

GUIDELINE FOR UK MIDWIVES/HEALTH VISITORS TO USE WITH PARENTS OF INFANTS AT RISK OF DEVELOPING CHILDHOOD OVERWEIGHT/OBESITY

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BACKGROUND

Childhood overweight/obesity is a significant public health issue [1]. In the UK in 2010, 23% of children aged 4-5 years and 33% of 10-11 year olds were overweight [2]. A child's weight at 5 years of age is a good indicator of their future health and obesity during childhood increases the risk of adult obesity [3]. The risk factors for childhood overweight/obesity can be identified during infancy, or even earlier. Some of these risk factors such as maternal pre-pregnancy BMI, paternal BMI, smoking during pregnancy and high birth weight are non-modifiable from the perspective of the infant [4]. However, rapid weight gain during infancy is the strongest risk factor for the development of childhood overweight/obesity [5] and this may be modifiable with early intervention targeting feeding and soothing practices, diet composition and physical activity.

Although UK health policy suggests early prevention is important [6-8], there is currently no national guidance for health practitioners (midwives, general practitioners, health visitors, registered nurses and community nursery nurses) and children's centre staff to help them manage childhood overweight/obesity risk during infancy. This, along with some practitioners' reluctance to label infants as overweight or obese [9, 10], is likely to make it difficult to identify those who might benefit from early intervention. In contrast, in the US, the Institute of Medicine's Early Childhood Obesity Prevention Policies advise practitioners to undertake growth monitoring and consider obesity risk factors as part of every well-child visit [11]. In the UK, members of the health visiting team (health visitors, registered and nursery nurses) and children's centre staff advise parents about infant nutrition, underpinned by the Healthy Child Programme [12]. A Framework for Action for tackling obesity [13] was produced in 2009 to provide general guidance for practitioners in relation to preventing childhood obesity but this still requires implementation into practice.

There are a number of barriers to identification and intervention with parents of infants at risk of developing childhood overweight/obesity. These include, low levels of knowledge about the health consequences of obesity, particularly among members of the health visiting team, practitioner concerns about raising the issue with parents and the impact on their professional relationship and lack of confidence about providing nutritional advice to parents amongst GPs and some registered nurses [10]. A qualitative study found that members of the health visiting team felt they had a role in advising parents about infant diet but did not formally identify and/or intervene with larger infants. Infant overweight/obesity was considered a sensitive issue that was difficult to raise with parents. Health visitors believed some parents preferred larger infants and were unaware that their feeding practices might be contributing to overweight/obesity risk. A need for training and guidance was identified together with strategies to overcome system barriers [14].

Parents interviewed for a qualitative study reported the advice they received from members of the health visiting team in relation to infant feeding and growth expectations was sometimes inconsistent [15]. Parents were receptive to intervention to improve infant feeding practices but some of them needed additional guidance about how to recognise and prepare a healthy diet for their infant [15]. The findings of these studies suggest that some members of the health visiting team are unclear about their role and responsibilities in relation to proactively engaging with parents about infant feeding practices, diet and overweight/obesity risk.

Obesity risk prediction tools have been developed [16-18] to facilitate identification during infancy. However, these models have not yet been implemented into clinical practice. A systematic review of the literature to identify the risk factors for both overweight and obesity has been conducted [4] and an Infant Risk of Obesity Checklist (IROC) developed to help health practitioners identify overweight and obesity risk [19, 20] (Appendix 1). There are questions about the timing of risk communication during infancy and concerns about the impact this may have on parental approaches to diet and feeding [16]. It has been recommended that identification of infants at risk of developing childhood obesity is accompanied by appropriate evidence-based intervention [16]. However, overweight/obesity prevention during infancy is an emerging field and little is known about

effective interventions, especially in a UK setting. The Healthy Beginnings Trial [21, 22] and the NOURISH trial [23, 24] have taken place in Australia and recently reported their findings. The EPOCH collaboration also in Australia plans to retrospectively combine the results of intervention trials taking place during infancy [25]. In the UK the EMPOWER study [26] is a Randomised Controlled Trial of a health visiting intervention during weaning which is due to publish its findings in 2013.

There is a need to broaden the evidence base around overweight/obesity identification and intervention during infancy and in particular to develop tools and guidance for UK parents and health practitioners. This project aimed to develop clinical guidance for members of the UK health visiting team to use with parents of infants at risk of childhood overweight/obesity.

METHOD

The National Institute for Health and Clinical Excellence (NICE) guidelines manual [27] was used as a basis for the guideline development. Four stages were involved, 1) Assemble a Guideline Development Group (GDG), 2) Develop a review protocol and undertake a systematic review, 3) Data interpretation and writing of the guideline, 4) Piloting of the guideline.

STAGE 1 ASSEMBLE A GUIDELINE DEVELOPMENT GROUP (GDG)

A guideline development group (GDG) was assembled. This comprised of the research team (SR, BE, CG, JS, ANS, SW, DN) clinical stakeholders (PA, VW) and a parent stakeholder (FE). The core team members (SR, BE) met with the clinical stakeholders on four occasions and with the parent stakeholder on one occasion. The research team met on ten occasions; the entire team met on one occasion.

STAGE 2 DEVELOP A REVIEW PROTOCOL AND UNDERTAKE A SYSTEMATIC REVIEW.

A scoping review was conducted to identify any previously published systematic reviews on the topic of childhood overweight/obesity prevention during infancy. A systematic review of the literature on interventions to prevent childhood obesity was identified, but the search strategies were limited to studies conducted between 1995 and 2008. At the time only a few studies had been undertaken testing interventions delivered during infancy, or even earlier, although the review identified a number of interventions designed for pre-school children [28].

Therefore, the aim of the systematic review was to identify any further studies reporting behavioural interventions delivered during infancy, or even earlier, that reduce the risk of childhood overweight/obesity. The inclusion criteria for the review were:

Participants: Parents of infants < 2 years old.

Intervention: Behavioural/non-behavioural.

Comparison: Control group.

Primary outcomes: Child BMI (weight and height), child body fat percentage, child age at follow-up.

Secondary outcomes: Breastfeeding uptake and duration, timing of introduction of solid food, food composition, energy intake and expenditure, sleep/soothe strategies, responsive feeding and infant physical activity.

Further detail about the systematic review protocol and findings will be published elsewhere [29].

STAGE 3 DATA INTERPRETATION AND WRITING OF THE GUIDELINE

The evidence was interpreted by the GDG in order to make recommendations for practice. This was an iterative process that was guided by the quality of the evidence identified, clinical and parent-user opinion. Three levels of evidence were considered.

1. Cochrane-registered systematic reviews
2. Primary Randomised Controlled Trials: key findings, quality (randomisation, blinding and attrition) [30] and process (training, supervision, adherence, preference, and delivery) [31].
3. Current guidelines, policy documents and clinical opinion.

A consensus method was used to establish agreement on the strength of a recommendation. Each recommendation was assigned wording to reflect the GDG's views about its relative importance. For interventions where there was strong evidence of efficacy (usually demonstrated by several randomised controlled trials) and clinical consensus a recommendation of "must" was made, where there was good evidence and clinical consensus a recommendation of "should" was made and where there was some evidence and clinical consensus a recommendation of "could" was made. Some of the recommendations were aligned with the Health visiting "Universal service".

The GDG considered identification of overweight/obesity risk in light of the IROC developed by the research team for another project [4, 19]. Identification of overweight/obesity risk was provided with a "must" recommendation on the basis that this is necessary in order for targeted intervention to take place. There was detailed discussion within the GDG around the timing of identification and communication of overweight/obesity risk during infancy with parents. The IROC has been developed from the Millennium Cohort Study (MCS) with infants at 6-12 months of age [19]. Based on what is currently known the guideline development group recommend that a full IROC assessment is made at 4 and 12 months to fit with the current timing of health visitor contacts with parents on the Universal Service pathway in the Healthy Child Programme [12]. However, development work is on-going [20], therefore, the GDG advise that feasibility testing is required prior to full implementation of this recommendation.

The GDG considered how the evidence statements might be developed into a guideline. It was agreed that the guideline should be presented as a patient pathway which is summarised on a flow chart for ease of use in practice. The flow chart was developed using lucid chart and numbered boxes were applied to each section for ease of navigation. Each numbered box is linked to a body of text which describes how midwives/health visitors should identify and assess clients at this stage in the pathway, what actions might be taken, and a summary of the evidence relevant to the recommendations made. The online version of the chart can be found here: <http://tinyurl.com/obesityguideline>

The guideline was circulated for external review to national stakeholders with expertise in health visiting (Professor Dame Sarah Cowley), obesity prevention during early years (Dr Rebecca Lang), Midwifery practice (Dr Patricia Lindsey). These stakeholders provided valuable contributions, particularly around how the evidence identified in the systematic review might be incorporated into practice. The key themes from the reviewers' feedback can be found in Appendix 2. Each item of feedback was discussed by members of the GDG and the guideline adjusted as appropriate.

STAGE 4 PILOTING OF THE GUIDELINE

The revised guideline was reviewed by a health visiting team in Nottingham, East Midlands Region who were asked to report any comments made about its feasibility, acceptability and usability. A focus group was held in a local health centre with 12 members of the health visiting team facilitated by two members of the GDG (BE,

JS). Copies of the draft guideline were circulated to the health visitors ten days prior to the meeting. Health visitors were asked to comment on the flow chart and the action points in relation to their current practice. The key themes from the focus group are available as Appendix 3. Following the focus group the GDG met and discussed the main points raised by the health visitors. A number of changes were made to the actions section of the guideline to make them more workable in practice.

IMPLICATIONS FOR HEALTH PRACTITIONERS (MIDWIVES, GENERAL PRACTITIONERS, HEALTH VISITORS, REGISTERED NURSES AND COMMUNITY NURSERY NURSES)

A guideline for members of the health visiting team to use with parents of infants at risk of overweight/obesity has been developed. The guideline contains recommendations about identification of infants at risk as well as a number of strategies that could be used for prevention of overweight/obesity. The guideline needs to be applied alongside health visitors' professional judgement. It is not intended to replace normal UK clinical practice which is guided by the Healthy Child Programme [12] and complements existing guidance such as the Framework for Action for tackling obesity [13]. The Health Visitor Implementation Plan (2011-2015) provides a vision of health visitors leading teams to provide services across the full range of preventative health care for children and families [32]. This guideline may be useful to health visitors leading infant nutrition and overweight/obesity prevention strategies. However, whilst the guideline has been designed to fit mainly with health visiting practice it will also be useful for other health practitioners who have contact with pregnant women and parents of infants and young children. In particular, there are recommendations for midwives in relation to liaising with health visitors around providing additional breastfeeding support to overweight/obese women. It is also recommended that health visitors work alongside their general/nurse practitioner colleagues in relation to identifying and intervening with infants at risk of developing childhood obesity [10].

Policy makers, commissioners and members of the health visiting team will need to consider carefully how to implement the recommendations around obesity risk identification. The authors of this guideline recommend that the identification of infants at risk of overweight/obesity is required in order for interventions to be appropriately targeted. Given the absence of literature around overweight/obesity risk communication during infancy, the recommendations around this are tentative and need to be set within the context of the practitioners' professional judgement since this is a highly contentious issue [9, 16]. Members of the health visiting team will need to consider the appropriateness of informing parents about overweight/obesity risk and the impact this may have on them in terms of stigma; their relationship with practitioners and the way they feed their infant. Consideration is needed as to whether the benefits of risk communication outweigh the potential harm and how parents of infants who are identified as "at risk" might be supported in a manner that is neither pejorative nor stigmatising.

Policy makers, commissioners and members of the health visiting team will need to explore in detail which interventions they should prioritise. The framework set out in the recent report by the National Nursing Research Unit on health visiting [33] could be used as a guide, alongside the Healthy Child Programme [12]. Although there has been considerable focus on breastfeeding, prompted by UNICEF's Baby Friendly Initiative [34] and many local initiatives providing post-natal breastfeeding support there is less focus on antenatal support. The evidence identified in this review suggests that providing antenatal support to women who are overweight/obese in early pregnancy who express a desire to breastfeed has a strong impact on the initiation and duration of breastfeeding [35]. It is for commissioners and health visitors to decide the extent to which antenatal breastfeeding promotion is Universal Service or Universal - Plus Service in accordance with the Healthy Child Programme [12].

Postnatal support for breastfeeding, healthy weaning, diet and physical activity advice are part of the health visiting Universal Service and should be available to all parents. However, the health visitor will need to use

professional judgement to decide whether a parent requires routine advice or an intensive period of support to improve knowledge and understanding and facilitate behavioural change. Intervention(s) that support behavioural change such as educating parents about infant soothe strategies, sleep, and responsive feeding will require additional training and resources. The Universal Service in the Healthy Child Programme [12] is unlikely to be able to adequately tackle obesity prevention in infants at risk and members of the health visiting team will need to work with Children's centre staff and general practitioners to develop a comprehensive strategy. Additional training may be required for all members of the health visiting team to provide a Universal – Plus Service intervention to parents of infants at risk of overweight/obesity.

RESEARCH RECOMMENDATIONS

A number of recommendations for further research have emerged from the work underpinning the development of the IROC and the guidelines. A phased approach to the development and evaluation of complex interventions is recommended which follows the MRC guidance [36] .

Research is needed to determine whether and how to communicate overweight/obesity risk during infancy. Studies are needed to explore whether the benefits of risk communication outweigh the potential harm and how parents of infants who are identified as “at risk” might be supported in a manner that is neither pejorative nor stigmatising. This will require exploration of the most appropriate theoretical based strategy to use, the development of tools (and possibly/probably motivational interviewing/communication skills training for the relevant practitioners) together with acceptability testing with parents of infants risk.

A feasibility randomised controlled trial is required to explore the implementation of the IROC and guidelines with parents and members of the health visiting team and the impact on infant outcomes (risk score, weight/length), parental and practitioner acceptability.

A number of high quality robust interventions were identified as a result of the systematic review undertaken for the development of the guidelines [29]. However, none of the published research was UK based, and most of the interventions were broadly rather than narrowly targeted. Research is needed to develop and test a UK based intervention that is delivered antenatally and postnatally to parents of infants identified as at risk of childhood overweight/obesity.

The searches conducted for the systematic review did not identify any effective interventions that had been developed to improve parental understanding and knowledge around infant formula milk feeding. One on-going trial was identified of an intervention developed to help prevent excess weight gain in formula-milk fed babies [37]. The findings of this study will make an important contribution to the literature but it is likely that further interventions that incorporate behavioural change strategies, such as educating parents who formula feed their infants about responsive feeding/soothing, will need to be developed and tested.

CONCLUSION

Overweight and obesity prevention during infancy is complex and policy makers, commissioners, health practitioners (midwives, general practitioners, health visitors, registered nurses and community nursery nurses), parents and academics need to collaborate on a number of key priorities. These include engaging in the debate about obesity risk identification during infancy, supporting parents to improve infant feeding practices, improving health practitioners' knowledge and communication with parents and better team working. The development of these guidelines are one step along the way to improving the care provided to parents with infants at risk of overweight/obesity by members of the health visiting team.

EVIDENCE SUMMARY

1. MIDWIFE-CLIENT ENCOUNTER(S): ASSESS MATERNAL HEALTH <34 WEEKS GESTATION

IDENTIFICATION AND ASSESSMENT

Midwives **must** identify women who were overweight (BMI ≥ 25 kg/m²) or obese (BMI ≥ 30 kg/m²) prior to pregnancy, or overweight/obese in early pregnancy. A self-reported pre-pregnancy or early antenatal weight measure can be used but it is preferable to measure weight and height at the first antenatal appointment.

Midwives **should** be aware that BMI may underestimate overweight/obesity in some women such as those of South Asian heritage, and overestimate overweight/obesity in other, particularly Black ethnic groups [38]. Professional judgement **should** also be used in determining whether a woman is overweight/obese.

Midwives **should** identify women who gain too much weight during pregnancy.

Midwives **could** identify a woman's infant feeding intentions prior to 34 weeks gestation.

ACTIONS

Midwives **should** talk to women who are classified as obese [39] about the health risks to themselves and their unborn child [40]. Midwives **should** follow the guidance from the National Institute for Health and Clinical Excellence (NICE) around weight management before, during and after pregnancy [41]. Midwives **should** advise women about healthy eating and physical activity during pregnancy [41]. Women **could** be provided with information sources to help them manage their weight during and after their pregnancy [42-44]

All women who are overweight (BMI ≥ 25 kg/m²) or obese (BMI ≥ 30 kg/m²) prior to or in early pregnancy and/or who gain too much weight during pregnancy **must** be provided with advice and support with breastfeeding by the midwife. These women **should** be referred to the health visitor for additional antenatal advice and support around the initiation and maintenance of breastfeeding. Midwives **should** inform women that breastfeeding may be protective against childhood overweight/obesity and is therefore encouraged.

Midwives **could** refer to the *Preparation for Birth and Beyond* [45] toolkit for more detailed information about and setting up support groups for breastfeeding.

EVIDENCE

A systematic review found that women who are overweight (BMI ≥ 25 kg/m²) or obese (BMI ≥ 30 kg/m²) pre-pregnancy are at greater health risk and their infants are more likely to become overweight/obese children. Any breastfeeding may be protective against childhood overweight/obesity [4].

There is systematic review evidence demonstrating that obese women are less likely to initiate breastfeeding. The majority of larger studies included in the review found that obese women breastfed for a shorter duration than normal weight women, even after adjusting for possible confounding factors [46].

There is currently no UK guidance for desirable weight gain during pregnancy [47]. The US Institute of Medicine (IoM) has issued guidance but this has not been adopted in the UK [41]. The IoM suggests that women with a BMI <25 should aim to gain around 11.34-to-15.88 kg throughout pregnancy. Women who are

overweight (BMI \geq 25) should aim to gain around 6.8-to-11.34 kg; obese women (BMI \geq 30) should aim to gain no more than 4.99-to-9.07 kg. These recommendations for weight gain in pregnancy are the same for all women regardless of height, racial group and ethnicity. However, the recommendations are different for women carrying twins: women with a normal BMI should aim to gain around 16.78-to-24.49 kg; women with a BMI \geq 25 should aim to gain 14.06-to-22.68 kg; women who have a BMI \geq 30 should aim to gain 11.34-to-19.05 kg [47]. In all cases, professional judgement should be used to determine whether maternal weight and weight gain in pregnancy is a cause for concern.

EXCEPTIONS

None

2. HEALTH VISITOR-CLIENT ENCOUNTER(S): ANTENATAL ADVICE

IDENTIFICATION AND ASSESSMENT

The health visitor **should** identify any previous breastfeeding experiences.

The health visitor **should** assess maternal/paternal (and other family members' views) on the feasibility of breastfeeding.

ACTIONS

Health visitors **should** continue to advise women to avoid putting on too much weight [41] and **could** refer mothers to other sources to help them manage their weight [42-44]

Breastfeeding **must** continue to be encouraged in women who are overweight or obese or who gain too much weight during pregnancy.

Breastfeeding education and peer support interventions **must** be available during pregnancy for these women. These **should** be needs-based, one-to-one, informal sessions by a trained breastfeeding professional or peer counsellor.

Health visitors **should** refer women who express a desire to breastfeed to an appropriate breastfeeding support programme. Breastfeeding support workers **must** be appropriately trained and client encounters **should** occur regularly and frequently during and post pregnancy.

Women **should** be advised that early skin to skin contact is important for initiation and duration of breastfeeding.

Health visitors **could** refer to the *Preparation for Birth and Beyond* [45] toolkit for more detailed information about parenting and providing antenatal and postnatal advice and setting up support groups.

EVIDENCE

There is evidence from systematic reviews and randomised controlled trials that any antenatal breastfeeding education (peer counselling, lactation counselling, and formal breastfeeding education) can increase uptake of breastfeeding and duration [35, 48, 49]. Trained workers providing regular and frequent pre and post pregnancy support can enhance the length of time an infant is exclusively breastfed [50-56].

A recent systematic review [57] found that early skin to skin contact for mothers of healthy new-borns had a positive effect on breastfeeding at 1 to 4 months.

EXCEPTIONS

Women who have had surgery, which involved the cutting of the lactiferous sinus.

In the UK, women who are HIV positive are advised not to breastfeed because of the risk of transmission but this is not the case worldwide.

Women on some antipsychotic medicines.

Women who have previously breastfed may not consider they require any additional support.

3. HEALTH VISITOR TO ASSESS INFANT OVERWEIGHT/OBESITY RISK AT BIRTH VISIT

IDENTIFICATION AND ASSESSMENT

The health visitor **must** assess an infant for overweight/obesity risk during the first client encounter after birth using key indicators on the Infant Risk of Obesity Checklist (IROC) [19, 20] (Appendix 1). This would normally occur at the birth visit which usually takes place at 10-14 days old. It will not be possible to assess for rapid weight gain at this time and a complete IROC assessment **must** be undertaken when the infant is 4 months old.

ACTIONS

Professional judgement **must** be used to decide whether and how to communicate overweight/obesity risk to parents.

The health visitor **must** reach an understanding with parents of infants at risk that regular clinic attendance for weight checks is important in order to monitor rate of infant weight gain and to ensure they have access to regular and appropriate advice about infant feeding and physical activity.

EVIDENCE

The risk factors for childhood obesity are identifiable [17] and some may be modifiable during early infancy with interventions targeted at infant feeding, diet and physical activity. The Infant Risk of Obesity Checklist (IROC) has been developed to identify overweight/obesity risk [19, 20] (Appendix 1). Maternal pre-pregnancy overweight/obesity, paternal overweight/obesity, high infant birth weight and smoking during pregnancy are non-modifiable risk factors [4] that are present at birth which could be used to identify infants at risk of overweight/obesity in order to prioritise targeted intervention to prevent rapid weight gain.

EXCEPTIONS

It may be difficult for the health visitor to undertake an overweight/obesity risk assessment and communicate this to a parent during a client encounter, because of other maternal psychological or physical health priorities or concerns that raising an issue at a particular time could negatively affect the mother-practitioner relationship. Professional judgement should be used to ascertain the appropriateness of this activity.

4. HEALTH VISITOR TO OFFER TAILORED POST-NATAL ADVICE

In addition to the advice offered at the birth visit, the parents of infants identified as being at increased risk for overweight/obesity **must** be offered on-going tailored advice and support in relation to prevention.

5. PARENT AND INFANT TO REGULARLY ATTEND HEALTH VISITOR CLINICS

The health visitor **must** reach an understanding with parents of infants at risk that regular clinic attendance for weight checks is important to ensure they have access to regular and appropriate advice about infant nutrition and physical activity.

6. BREASTFEEDING SUPPORT

IDENTIFICATION AND ASSESSMENT

The health visitor **must** undertake a full breastfeeding assessment during the birth visit to determine whether a woman needs further education and support.

ACTIONS

The health visitor **must** support mothers to maintain exclusive breastfeeding. Women **should** be advised that early skin to skin contact is important for initiation and duration of breastfeeding. Health visitors **should** refer women who express a desire to breastfeed to an appropriate breastfeeding support programme. Breastfeeding support workers **must** be appropriately trained and client encounters **should** occur regularly and frequently during and post pregnancy.

Health visitors **could** advise parents that pacifiers **should** not be used until lactation is established.

EVIDENCE

There is evidence from systematic reviews and randomised controlled trials that any antenatal breastfeeding education (peer counselling, lactation counselling, and formal breastfeeding education) can increase uptake of breastfeeding and duration [35, 48, 49]. Trained workers providing regular and frequent pre and post pregnancy support can enhance the length of time an infant is exclusively breastfed [50-56].

A recent systematic review [57] found that early skin to skin contact for mothers of healthy new-borns had a positive effect on breastfeeding at 1 to 4 months.

There is some evidence that pacifier use in healthy term breastfeeding infants, starting from birth or after lactation is established does not significantly affect the prevalence, duration or exclusivity of breastfeeding up to four months of age [58]. Evidence to assess the long term effect of pacifiers on infants' health and development is absent from the literature.

EXCEPTIONS

Women who have had surgery, which involved the cutting of the lactiferous sinus.

In the UK, women who are HIV positive are advised not to breastfeed because of the risk of transmission but this is not the case worldwide.

Women on some antipsychotic medicines.

Women who have previously breastfed may not consider they require any additional support.

7. SLEEPING AND SOOTHING

IDENTIFICATION AND ASSESSMENT

The sleeping patterns of infants at risk of overweight/obesity **must** be assessed.

The health visitor **must** ascertain parental understanding of the different reasons why infants cry and their responses to infant crying.

ACTIONS

Parents of young infants at risk who report sleep difficulties **should** be advised about how to establish sleeping patterns and provided with techniques detailing how to soothe their infant when they wake up at night.

Parents **should** be advised not to use feeding as method to calm their infants. Feeding on demand may be interpreted by parents as the need to feed an infant each time they cry. Parents may need to be taught how to discriminate hunger from other causes of distress.

Information about infant hunger cues and satiety **should** be provided to prevent overfeeding and encourage the infant to learn self-regulated feeding behaviours.

Health visitors **could** advise parents that careful negotiation may be required with an infant's grandparents around feeding and soothing.

EVIDENCE

There is good evidence that poor sleep is associated with childhood obesity [59-64]. The mechanism for this is unclear but it has been argued to reflect total energy expenditure [65], or that infants who sleep badly are comforted by food leading to over-consumption [66].

A systematic review of postnatal parental education for optimising infant health and parent infant relationships concluded that post-natal educational interventions increased infant sleep by an average of 26 minutes [67].

The SLIMTIME trial [66] investigated the effect of two interventions delivered either in isolation (Soothe/Sleep only or Introduction to Solids only) or in combination (Soothe/Sleep plus Introduction to Solids) on infant growth outcomes. They found a significant interaction between the two interventions on weight-for-length at the 12-month follow up. The mean weight-for-length percentile for the combined group was lower than that for the other groups. Conditional weight-gain analyses (from 2 weeks to 1 year of age) found a significantly slower rate of weight gain for in those infants receiving Soothe/Sleep intervention.

The NOURISH trial [24] evaluated a parent education intervention targeting infant feeding practices which commenced when infants were 4 months of age. The guidance was delivered by dieticians and psychologists, and promoted repeated exposure to unfamiliar foods, limiting the exposure to unhealthy foods, learning how to recognise and respond to infant cues of hunger and satiety. They found that infants in the intervention group had a significantly lower BMI-for-age z-score than those of a control group at 9 months of age; the

control group was also more likely to show rapid weight gain from birth to 9 months of age. Mothers in the control group of the NOURISH trial were more likely to respond inappropriately to infant satiety cues and offer food as a reward.

A brief intervention that specifically targeted the culture barriers between grandparent advice and good practice guidelines was effective in helping adolescent mothers read their infants' cues, provide non-food strategies for managing infants' behaviour and negotiate mother-grandmother negotiations regarding feeding [68].

EXCEPTIONS

None.

8. COMMUNICATE RISK TO PARENT

ACTIONS

Evidence of a greater risk of overweight/obesity during childhood **should** be communicated to the parent.

Professional judgement **should** be used to ascertain the appropriateness of this activity.

EVIDENCE

Overweight/obesity prediction during infancy is not 100% accurate and it is not known whether informing parents about this risk does more harm than good. There are questions about the timing of risk communication during infancy and concerns about the impact this may have on parental approaches to diet and feeding [69]. Parents of new-borns are sensitive about information about their child's health and identification at birth may allow them to be specifically targeted with growth monitoring and nutrition counselling [17]. However, it may be more effective and acceptable to communicate overweight/obesity risk to parents of infants between 6 and 12 months when the rapid weight gain is manifested [19].

EXCEPTIONS

It may be difficult for the health visitor to undertake an overweight/obesity risk assessment and communicate this to a parent during a client encounter, because of other maternal psychological or physical health priorities or concerns that raising an issue at a particular time could negatively affect the mother-practitioner relationship. Professional judgement should be used to ascertain the appropriateness of this activity.

9. FORMULA MILK FEEDING

IDENTIFICATION AND ASSESSMENT

The health visitor **must** assess whether a parent feeding their child with formula milk understands when, what and how to do so.

ACTIONS

Health visitors **must** advise parents when and how to formula feed their infants, and if necessary discuss infant feeding cues and maternal responsiveness.

Health visitors **could** advise parents about the constituents of different types of formula, in particular, the effects of higher protein formula milks on overweight/obesity risk.

For additional guidance on formula feeding the health visitor **should** direct parents to the *Start4Life leaflet* [70] and the NHS website *NHS Choices: Information Service for parents* [43].

Health visitors requiring additional information around advising parents about formula milk feeding **should** refer to First Steps Nutrition Trust *Infant Milks in the UK: A practical guide for health professionals* [71].

EVIDENCE

There is a lack of research around educating parents about formula milk feeding. Only one randomised controlled trial identified for this review used an intervention to improve parental understanding around formula fed infants' feeding cues which was effective but in this study obesity risk was increased [72].

A systematic review [73] examining the impact of infant feeding and diet interventions on BMI and body composition found that high energy and high protein intake from 2-12 months of age was associated with higher BMI and body fatness in later childhood. A number of trials found that infants fed formula milk from birth which had higher levels of protein than a comparison formula milk put on more weight [74-78].

EXCEPTIONS

Infants who are prescribed formula milk for health reasons (i.e. allergy, illness, etc.) **should** continue with their existing treatment.

Pre-term infants may have different needs.

10. PLAY AND PHYSICAL ACTIVITY

IDENTIFICATION AND ASSESSMENT

Family physical activity **should** be assessed for infants identified as at risk of overweight/obesity.

ACTIONS

Parents of young infants **could** be advised about encouraging early daily physical activity such as tummy time (i.e., time in the prone position for infants under 6 months of age).

Parents of older infants and toddlers at risk **should** be advised to increase active play sessions (outdoors as appropriate).

Parents **could** be advised that it is not recommended that children younger than 3 years of age are allowed to watch television or engage in other screen viewing activities.

Mothers **could** be advised about physical activity for themselves.

EVIDENCE

The Healthy Beginnings trial [21, 22] evaluated a home-based health promotion intervention which targeted breastfeeding, appropriate timing of introduction to solids, active play (including tummy time), physical activity (parents and infants) and family nutrition on BMI at 2 years of age. No significant differences in weight or length were observed between groups using a complete case analysis or an intention to treat analysis. However, mean BMI was significantly lower in the intervention group. The intervention also had positive effect on children's vegetable intake, not giving food as a reward, TV viewing at meal times, and physical activity (tummy time).

The Melbourne Infant Feeding and Nutrition Trial [79] implemented a parent-focussed intervention providing six 2-hour sessions on improving parental knowledge, parenting skills, and social support around infant feeding, diet, physical activity and (reducing) television viewing. At 20-months of age, infants in the intervention group watched significantly less television per day than infants in a control group.

Recent recommendations on screen time [80] suggest that screen viewing should be limited to 30-to-60 minutes per day for children aged 3-7 years, and should be avoided completely or minimised for children under 3 years age. When screen time is allowed, parents should choose material with a slow pace, less novelty and more of a single narrative quality.

Dewey et al [81] determined that neither the volume nor content of breast milk produced by breastfeeding mothers was affected by a program of regular aerobic exercise.

The British Heart Foundation and the Department of Health provide guidance on physical activity in children under the age of five [82, 83], including specific guidance for those not yet walking [84, 85].

EXCEPTIONS

None.

11. WEANING ONTO SOLID FOODS

IDENTIFICATION AND ASSESSMENT

The health visitor **must** ascertain the parent's understanding of the when, what and how of weaning infants onto solid foods.

ACTIONS

Health visitors **should** advise parents to delay the introduction of solid foods until the infant is around six months old [86].

Health visitors **should** advise parents to follow dietary guidelines around the provision of age-appropriate foods and portion size at each stage of weaning [87].

Health visitors **should** ensure parents are aware that infants **should** be allowed to regulate their own food intake from birth. This may involve individual and/or group interventions to teach parents how to feed their infants including aspects such as maternal responsiveness and infant satiety cues.

The health visitor **should** direct parents to website *NHS Choices: Information Service for parents* [43].

Health visitors requiring additional information around advising parents about weaning **should** refer to First Steps Nutrition Trust *Eating Well Birth to Five* [88].

EVIDENCE

A systematic review [73] examining the type of foods introduced during weaning and diet on BMI and body composition found that high energy and protein intake, particularly dairy protein, from 2-12 months of age was associated with higher BMI and body fatness in later childhood. Adherence to dietary guidelines during weaning was associated with a higher lean mass, but consuming specific foods or food groups made no difference to children's BMI.

The Healthy Beginnings trial [22, 89] evaluated a home-based health promotion intervention which targeted breastfeeding, appropriate timing of introduction to solids, active play (including tummy time), physical activity (parents and infants) and family nutrition on BMI at 2 years of age. They found that the intervention was effective in delaying the introduction to solids, reducing the number of mothers who introduced solids before 6 months.

The NOURISH trial [24] found that a parent education intervention targeting the when, how and what of infant feeding practices which commenced when infants were 4 months of age was effective in promoting maternal responsiveness. Mothers in the control group were more likely to respond inappropriately to infant satiety cues (e.g., using food as a reward or as part of a game).

Aboud [90] found that a group-based coaching intervention led by a peer educator was effective in improving infant self-regulation of food and maternal responsiveness at meal times.

The SLIMTIME trial [66] reported that families who had received education around soothing infants and introduction to solids had lower weight-for-length percentiles by 12 months of age.

EXCEPTIONS

None.

12. ASSESSMENT OF INFANT OVERWEIGHT/OBESITY RISK AT 4 MONTHS OF AGE

IDENTIFICATION AND ASSESSMENT

The Infant Risk of Obesity Checklist (IROC) [19, 20] (Appendix 1) **must** be used with all infants at 4 months of age to ascertain their overweight/obesity risk. All infants **must** be weighed at 4 months of age. An upward crossing of two centile lines on a growth chart **should** be interpreted as rapid weight gain.

ACTIONS

If there is evidence of rapid weight gain the health visitor **should** communicate the potential risk of childhood overweight/obesity to parents.

The health visitor **must** reach an understanding with parents of infants at risk that regular clinic attendance for weight checks is important to ensure they have access to regular and appropriate advice about infant nutrition and physical activity.

EVIDENCE

Rapid weight gain is the strongest predictor for childhood overweight/obesity [4, 91-93]. Rapid weight gain may be a genetic marker for childhood obesity and/or associated with environmental and nutrition factors [18].

Rapid weight gain is defined as weight gain greater than 0.67 standard deviation change in weight-for-age z score in the infant's first year of life [93-95].

The Infant Risk of Obesity Checklist used with infants between 6 and 12 months old and accompanied by effective intervention will avert 37% of cases of childhood overweight/obesity at 3 years [19] .

EXCEPTIONS

None.

13. ASSESSMENT OF INFANT OVERWEIGHT/OBESITY RISK AT 12 MONTHS OF AGE

IDENTIFICATION AND ASSESSMENT

The Infant Risk of Obesity Checklist (IROC) [19, 20] (Appendix 1) **must** be used with all infants at 12 months of age to ascertain their overweight/obesity risk. All infants **must** be weighed around 12 months of age. An upward crossing of two centile lines on a growth chart **should** be interpreted as rapid weight gain.

ACTIONS

If there is evidence of rapid weight gain the health visitor **should** communicate the potential risk of childhood overweight/obesity to parents.

The health visitor **must** reach an understanding with parents of infants at risk that regular clinic attendance for weight checks is important to ensure they have access to regular and appropriate advice about infant nutrition and physical activity.

EVIDENCE

Rapid weight gain is the strongest predictor for childhood overweight/obesity [4, 91-93]. Rapid weight gain may be a genetic marker for childhood obesity and/or associated with environmental and nutrition factors [18].

Rapid weight gain is defined as weight gain greater than 0.67 standard deviation change in weight-for-age z score in the infant's first year of life [93-95].

The Infant Risk of Obesity Checklist used with infants between 6 and 12 months old and accompanied by effective intervention will avert 37% of cases of childhood overweight/obesity at 3 years [19] .

EXCEPTIONS

None.

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APPENDIX 1. INFANT RISK OF OBESITY CHECKLIST (IROC)

Risk scoring algorithm for overweight risk in childhood derived from Weng et al. using factors that can be identified in the first year of life

Risk Factors	Categories	Score
Gender	Male	0
	Female	2
Infant birth weight (kg)	<2.93	0
	2.93- <3.24	1
	3.24-<3.49	3
	3.49-<3.81	5
	≥3.81	7
Infant weight gain ⁺	≤0.67 SD	0
	>0.67 SD	19
Maternal BMI (kg/m ²)	<18.5	0
	18.5- <25	8
	25- <30	12
	≥30	15
Paternal BMI (kg/m ²)	<18.5	0
	18.5- <25	1
	25- <30	6
	≥30	9
Mum smoked in pregnancy	No	0
	Yes	4
Ever breast fed	Yes	0
	No	3
Total Risk Score	--	0-59
Risk Score Categories	Very Low Risk	0-15 (4.1% to 11.1%)
	Low Risk	16-19 (11.8% to 14.2%)
	Medium Risk	20-24 (15.1% to 19.1%)
	High Risk	25-37 (20.2% to 37.2%)
	Very High Risk	38-59 (38.9% to 73.8%)

⁺Change in weight-for-age z-score from birth to assessment time using the WHO 2006 Child Growth Standards
WHO Child Growth Standards application: <http://www.who.int/childgrowth/software/en/>

Flow chart

The flow chart was viewed very positively as a practical summary for health visitors to use with the evidence. A number of tweaks were requested in relation to making it easier to follow.

1. Midwives Section

There were conflicting comments around how a midwife should determine whether a woman has gained too much weight in pregnancy. There were arguments for using the US Institute of Medicine Guidelines – in that they provide something for Midwives to base their decision making on. However, there was a caution that if they were to be used, and weight management advice provided, midwives must be vigilant with fetal growth monitoring. Against their use was the argument that the IoM guidelines have not been adopted in the UK because they are based on observational data and do not look at the impact on pregnancy outcome. The trials that will inform UK policy complete in 2014 and one reviewer suggested that the guidelines should not be advocating the use of the IOM when policy has decided not to adopt them.

2. Health visitor antenatal visiting

There was a view that referring overweight/obese women to health visitors for antenatal breastfeeding advice should not replace midwifery input and that this should be specified in the guideline.

3. Assess infant overweight/obesity risk

All reviewers commented on the need for sensitivity around assessing and communicating obesity risk during infancy. One reviewer correctly pointed out that the guidelines refer to the Infant Risk of Obesity Checklist (IROC) that has not yet been published and that the guidelines should include the tool. A suggestion was made that it may not be helpful to refer health visitors to primary research papers. They recommended that obesity prediction models needed to be translated into quick and easy tools for practitioners.

4. Health visitor to offer tailored post-natal advice

There were questions about what tailored post-natal advice/support should be in relation to health visitor practice. One reviewer suggested that the guidelines should be more specific rather than just referring to usual care. Another questioned whether the guidelines should differentiate between Universal Service and Universal – Plus Service.

5. Parent and infant to regularly attend health visitor clinics

There was a suggestion that the reference to “local” guidance should be removed since all local guidelines should be amended to meet the evidence set out in these guidelines.

6. Breastfeeding support

There was a recommendation that the recommendations around the use of trained breastfeeding support workers should be upgraded from **should** to **must**.

There was a suggestion that the “Exception” section should include a sentence stating that women on some anti-psychotic medication may not be able to breastfeed.

7. Sleeping and soothing

There was a view that this was an important but under resourced/ under researched area. One **reviewer** suggested that the NHS choices website failed to provide information for parents around using non feeding methods to soothe infants. There was also a view that aspects of this section overlapped with other sections such as formula milk feeding and weaning.

8. Communicate risk to parent

There was a view this section must include reference to professional judgement and sensitivity to parents particular situation. However, there was also a view that the way the section was written almost gave health visitors permission not to raise the subject. This reviewer suggested that such discussions needed to take place and recommended that the criteria used in the guideline (**must, should, could**) needed to be firm enough to challenge health visitors to ensure they try and raise the issue and have a conversation with parents. There was a belief that additional training was necessary for members of the health visiting team to do this well.

9. Formula milk feeding

There was a view that education around formula feeding should be up-graded to a **must** criterion, despite the lack of evidence. The view was expressed that poor formula feeding (making up feeds wrong, using solids in milk, bottle finishing) were all practices associated with weight gain. One reviewer was concerned that the recommendations needed to be much tighter because as they put it “I would hate to think that health visitors did not think this was part of their role”. Reviewers felt that parents needed to learn the “how” as well as the “what” and “when” of formula milk feeding.

A suggestion was made that the “Exception” section should include a sentence stating that preterm infants may have different needs in relation to formula milk feeding.

10. Play and physical activity

There was a question about how family physical activity should be assessed by health visitors. The suggestion was made that this could be done via a questionnaire and/or through discussion? Additional training needs were identified to support health visitors to determine how much physical activity was adequate.

11. Weaning onto solid foods

Reviewers felt more detail was required in this section. This was in relation to repeated exposure and variety on healthy eating practices at weaning to encourage healthy eating habits? One reviewer felt that the action points in this section needed to be tightened up in relation to providing better explanation and support to parents particularly around the “how” rather than the “what” to feed when weaning.

12. Assessment of overweight at 6/12 months

There was an observation that although the IROC tool is referred to, it is not currently available as a published paper.

Other comments

1. There was a view that the guideline needs to be clear that the **must, should, could** criteria are for practitioner not parents.
2. There was a view that a summary document for practitioners to use when face to face with parents might be useful.

3. There was a question about use of the guidelines in practice and on-going use. One reviewer indicated that there was going to be increasing evidence about the prevention of obesity during infancy in the next few years and asked how the guidelines would be up-dated.
4. One reviewer asked how we could be sure that health visitor's knowledge and skill base is up to date in terms of tactics such as raising the issue of infant obesity (sensitive topic), understanding hunger/satiety cues, soothe/sleep methods, introduction to solids.
5. A recommendation was made that the guidelines are disseminated via the Institute of Health Visiting.

Flow chart

Health visitors liked the flow chart approach and felt this was more usable in practice than the evidence summary. They stated that the evidence summary was a little long and that time to read it adequately might be an issue. The traffic light system of **must**, **should** and **could** recommendations in the flow chart was thought to be useful. They indicated that the fact that the numbers in the flow chart relate to the numbers in the evidence document needed to be clearer.

1. Midwives Section

There was a discussion about the section pertaining to the role of midwives and whose responsibility it might be to raise the issue of a woman's weight with her during pregnancy. The question of when, how, who should intervene with maternal overweight/obesity postnatally was also raised. Health visitors believed that general practice also needed to be involved in the management of overweight/obese mothers during pregnancy and postnatally and their infants. They believed that GP systems needed to flag up overweight/obese women for intervention early on in pregnancy.

Health visitors stated that there is currently no formal pathway for midwives to refer overweight/obese mothers to health visitors antenatally. Some health visitors stated that it would be easy to get referrals from midwives since they shared an Office but for others a pathway would need to be developed. They suggested it is not current practice for the midwife to identify or summarise risk factors/concerns universally to the health visitor, and it would depend on the health visitor to review the antenatal records in her caseload when the midwife "shares the care" with her on System one. There were suggestions that System one could be used to flag up infants at risk of obesity to all members of the primary health care team (including GPs).

2. Health visitor antenatal visiting

Health visitors stated that they don't currently undertake antenatal visits but they believed they would be doing so in the future. They stated that low numbers of health visitors was a problem when it came to being able to deliver preventative initiatives but this should improve with Health Visitor Implementation Plan. Those present were keen to start intervening antenatally with higher risk mothers.

3. Assess infant overweight/obesity risk

The health visitors stated they collected some of the data required to complete an obesity risk assessment i.e. weight and growth. They questioned as to why smoking was a risk factor. Health visitors thought this was counter-intuitive; there was a belief that smoking reduces birth weight and obesity risk.

The health visitors talked about different perceptions of health in other cultures and a particular need for infants in some cultures to be larger. There were questions about the UK growth charts and whether or not they control for ethnicity with one health visitor stating that she found that infants from South East Asian families tended to be on the lower centiles and those from Black families tended to be higher on the centile charts.

4. Health visitor to offer tailored post-natal advice

There was a discussion about providing postnatal advice to women who are overweight and whether or not this should be raised by a GP at the 6-8 week check and the infant flagged up for possible additional intervention.

5. Parent and infant to regularly attend health visitor clinics

The health visitors stated that the guideline should not refer to the Birth to Five book as it was no longer available for them to give out to parents as a printed publication. It was available on-line but this might mean that families without internet access cannot obtain it.

6. Breastfeeding support

Health visitors believed mothers have already having made a decision about infant feeding when they see them at the Birth visit. Health visitors expressed the view that they already undertook most of the activities in the guideline around providing breastfeeding support, where this is needed and advice about skin to skin contact.

They stated that support is provided to all breastfeeding women by health visitors, although the criteria for a one to one support from the breastfeeding team in Nottingham is the women being under 25yrs old. Women who are older than 25 years are invited to attend breastfeeding support groups which are more successful in some areas than others. Health visitors from one team stated their postnatal breastfeeding support group was not well attended at the moment. They believed this aspect of their role needed more input and linkage with antenatal care.

7. Sleeping and soothing

Health visitors believed that some parents fed their infants when they woke up at night because they didn't want the baby to wake others who were sleeping. They talked about providing a course on baby massage that helped parents understand how to soothe infants when they woke at night by not using food but suggested this only appealed to some mothers. They stated that settling and sleeping advice is often given ad hoc by health visitors or by another member of the team, especially in the first couple of months of birth when a baby is usually unsettled, first time parents and when overfeeding is suspected.

8. Communicate risk to parent

There were concerns about some mothers not taking on board information about obesity risk for themselves. Health visitors stated that they can only give information/advice and that it is up to parents consider what is being said both for themselves and their young child.

9. Formula milk feeding

One health visitor talked about taking part in a study testing different formula milks with her own child which explored the impact of high and low protein milks on infant weight. There was a discussion about the recommendation that infants should not be given formula milk that is high in protein. There were a number of questions around which formula milks they should be recommending. Which brand of formula milk is low protein, which is high? Health visitors said they needed more knowledge around how much protein is appropriate. They stated that they were constantly being asked for recommendations from parents about which formula milk they should use. They stated they used to have representatives from formula milk companies who gave them information about particular milks but this is not acceptable under Baby Friendly which has left a knowledge gap. They felt they still needed to have information about formula milks to help parents and were concerned about where they might get that information.

They talked about how some parents provide their infants with "second milks" too early and said they did not always feel equipped with knowledge about how to deal with this. They stated that the baby milk manufacturers were always coming up with new ways of presenting milk which they were not always aware of or fully informed about.

10. Play and physical activity

Health visitors stated that activity such as tummy time is routinely discussed universally at the birth visit, and importance of play e.g. reaching for objects etc. at 3-4 month review, and at 12 month review.

11. Weaning onto solid foods

Health visitors reported that parents received advice about weaning onto solid foods from them at 3-4 months and also at weaning groups delivered by other members of the team at the Children's Centre. Topics covered include weaning guidelines, why, when, and what weaning food and how to feed. They suggested that preventing obesity is covered in topics such as the eatwell plate, portion sizes, satiation cues, family foods.

There were a number of different views as to whether 3-4 months was the best time to provide weaning advice. One health visitor stated that she often gave advice at the birth visit particularly when mothers had much older children and/or where a grandmother was very influential. Others felt that providing advice later was better but felt you needed to "catch" parents before they start. Health visitors generally felt they needed to raise parents awareness of the conflict between the advice they gave that was based on the DH guidance and the guidance that was printed on pre-prepared baby food in packets and jars. The health visitors suggested that they try to promote baby-led weaning with parents as appropriate.

12. Assessment of overweight at 6/12 months

Health visitor stated that current practice is to have contact visits at 3-4 month review, and at 12 month review. They were unsure how some of the recommendations would work with the Universal service.

Other comments

Health visitors were confused about the **must should** and **could** as in the guidelines as practitioner recommendations vs. recommendations for parents. The health visitors re-iterated that they could not tell parents that they "must" do anything.

Health visitors stated that advice about many of the areas where intervention was recommended in the guidelines is already universally provided in X City.