DARE and NHSEED. The search strategy combined relevant terms relating to:

- pre-conceptual, pregnant and postpartum women
- children up to age 5 years.

The search incorporated a sensitive health economics filter and focused on interventions rather than being restricted to outcomes.

In selecting studies for the review, the main exclusion criteria were as follows:

- primary studies set in developing or low-income countries
- studies published before 1990
- papers in a language other than English
- papers not held at the British Library
- abstracts.

A total of 24 articles were included in the pre-conceptual, pregnant and postpartum women review. Nine articles were included in the children 0–5 years review. These were assessed for their methodological rigour and quality using the critical appraisers' checklists provided in appendix B of the ['Methods for development of NICE public health guidance'](#) (see table 3.1). Each study was categorised by study type and graded using a code (++), (+) or (-), based on the potential sources of bias.

### **Cost-effectiveness analysis**

An economic model was constructed to incorporate data from the reviews of effectiveness and cost effectiveness. The results are reported in: 'Modelling the cost-effectiveness of breastfeeding support'. They are available on the

NICE website at:

<http://guidance.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain>

### ***Fieldwork***

This section will be completed in the final document.

### ***How the PDG formulated the recommendations***

At its meetings held between March 2006 and May 2007, the PDG considered the evidence of effectiveness and cost effectiveness.

The PDG 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 population health and/or reducing inequalities in health.
- Cost effectiveness.
- Balance of risks and benefits.
- Ease of implementation and the anticipated extent of change in practice that would be required.

The PDG also considered whether a recommendation should only be implemented as part of a research programme, where evidence was lacking.

Where possible, recommendations were linked to an evidence statement(s) (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 sets out the evidence statements taken from eight reviews and links them to the relevant recommendations (see appendix B for the key to study types and quality assessments). It also lists three expert reports and their links to the recommendations and sets out a brief summary of findings from the economic appraisal.

The eight reviews of effectiveness are:

Review 1: 'The effectiveness of public health interventions to promote nutrition of pre-conceptual women'.

Review 2: 'Review of the effectiveness of interventions to improve the nutrition of pregnant women with a focus on the nutrition of pregnant women in low-income households'.

Review 3: 'The effectiveness of public health interventions to improve the nutrition of postpartum women'.

Review 4: 'The effectiveness of public health interventions to promote safe and healthy milk feeding practices in babies'.

Review 5: 'The effectiveness of public health interventions to improve the nutrition of young children aged 6–24 months'.

Review 6: 'The effectiveness of public health interventions to improve the nutrition of 2 to 5 year old children'.

Review 7: 'The effectiveness and cost-effectiveness of interventions to promote an optimal intake of vitamin D to improve the nutrition of pre-conceptual, pregnant and postpartum women and children in low-income households'.

Review 8: 'Supplementary evidence review 8 on the effectiveness of public health interventions to improve the nutrition of infants/children aged 6 months to 5 years'.



**Evidence statement 4.4** indicates that the linked statement is numbered 4 in review 4 (King and D'Souza 2006). **Evidence statement 7.4** indicates that the linked statement is numbered 4 in review 7 (Kwan and Jacklin 2006). Where a recommendation was inferred from the evidence, this is indicated by the reference 'IDE' (inference derived from the evidence) below.

Where the PDG has considered other evidence, it is linked to the appropriate recommendation below. It is also listed in the additional evidence section of this appendix.

The reviews and economic appraisal are available on the NICE website (<http://guidance.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain>).

**Recommendation 1:** evidence statements 1.1, 1.2, 2.4, 4.27, 4.28, DH 2000, SACN 2006

**Recommendation 2:** evidence statements 1.1, 1.3, 1.4, 1.5, CEMACH 2007, DH 2000, SACN 2006

**Recommendation 3:** SACN 2004, IDE

**Recommendation 4:** evidence statements 2.7, 4.11, 7.2, 7.7, 8.3, 8.6

**Recommendation 5:** evidence statements 7.1, 7.2, 7.7, DH 1998, SACN 2007

**Recommendation 6:** evidence statements 2.2, 2.3

**Recommendation 7:** evidence statements 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, Goldberg 2006, CEMACH 2004

**Recommendation 8:** evidence statements 4.1, 4.6, 4.8, 4.9, 4.23, 4.24, 4.25, 4.26, 4.27

**Recommendation 9:** evidence statements 4.1, 4.6, 4.8, 4.9, 4.23, 4.24, 4.26, 4.27

**Recommendation 10:** evidence statements 4.23, 4.24, 4.25, 4.26, 4.27

**Recommendation 11:** evidence statements 4.9, 4.12, 4.13, 4.16, 4.17, 4.26

**Recommendation 12:** evidence statements 4.3, 4.6, 4.8, 4.9, 4.10, 4.19, 4.25, 4.26, 4.27

**Recommendation 13:** evidence statements 4.30, 4.31, Cook 2006

**Recommendation 14:** evidence statement 4.29

**Recommendation 15:** evidence statements 4.1, 4.2, 4.4, 4.27, 6.2, 8.8, 8.9

**Recommendation 16:** evidence statements 8.9, 8.10

**Recommendation 17:** Anderson et al. 2003, IDE

**Recommendation 18:** evidence statements 5.1, 5.2, 6.1, 6.2, 6.3, 8.3, 8.6, 8.7, DH 1994

**Recommendation 19:** Sachs and Sykes 2006, Blair and Hall 2006

**Recommendation 20:** evidence statement 5.6

**Recommendation 21:** evidence statements 5.8, 5.9, 6.10, 6.11, 8.10, 8.14

**Recommendation 22:** evidence statement 4.29, Cook 2006

**Recommendation 23:** evidence statements 6.4, 6.5, 6.6, 6.7, 6.8, 8.7, 8.12

**Recommendation 24:** evidence statements 6.2 8.13, 8.15

### ***Evidence statements***

#### **Evidence statement 1.1**

Evidence from one randomised community trial 1 (+) and media campaign 2 (+) conducted in developed countries to promote the uptake of folic acid supplements using advertising, leaflets and promotional material were effective in increasing awareness among women of child-bearing age about the benefits of folic acid supplements.

**Evidence statement 1.2**

Evidence from one systematic review 2 (+) that included studies on interventions and media campaigns conducted in developed countries to promote the uptake of folic acid supplements using advertising, leaflets and promotional material reports that these campaigns were effective in increasing the proportion of women of child-bearing age that regularly take folic acid supplements.

**Evidence statement 1.3**

A large proportion of women of child-bearing age who are planning a pregnancy or may become pregnant do not regularly take folic acid supplements. Evidence from one systematic review 2 (+) that included 30 studies that reported risk factors for low pre-conception folic acid use found that low levels of formal education, young maternal age, lack of a partner, immigrant status and unplanned pregnancy are associated with lower odds of using folic acid around the time of conception.

**Evidence statement 1.4**

Evidence from a RCT 1 (+) based on a southern population in the USA who received brief counseling from a physician about the benefits of folic acid along with the provision of free folic acid supplement tablets found that this was effective in increasing folic acid supplement use.

**Evidence statement 1.5**

There is evidence from a large survey 2 (+) of health professionals working in England that folic acid advice is not perceived by them as being part of general health advice for women of child-bearing age. The survey also found that many health professionals working in England have gaps in their knowledge about the appropriate dosage and timing of folic acid for women.

**Evidence statement 2.2**

Studies undertaken in the USA and Europe have consistently found that women enrolled into studies that measure self-reported alcohol consumption during pregnancy reduce their reported alcohol consumption as pregnancy

progresses. This reduction is found in both control groups and intervention groups.

### **Evidence statement 2.3**

A brief intervention from a trained counsellor to reduce alcohol consumption among women who were drinkers involving goal setting and including a woman's partner did not lead to a significant reduction in reported alcohol consumption when compared to a control group that did not receive the intervention. However, in both the control and intervention groups reported drinking fell.

### **Evidence statement 2.4**

A non-randomised control trial in Scotland demonstrated that written educational materials aimed at improving knowledge, practical skills and diet of pregnant women, provided to pregnant women at an initial meeting during the first trimester and again with an accompanying personalised letter at 6 months gestation, produced a small but significant increase in women's nutrition knowledge but failed to improve women's attitudes about diet or their reported nutrition.

### **Evidence statement 2.7**

One RCT found a statistically significant maternal weight gain among pregnant women recruited into the USA's women, infants and children supplemental food programme (WIC) at mid-pregnancy compared to women in a control population who received no free dietary supplements.

### **Evidence statement 3.1**

There is evidence from four RCTs (all 1 [-]) that diet and exercise programmes are effective in enabling some postpartum women to lose weight gained during pregnancy. This finding is based on US studies of women not noted to be from disadvantaged groups and who appear to be highly motivated to lose weight.

**Evidence statement 3.2**

There is evidence from 2 RCTs (both 1 [-]) that a combination of diet and physical activity results in more effective and preferable weight loss than diet alone or physical activity alone.

**Evidence statement 3.3**

There is evidence that physical activity as part of a combined diet and physical activity intervention to promote weight loss, is more effective when frequent and regular, than when vigorous and less frequent.

**Evidence statement 3.4**

There is evidence from 2 RCTs (both 1 [-]) that integrated programmes of activity which support participants in combining diet and regular physical activity in order to promote weight loss in the postpartum period are more effective than interventions which provide information alone.

**Evidence statement 3.5**

There is evidence from 2 RCTs (both 1 [-]) that the characteristics of programmes which are effective in enabling some women to lose weight in the postpartum period are those which: combine diet and physical activity; include strategies for behaviour change; tailor the intervention to individual or group needs; include some group sessions and written materials; provide ongoing support and contact with programme staff; and are of a sufficient duration to make sustained lifestyle changes.

**Evidence statement 3.6**

There is evidence from one RCT 1 (-) that short-term weight loss of 1kilogram/week achieved through a combination of diet plus physical activity in healthy postpartum women has no detrimental effect on milk quantity or quality and does not appear to affect infant weight gain.

A second RCT 1 (-) combining diet and physical activity in healthy postpartum women (BMI 25–30) over a longer time period and resulting in a mean weight loss of 0.5kilogram/week did not appear to affect infant weight or length.

However, the study may not have been sufficiently powered to demonstrate such effects.

**Evidence statement 4.1**

Three (++) non-randomised control trials evaluated peer support programmes. The interventions included training of peer supporters, antenatal and postnatal support (telephone, home visits group or contact at clinic that was initiated by the peer supporter). The studies found a statistically significant increase in the initiation and or duration of breastfeeding among women from low-income groups who intended to breastfeed.

**Evidence statement 4.2**

One 1 (++) RCT evaluated a peer support programme including: peer support training, one antenatal visit, postnatal support (not necessarily within 72 hours) by telephone or home visit and support groups. The study found no significant difference in breastfeeding initiation and duration rates (up to 16 weeks) compared to routine care in a general population in Scotland.

**Evidence statement 4.3**

Two 1 (++) RCTs evaluated volunteer breastfeeding counsellors. The first found telephone support instigated by the supporter within 48 hours of hospital discharge, significantly increased the duration of any and exclusive breastfeeding at 4, 8 and 12 weeks compared to conventional care in relatively well-educated mothers who were breastfeeding at study recruitment. The other study found one antenatal visit at which the offer of postnatal support was made along with a contact card and leaflets had no effect on breastfeeding initiation or duration rates.

**Evidence statement 4.4**

One 1 (++) RCT evaluated an intervention that included up to 10 visits from a trained support worker for up to 3 hours per day in the first 28 days postnatal, (as well as usual care). The study reported no significant increases in the duration of breastfeeding. Women were recruited from the general UK population.

**Evidence statement 4.6**

Four RCTs evaluated health professional support. One 1 (++) RCT included frequent postnatal visits and telephone support from a skilled, knowledgeable midwife and found breastfeeding duration rates increased significantly in women who had planned to breastfeed. One 1 (+) RCT evaluated intrapartum visits in hospital and postnatal home visits with telephone support from a community nurse and peer counsellor to be effective in increasing the duration of exclusive breastfeeding amongst minority women on low income.

**Evidence statement 4.8**

One RCT evaluated the effect of a lactation consultant conducting two educational antenatal visits, weekly antenatal telephone contacts, a hospital intrapartum contact and postnatal home visits compared with standard care in women on low incomes who were primarily Hispanic and black living in the US. The study found the intervention significantly increased breastfeeding duration rates up to 20 weeks

**Evidence statement 4.9**

Four RCTs included trained, skilled, knowledgeable health professionals delivering interventions. Of these, one 1 (+) RCT found a group antenatal education specifically on positioning and attachment significantly increased exclusive breastfeeding rates at 6 weeks among low-income women who intended to breastfeed. A 1 (+) RCT included: two to four (10–15 minutes) individual antenatal sessions, training of health professionals and early frequent postnatal support that continued throughout the first year in a population of mostly white women on low income. It found a significant increase in the breastfeeding initiation and duration rates. A 1 (++) RCT included: group antenatal education at 24–28 weeks, support in hospital, postnatal contact at 2–3 weeks and 3 months and found no difference in exclusive breastfeeding duration rates in women intending to breastfeed. One 1 (+) RCT included five to eight home visits lasting up to an hour during the first 2 months with telephone support. Visits were concentrated in the first 2 weeks. The study found significant increase in breastfeeding duration rates at 2 months postnatal

**Evidence statement 4.10**

One 1 (++) RCT evaluated a single, 30 minute, one to one discussion and leaflet on 'breastfeeding and employment' by a midwife or intern. The intervention did not significantly increase exclusive, or any, breastfeeding at 17 weeks postpartum. This study was conducted in France on a relatively affluent group of women.

**Evidence statement 4.11**

One 1 (++) RCT evaluated a single discussion at WIC registration (mean 12 minutes) and discharge packs at delivery. The study found breastfeeding duration was highest among mothers who had planned to breastfeed but had low breastfeeding knowledge.

**Evidence statement 4.12**

This three-armed 1 (+/-) RCT compared at least one group, antenatal, breastfeeding session (50–80 minutes, lead by the researchers) with a single one to one breastfeeding session (15–30 minutes) and standard care. The study found significantly higher breastfeeding initiation rates in both intervention groups among US black women on low incomes.

**Evidence statement 4.13**

One 1 (++) RCT evaluated a didactic one to one, antenatal discussion among a population of African-American women on low incomes with a paediatrician (who had received specific training) at a scheduled hospital visit. The advantages of breastfeeding were included in material covered. The study found no significant increase in breastfeeding initiation or duration rates.

**Evidence statement 4.16**

One 1 (+) RCT examined a 1 hour group, antenatal, breastfeeding session on positioning and attachment given by a lactation consultant. Most participants were from a low-income group. The study demonstrated significantly higher rates of exclusive breastfeeding at 6 weeks compared to women who received standard antenatal care.



**Evidence statement 4.17**

One 1 (+/-) Australian RCT evaluated a small, informal group antenatal, breastfeeding session in immigrant Vietnamese women on low incomes. It found significantly higher breastfeeding initiation and duration rates among women who received the intervention as opposed to a leaflet alone.

**Evidence statement 4.19**

One 1 (++) RCT evaluated the effect of an outpatient appointment 2 weeks after the birth with a physician/paediatrician (who had received 5 hours lactation training) in well-educated women on high incomes. The study found significant increases in exclusive breastfeeding at 4 weeks and extended overall duration of breastfeeding.

**Evidence statement 4.23**

Post registration or update training for healthcare professionals to increase knowledge or skills in breastfeeding as part of multi-faceted interventions or training specifically to deliver an intervention can be effective.

**Evidence statement 4.24**

Two 2 (+) before and after studies evaluated a breastfeeding training programme for hospital health professionals and found a significant increase in breastfeeding duration rates.

**Evidence statement 4.25**

Two 2 (+) before and after studies evaluated the UNICEF 'Baby friendly hospital initiative' (BFHI) training for health professionals in hospital settings. One study found significant increases in breastfeeding rates at 6 months where initial breastfeeding rates were low. The BFI training did not increase breastfeeding rates at hospital discharge where breastfeeding rates were relatively high.

**Evidence statement 4.26**

One 1 (+) RCT evaluated education and support, including: individual education that was given to all women in both groups (mostly white on low incomes), support in the ante, intra and postpartum period and into the first

year of infancy. This included training of health professionals, daily inpatient visits, telephone call 48 hours after discharge, lactation clinic at 1 week and lactation consultant present at all health clinics up to 1 year after the birth. Significant increases were found in the initiation and duration of breastfeeding.

**Evidence statement 4.27**

One 2 (++) before and after study conducted among American Indian women evaluated the adoption of hospital policy and practices which were culture specific together with a media campaign. The latter included the 10 steps in the BFHI, a peer support programme and a public health campaign. The study found a statistically significant increase in breastfeeding initiation rates.

**Evidence statement 4.28**

One 2 (+) before and after study evaluated media campaigns (predominantly television commercials) and found limited evidence of an increase in breastfeeding initiation rates.

**Evidence statement 4.29**

A 2 (+) systematic review found the reconstitution of infant formula milk from powder may be associated with errors with a greater tendency to over-concentrate feeds.

**Evidence statement 4.30**

One 1 (+) RCT compared a specific brand of mini electric breast pump with a specific brand of manual breast pump. No significant differences were found in the volume of milk expressed or its fat content.

**Evidence statement 4.31**

One 1 (+) RCT compared pumping each breast sequentially with both breasts simultaneously. Women preferred simultaneous pumping which also produced a greater volume of milk. No significant differences were found in milk fat concentrations.

**Evidence statement 5.1**

Of four relevant studies included in a 2 (+) systematic review, only one (a 1 [+] RCT) was of sufficient quality. It found intensive home visiting by a health

professional significantly improved daily milk intake, self-feeding, fruit or fruit juice and meat intake in children under 3 years whose mothers were unmarried, low income, black school girls (15–18 years).

#### **Evidence statement 5.2**

One 2 (+) study included in a systematic review, found monthly visits by 'community mothers' significantly improved dietary intake of animal protein, non-animal protein, whole foods, milk, fruit and vegetables in infants under 1 year of age from low-income families in Dublin.

#### **Evidence statement 5.6**

A single RCT (a 1 [+] study) with multiple interventions including reduced exposure to allergens in food for breastfeeding mothers and infants, and a reduced exposure to house dust, reduced the frequency of allergic disorders in infants at 12 months with a family history of atopy. Parental smoking was a significant risk factor for total allergy at 12 months ( $p < 0.05$ ). Infants from low socio-economic groups had a higher risk of developing an allergy than those from a higher socio-economic group ( $p < 0.05$ ).

#### **Evidence statement 5.8**

A systematic review (graded 2 [+]) of 28 articles of varying quality, found no consistent high quality evidence of an association between breastfeeding beyond 1 year and the development of early dental caries.

#### **Evidence statement 5.9**

An Australian cross sectional survey (a 2 [+] study reported in a 2 [+] systematic review) of infant feeding including dental examination of 3375 children analysed using a stepwise regression model, found significant associations between reported use of sweetened drinks in bottles, going to sleep with a bottle and sipping from a bottle during the day and early childhood dental caries.

#### **Evidence statement 6.1**

There is evidence from two RCTs (both 1 [+]) and two other studies (both 2 [+]) reported in two systematic reviews, that nutrition education interventions

that focus on skills development in the mothers of young children can be effective in improving the diets of the family in terms of increasing the amount of fruit and vegetables consumed and in improving the quality and diversity of the diet.

**Evidence statement 6.2**

There is evidence from two RCTs (both 1 [+]) and two other studies (both 2 [+]) reported in two systematic reviews, that effective nutrition education programmes aimed at the mothers of young children are those which: are multi-faceted; include 'hands on' skills development; are tailored to the educational level and needs of the mothers and to family resources; include strategies for behaviour change; are intensive and ongoing; and are delivered by nutrition paraprofessionals and/or peer supporters.

**Evidence statement 6.3**

There is evidence from two studies among low-income mothers, including teenage mothers, (a 1 [+] RCT and a 2 [+] before and after study) reported in two systematic reviews, that interventions based on intensive and regular home visits by health professionals delivering tailored advice are effective in improving the diets of pre-school children.

**Evidence statement 6.4**

There is evidence from three RCTs (all 1 [+]) reported in one systematic review (2 [++]) that educational interventions which provide information through a variety of different media such as storybooks, videos and audiotapes, can be effective in improving children's knowledge and understanding of healthy eating and their understanding of the relationship between nutrition and health. However, the provision of information alone does not appear to change eating behaviour.

**Evidence statement 6.5**

There is evidence from two RCTs (both 1 [+]) that the more frequently young children taste new or previously disliked foods, the more likely they are to accept those foods. One RCT 1 (+) demonstrated that looking at the foods

without tasting them was not effective in increasing the acceptance of those foods.

There is evidence from one systematic review (a 2 [-]) and two RCTs 1 (+) that interventions which provide the opportunity for children to handle and repeatedly taste foods, are more likely to be successful in changing eating behaviour than interventions that provide information alone.

#### **Evidence statement 6.6**

There is evidence from one RCT 1 (+) that foods should be positively presented in interventions which aim to encourage young children to eat healthily.

#### **Evidence statement 6.7**

There is evidence from two RCTs (both 1 [+]) that parent-led interventions in isolation, can be effective in improving pre-school children's nutrition knowledge and eating behaviours.

However, while there is evidence from one before and after study 2 (++) that interventions are more effective when delivered by teachers than by parents, there is further evidence (from a 1 [+] RCT) which demonstrates that parental reinforcement of teacher-led learning enhances the overall effectiveness of the intervention. Three out of four of these studies were conducted in white middle-class families.

#### **Evidence statement 6.8**

There is evidence from three systematic reviews that classroom-based interventions can be effective in increasing pre-school children's nutrition knowledge and their consumption of particular foods.

Effective interventions appear to be those which are multi-faceted and which include characteristics such as: teaching based on behavioural approaches; teaching levels which are developmentally appropriate; training for teachers in delivering the intervention; activity-based teaching; opportunities to taste and handle foods; and reinforcement of learning from the classroom in the cafeteria and at home by parents.

**Evidence statement 6.10**

Evidence from a Brazilian study 2 (++) found children attending nurseries which restricted the consumption of sugar and who consumed lower amounts of sugar at lower frequencies, had a substantially lower risk of dental caries.

**Evidence statement 6.11**

A systematic review 2 (+) based on 36 studies, found that the relationship between sugar consumption and caries is much weaker in the modern age of fluoride exposure than it used to be, but controlling the consumption of sugar remains a justifiable part of caries prevention.

**Evidence statement 7.1**

Evidence from 10 studies (eight 1 [+] RCTs and two 2 [+] studies) show that antenatal vitamin D supplementation is effective in improving the vitamin D status of Asian and white women.

**Evidence statement 7.2**

Evidence from two RCTs indicates that infants of mothers who received an antenatal vitamin D supplement achieved a higher body weight during the first year after birth than infants of mothers who received no antenatal vitamin D supplement.

**Evidence statement 7.7**

There is 1 (-) and 2 (-) evidence to suggest that health education programmes on the prevention of vitamin D deficiency had the potential to improve the knowledge base about vitamin D, increase the uptake of vitamin D supplements and reduce the number of hospital admissions with rickets and osteomalacia.

**Evidence statement 8.3**

A 2 (+) study found that anaemic children aged 5 years whose parents received individual counselling, group nutrition education and WIC food vouchers achieved higher mean haemoglobin levels when compared with children whose parents did not receive the intervention, at 6 months follow up.

**Evidence statement 8.6**

Evidence from five UK qualitative studies/surveys (evidence level 3) indicate that the introduction of solid foods is influenced by mothers' perceptions of the baby's needs, cultural beliefs and advice/encouragement from family members and friends. The most common reasons for early introduction of solid foods were mothers' perception that the infant was hungry and not settling. Infant weight was perceived as a marker of child health and successful parenting. There is an association between early introduction of solid foods and maternal smoking, non-breastfeeding, male infants and low maternal educational level

**Evidence statement 8.7**

The formation of children's food preferences and acceptance patterns are shaped by learning and repeated experience within the social context in which the food is consumed. Evidence from observational studies and surveys (evidence level 3) suggest that:

- repeated exposure to a target food enhances the acceptance of same, similar and target foods in young infants
- children's consumption of fruits and vegetables was positively associated with parental consumption of fruits and vegetables
- women's own weight control attempt may influence their young daughters' emerging ideas, concepts and beliefs about dieting.

**Evidence statement 8.8**

Unpublished findings from a 1 (+) UK RCT suggest that a peer support intervention designed to improve infant feeding practices can increase feeding knowledge, confidence in following advice and was valued by recipients and volunteers providing the intervention. However, the intervention did not positively influence vitamin C intake from fruits, growth parameters, use of NHS services and medication use among infants.

**Evidence statement 8.9**

There is evidence from two UK studies (2 [+] and 3) to suggest that specially trained link workers can be effective in helping South Asian families to

establish healthy weaning patterns, modest changes in children's diets and improved maternal knowledge.

**Evidence statement 8.10**

There is UK observational study evidence (level 3) to suggest that a community-based campaign to improve child feeding practices and oral health among the Asian children aged under 5 years was well received by the target populations.

**Evidence statement 8.12**

Evidence from a 2 (+) study demonstrates the need to focus on other avenues, such as responsiveness to children's verbal and nonverbal behaviours, in addition to increasing knowledge, to enhance parents' ability to feed toddlers appropriately.

**Evidence statement 8.13**

The St Philips Healthy Eating Project, which aimed to help families to develop healthy eating habits in a community setting, was well received and appreciated (evidence level 3).

**Evidence statement 8.14**

There is evidence from four studies (three 2 [+] and evidence level 3 observational study) to suggest that interventions in day care centres improves the nutritional adequacy of the food provided and is associated with dietary improvements.

**Evidence statement 8.15**

There is 1 (+) systematic review-level evidence to suggest that food promotion can have an effect on children's food preferences, purchase behaviour and consumption. The majority of food promotion focuses on foods high in fat, sugar and salt and therefore tends to have a negative effect. However, food promotion has the potential to influence children in a positive way, in improving their nutritional knowledge.



**Expert reports**

Cook P (2006) Handling and storage of expressed breast milk [online].

Available from: <http://guidance.nice.org.uk/page.aspx?o=421793>

Goldberg G (2006) Nutrition and breastfeeding [online]. This document will be available when the final guidance is published.

Sachs M, Dykes F (2006) Growth monitoring of infants and young children in the United Kingdom [online]. Available from:

<http://guidance.nice.org.uk/page.aspx?o=421790>

***Additional evidence***

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### ***Cost-effectiveness evidence***

Two economic reviews were commissioned for this guidance:

- 'Rapid economic review of public health interventions designed to improve the nutrition of pre-conceptual, pregnant and postpartum women'
- 'Rapid economic review of public health interventions designed to improve the nutrition of children aged 0–5 years'.

There was a dearth of good quality economic studies relating to the UK and the conclusions from other studies cannot readily be translated to a UK setting. However, where relevant published literature exists, it does indicate that increased breastfeeding rates could produce cost savings by reducing various childhood diseases.

### **Cost-effectiveness analysis**

A model was developed, using the published literature, to determine the relationship between breastfeeding and health outcomes. In particular, it looked at the 'downstream costs' of these outcomes. 'What if' scenarios were constructed for given interventions to estimate their impact on breastfeeding

initiation. Sensitivity analysis was used to investigate how these different scenarios affect cost effectiveness.

## Appendix D: gaps in the evidence

The PDG identified a number of gaps in the evidence related to the programme under examination, based on an assessment of the evidence. These gaps are set out below.

1. There is a lack of evidence on the effectiveness of interventions targeting specific socio-economic, ethnic, low-income or vulnerable groups. More evidence is also needed on the differential effectiveness of interventions among these groups – and the effectiveness of different components within each intervention.
2. There is a lack of evidence about the effectiveness and cost effectiveness of interventions to improve the nutrition of mothers and children aged under 5, particularly those from disadvantaged, low-income and minority ethnic groups.
3. There is a lack of good quality economic studies on public health interventions to improve nutrition in the UK.
4. There is a lack of well-designed intervention studies on how to:
  - improve the nutritional status of women before and during pregnancy
  - enable pregnant women who are obese to reduce the associated health risks for both themselves and their babies
  - help postpartum women with their nutritional needs and weight
  - help improve iron intake and reduce salt intake among infants and young children
  - balance the benefits of improving vitamin D status and the associated risks of increased exposure to the sun.
5. There is a lack of studies that have adequately measured and validated nutrition levels before and after an intervention. Studies too often rely on self-reported information alone. In addition, few studies

include measured dietary change as an outcome measure (many rely on surrogate measures such as the baby's birth weight, which can be affected by confounding.)

6. There is a lack of intervention studies and evaluations providing process and qualitative data. This is needed so that the effective components of an intervention can be assessed and replicated on a wider scale.
7. There is a lack of well-designed studies that have evaluated the use of food vouchers to encourage healthy eating.

## Appendix E: supporting documents

Supporting documents are available from the NICE website at

<http://guidance.nice.org.uk/page.aspx?o=MaternalandChildNutritionMain>

These include the following:

- Reviews of effectiveness
  - Review 1: 'The effectiveness of public health interventions to promote nutrition of pre-conceptual women'
  - Review 2: 'Review of the effectiveness of interventions to improve the nutrition of pregnant women with a focus on the nutrition of pregnant women in low-income households'
  - Review 3: 'The effectiveness of public health interventions to improve the nutrition of postpartum women'
  - Review 4: 'The effectiveness of public health interventions to promote safe and healthy milk feeding practices in babies'
  - Review 5: 'The effectiveness of public health interventions to improve the nutrition of young children aged 6–24 months'
  - Review 6: 'The effectiveness of public health interventions to improve the nutrition of 2 to 5 year old children'
  - Review 7: 'The effectiveness and cost-effectiveness of interventions to promote an optimal intake of vitamin D to improve the nutrition of pre-conceptual, pregnant and postpartum women and children in low-income households'
  - Review 8: 'Supplementary evidence review on the effectiveness of public health interventions to improve the nutrition of infants/children aged 6 months to 5 years'.
  
- Economic reviews
  - 'Rapid economic review of public health interventions designed to improve the nutrition of pre-conceptual, pregnant and postpartum women'
  - 'Rapid economic review of public health interventions designed to improve the nutrition of children aged 0–5 years.'

- Economic analysis/modelling report
  - 'Modelling the cost-effectiveness of breastfeeding support.'
- Expert reports
  - 'Growth monitoring of infants and young children in the United Kingdom'
  - 'Handling and storage of expressed breast milk'
  - 'Nutrition and breastfeeding.'

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

- 'Methods for development of NICE public health guidance' available from: [www.nice.org.uk/phmethods](http://www.nice.org.uk/phmethods)
- 'The public health guidance development process: an overview for stakeholders including public health practitioners, policy makers and the public' available from: [www.nice.org.uk/phprocess](http://www.nice.org.uk/phprocess)