

TACKLING OBESITY THROUGH THE HEALTHY CHILD PROGRAMME A FRAMEWORK FOR ACTION

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Foreword

The Healthy Child Programme is the universal preventive programme that begins in pregnancy and continues through childhood. It is an evidence based programme of developmental reviews, screening, immunisations, health promotion and parenting support. When we produced the updated guidance on the Healthy Child Programme in 2008 we were aware that more needed to be done to support practitioners in their important work to prevent obesity in childhood. Whilst the scale of the public health threat posed by increasing rates of obesity was known the literature on effective interventions in the early years was sparse. We therefore welcomed the opportunity to ask Professor Mary Rudolf, well known for her excellent clinical and research work on obesity, to review the evidence and produce this report.

This publication draws on some of the existing and emerging evidence, with thoughtful conclusions that we thought should be available to front line practitioners as a valuable addition to their professional knowledge of obesity in the pre-school years. It sets out some key messages to parents and ideas for how to be more effective when supporting mothers and fathers to change their behaviour and encourage healthy nutrition and physical activity. This advice is invaluable as we know that obesity prevention can be complex work given the psycho-social factors that influence behaviour in this area. However, it does not, and cannot give all the answers and some areas may not reflect current policy on practice with families with very young children as set out in the Healthy Child Programme and Professor Rudolf has highlighted where current policy is under review, for example the physical activity recommendations. We also need to be able to demonstrate the cost benefits of preventive interventions during a time of financial constraints. Nonetheless, this publication makes an important contribution to our thinking on the Healthy Child Programme and to all services working with young children and their families.

I hope that this document will help give practitioners the understanding and confidence to make obesity prevention a core part of the Healthy Child Programme.

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This document is available on the National Obesity Observatory website:
www.noo.org.uk

USING THIS GUIDE

This document aims to provide guidance and practical direction in a strategy to reduce the risks of obesity for babies, toddlers and preschool children. Nineteen themes for action are outlined that have the potential to encourage the development of lifelong healthy lifestyle and reduce the risk of obesity. These provide a framework for practitioners who work with parents and carers; offer some clear messages for parents on how to develop a healthy home environment for their young children, and provide a basis for guiding public health strategy. The last three themes relate to the enhancement of health and community practitioners' skills to maximize their effectiveness when working in the area of lifestyle change.

The document has been developed through exploration and critical review of the evidence relating to the early indicators of lifestyle development. It was written while working as a guest researcher at the Centers for Disease Control and Prevention in Atlanta, Georgia, USA. Through discussion and guidance from experts at the CDC, researchers in the USA and colleagues in the UK a number of strategic themes were identified. Electronic databases were searched to establish the strength and breadth of the evidence and key research was reviewed. At each stage, and on completion, the framework was reviewed by Dr Bill Dietz, Director of the Division of Nutrition, Physical Activity and Dr Bettylou Sherry, the Research and Surveillance Team Lead. On returning to the UK the framework was discussed by members of the Healthy Child Programme and Healthy Weight Healthy Lives Expert Advisory Groups and amendments made in line with current policy and thinking in the UK.

Each section of the document is underpinned by:

- **The rationale for the strategic theme:** where the background evidence that underpins the theme is described
- **Interventions that provide supporting evidence:** where evidence based interventions that utilise the strategic theme are described. Much of the evidence base, by necessity, is drawn from interventions with older children as there is a paucity of research on preschool children.
- **Key considerations:** includes issues that may be important to keep in mind when planning, implementing, and/or evaluating action relating to the theme
- **Potential actions:** where suggestions are made for practical action
- **Selected resources:** where materials, books, web links and contact information for practitioners, policy makers and parents are provided
- **References:** a list of selected evidence and sources that underpin the section

Due to limitations of time and resources, the document cannot claim to be fully comprehensive. It has however outlined a framework for action that could form a basis for tackling obesity through working with parents of very young children and in child care settings.

Mary Rudolf
November 2009

This report was commissioned to inform the development of the Department of Health's work on obesity in early years. The report represents the views of the author and does not constitute government policy.

FRAMEWORK FOR ACTION

Development of healthy lifestyle

PARENTING

1. Encourage parents and carers to model a healthy lifestyle
2. Help parents enhance their parenting skills and develop an authoritative approach to shaping their children's lifestyles
3. Encourage parents and carers to take a whole family approach

EATING & FEEDING BEHAVIOUR

4. Encourage responsive feeding
5. Encourage positive family mealtimes
6. Find alternatives to food for comfort and to encourage good behaviour

NUTRITION

7. Encourage exclusive breast feeding for 6 months
8. Introduce solid foods at 6 months
9. Ensure portion sizes are appropriate for age
10. Increase acceptance of healthy foods – including fruit and vegetables
11. Reduce availability and accessibility of energy dense foods in the home
12. Reduce consumption of sweet drinks and increase consumption of water

PLAY, INACTIVITY AND SLEEP

13. Encourage active play
14. Create safer play-space at home
15. Reduce sedentary behaviour and screentime
17. Ensure children get a good night's sleep

Enhancing practitioners' effectiveness

18. Recognise babies and toddlers who are at particular risk for obesity
19. Provide training on how to help parents make lifestyle changes
20. Encourage practitioners to model healthy lifestyles themselves

INTRODUCTION

The case for intervening in the very early years to prevent obesity is compelling. Its rationale is based on epidemiological studies that point to the high prevalence of obesity on starting school, the link between infant weight gain and later obesity, and tracking of obesity into adult life. Evidence from other sources highlights how lifestyle choices – both food preferences and physical activity – have their roots in the very early years. When we consider that young children themselves are likely to be more receptive at this age, it becomes clear that action is needed long before children reach school.

Epidemiological studies

Three sources of data point to the importance of the preschool years. The Department of Health's National Child Measurement Programme shows that by the start of school as many as 13% children are already overweight and 10% obese, rising to 14% and 17% by the end of primary school.¹ Confirmation that most excess weight before puberty is gained before the age of 5 years comes from the Early Bird Study.² Preventive strategies therefore are needed well before the age of 5 years.

The need for intervention even earlier, in babyhood, is suggested by the findings of a systematic review³ that showed that heavier babies are at increased risk of later obesity (odds ratios ranged from 1.35–9.38). Other studies found that babies who grow rapidly (but are not necessarily overweight) also have an increased risk (OR 1.17 to 5.70). Once child obesity is established the evidence is clear that tracking takes place into adulthood.⁴

When is children's health affected by their weight?

Obesity in childhood used to be thought of as a cosmetic problem. If this were so, leaving intervening to a later date might be a reasonable strategy. However evidence is emerging that even very young children already have signs of adverse effects on their health. The Early Bird study found that metabolic markers of high cholesterol, blood pressure and abnormal glucose metabolism were already present at the age of 9 years.² Other studies have shown that children as young as 3–8 years old already have early vascular lesions.⁵ There is also some indication that childhood obesity in and of itself provides an independent contribution to the development of adult morbidity.

The development of lifestyle choices

The argument for a focus on the early years is only partly based on the knowledge that obesity has its roots in the preschool years. As, or more important, is the evidence that individuals' lifestyles are also determined by early life experiences. Later food preferences, activity levels and leisure activities are all influenced by parenting and the home environment in the first years of life. If children could be set up to have healthy life experiences from the start it is plausible that benefits might accrue in the very long term. It is on this premise that the suggestions in this document have been made.

What can be done?

Health professionals report a lack of confidence in working in the area of obesity^{6,7} and parents of obese preschool children report that traditional approaches to obesity management are unhelpful⁸. There is a need for developing an approach that is suitable for very young children and ensuring that health professionals have the skills to support parents and carers. This document provides a framework for action that relates to messages that are likely to be helpful to parents, and also to the skills of the 'messenger'. The complexity of the task is well expressed in an article by David Benton:

"Traditionally, educational strategies have almost inevitably involved the attempt to impart nutritional information, typically to eat less fat and more fruit and vegetables ... Although it is an approach that is typical of much of health education, ... for many non-scientists it misses

the point. ... The objective of health education is to change behaviour, however, the giving of bald information often has little if any impact on what people do. ... We should be aiming to establish in the first place healthy attitudes, rather than simply giving information to try to change inappropriate behaviour that has been formed previously. In the early stages a key role is played by the parents, who need to understand the implication of their behaviour for the development of the eating pattern of their child ... It is reasonable to suggest that the role can either lay the foundations of obesity or alternatively develop a healthier pattern of eating with enormous implications for health."⁹

Should we be focusing on children known to be at risk?

The new Healthy Child Programme (formerly the Child Health Promotion Programme) is underpinned by the principle of progressive universalism (where all children receive a basic package of health promotion which increases in intensity with children's particular needs). This approach is particularly appropriate for childhood obesity. By 2050 two thirds of the population are predicted to be obese, so a whole population approach is needed.¹⁰ However certain children are at greater risk through family lifestyle, genetics, poverty or other circumstances. These children deserve more input. The emphasis of partnership working and parenting in the new HCP is particularly pertinent to the problem of obesity.

Developing the Framework

The Framework for Action was developed through exploration and critical review of the evidence relating to the early indicators of lifestyle development. This led to the identification of strategic themes in the areas of parenting, eating behaviour, nutrition, play, screentime and sleep, with additional consideration of health and community professionals' roles in promoting healthy lifestyle. Where possible the evidence was drawn from studies relating to babies, toddlers and preschoolers, however such evidence is sparse and so relevant research on school aged children is also cited. In the document the rationale behind each theme is outlined, along with interventions, where available, that have utilized the approach. To ensure the Framework is of practical use, potential action points are provided along with resources that practitioners and policy makers may find helpful.

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PARENTING

Parents strongly influence their children's lifestyle. This goes beyond the food they provide for their children and the activities they encourage them to do. They influence them through the way they feed them, the way they present themselves as role models, the foods and activities they make available and accessible in the home, and the parenting style they adopt.

Arguably the most effective strategy we can employ for tackling obesity in childhood is to work with parents, and so this guidance document starts by focusing on parents and how to help them set their young children up for a healthy start to life.

1. Encourage parents and carers to model a healthy lifestyle

'The best way to encourage your child to become the adult you have dreamed of is to become the type of adult you would like him to be' Robin Sharma (PATCH¹)

Background

The extent to which children's lifestyles are linked to their parents' lifestyle behaviour is not always appreciated. The evidence indicates that this association is strong, especially for food and eating behaviour, with some evidence that activity levels are linked too.^{2,3}

A number of studies show that there is an association between the composition of mothers' and children's diets, their fruit and vegetable intake, the amount of fat that they eat and the sort of beverages that they drink.⁴ For example, girls who eat higher fat diets have mothers who do so too.⁵ Mothers who drink more milk tend to drink fewer soft drinks, and their daughters do so too. Even the types of food liked and disliked by mothers, the timing of eating, and where food is eaten in the home is correlated with children's eating behaviours later on.²

Parents' own relationship to food also has an influence.⁴ For example, Cutting et al⁶ studied the behaviour of preschool girls who were given unrestricted access to sweets and crisps after eating a meal. Girls who ate the snacks in an uncontrolled way tended to have mothers who were overweight and who reported that they had a tendency to eat uncontrollably themselves. Another study showed that mothers who reported that they overeat tend to have preschool daughters who are overweight.⁵ Interestingly at the other end of the spectrum, mothers who

reported that they 'diet' frequently had 5-year-old children who were less able to control the amount they ate than other children. Westenhoefer found that when both parents have a tendency to eat uncontrollably their children are prone to gain excess weight.⁷

The importance of parents as role models extends to physical activity too. A systematic review on the correlates of preschool children's physical activity levels found that children with active parents tended to be more active.⁸ The effect was strongest for younger children, and was as important a factor as the amount of time children spent outdoors or in play spaces. Interestingly parents' encouragement of physical activity alone appeared to have no effect.^{8,9} In contrast to



studies on nutrition where mothers feature prominently, fathers may have a stronger influence on physical activity. A study in Sweden found a correlation between the number of sports activities attended by fathers and the activity levels of their children.¹⁰

Rationale for encouraging parents and carers as role models

There is therefore a wealth of studies that show that there is a relationship between parents' lifestyles and that of their children in terms of what they eat, how they eat it and their activity levels. This provides a good rationale for encouraging parents to model healthy behaviours. Indeed it could be argued that children's lifestyles can only change for the better if they live in a household where adults are leading a healthy lifestyle themselves.

Interventions that provide supporting evidence

Research into the role that parents have in influencing their children's lifestyles is mostly observational. Interventions that focus on encouraging parents to become healthier role models are lacking, however there are pointers in the literature that indicate the benefits of this strategy:

- One study from 30 years ago explored how to encourage children to eat novel foods. Mothers were asked to eat new foods, watched by their children. The children found it easier to sample these foods once they had seen their mothers doing so. When they watched strangers eating a new food the effect was less.¹¹
- Parents are not the only effective role models. Jansen et al studied the influence that teachers can have on children's consumption of novel yoghurt drinks. Children were given the drinks with or without a teacher who was also drinking and praising the product. Preference for new yoghurt flavours was greatest when they were drunk with the teacher.¹²
- Perhaps the strongest evidence for the importance of role modelling comes from the PATCH programme in Israel, an intervention for obese children that has been rigorously evaluated by RCT.¹³⁻¹⁵ The programme delivered to groups of parents has a strong focus on parenting, role modelling and the home environment. PATCH is one of very few interventions that has demonstrated long term benefits in terms of weight reduction for children and also their parents.
- Parents concur about the importance of their role in modelling eating. In a qualitative study, Casey and Rosin gathered parents' views about strategies they thought were effective in influencing children's likes and dislikes. Parents reported that they could encourage their child to eat by showing that they liked the food themselves (and also involving them in its preparation).¹⁶

Key considerations

Studies indicate that older children's food preferences resemble their parents' food preferences more than younger children's do.¹⁷ The benefits of role modelling may therefore become more apparent as children get older.

Studies relating to eating behaviour and food preferences tend to involve mothers alone. It is likely that role modelling is most effective when practiced by both parents.

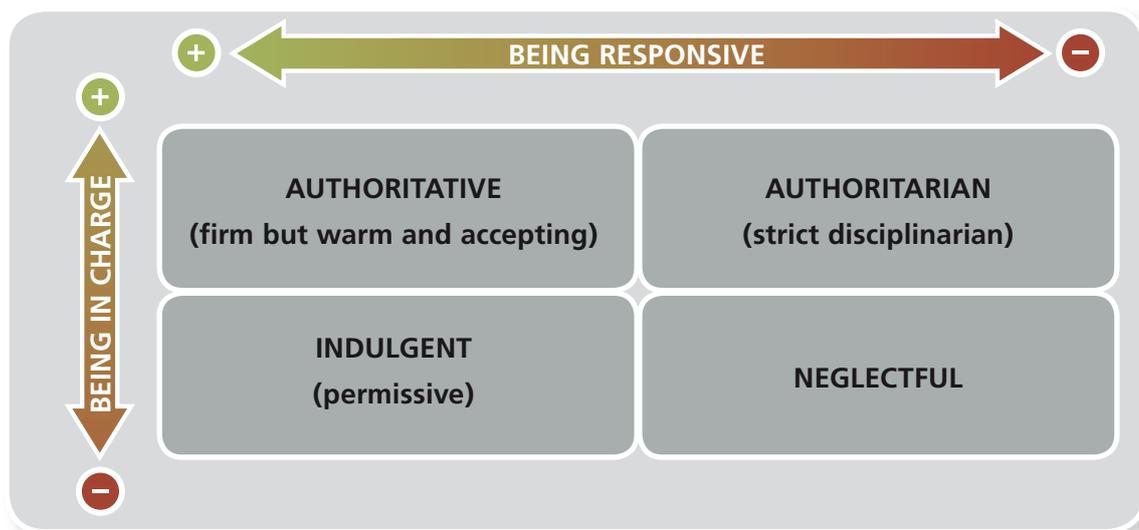
Potential actions

- Emphasise the importance of parents' own lifestyle whenever children's weight or lifestyle is addressed
- Take a Do as I Do approach rather than Do as I Say (recognizing that not all parents will have healthy lifestyles so may need to address their own diet and activity)
- Ensure parents are knowledgeable and supported in making lifestyle changes themselves. Ideally this needs to Start from the Start and be introduced into antenatal care

2. Help parents enhance their parenting skills and develop an authoritative approach towards their children's lifestyles

Background

Parenting style is recognised as an important determinant of children's health and wellbeing and is gaining increasing interest as an area for study. Broadly speaking, positive parenting involves being responsive to children's emotional and physical needs, while being 'in charge' and able to set clear boundaries. Four parenting styles have been described that relate to responsiveness and control.¹⁸



The *authoritative style* is optimal. This involves being sensitive and responsive, while remaining in charge and able to maintain appropriate limits for behaviour. By contrast, the *authoritarian style* takes control to extremes, and is coupled with low responsiveness. Restrictions and demands are made without the child's needs, feelings and preferences being taken into account. An *indulgent style* is a kind but weak approach to parenting, where the parent is responsive to the child's wishes and demands even when they are not in the child's best interests. It is linked to an inability to set limits and maintain boundaries. A *neglectful style* is one where the parent is neither in charge nor responsive to the child.

The authoritative style is the ideal as it promotes healthy development and a feeling of security where children know that their needs will be respected and their views considered within a consistent framework. Research shows that authoritative parenting is linked to social development, self esteem and mental health, higher academic achievement, lower levels of problem behaviour, increased ability to self regulate, less depression and less risk taking. The other styles have been associated with lower academic grades, lower levels of self control, poorer psychosocial and emotional development, behavioural problems and substance abuse.⁴

Rationale for the emphasis on parenting skills and authoritative parenting as a means to tackle obesity

There is substantial evidence that parenting style relates to children's eating behaviours and obesity too, particularly when an authoritarian (disciplinarian) approach is taken to mealtimes.³ In a comprehensive literature review Faith, Scanlon et al found that 19 of 22 studies showed a significant association between parents' feeding styles and children's outcomes in terms of their rate of eating, their total energy intake and their weight status.¹⁹

Rhee et al (2006) found that children of authoritarian parents (strict disciplinarians) had an almost 5 fold increased risk having overweight children in first grade than authoritative parents did. They also found that children of parents who were warm and sensitive ate more fruit and

vegetables and were more physically active.²⁰ The effect of an authoritarian style of parenting is particularly negative when parents are restrictive about certain foods. For example children of mothers who restrict access to food and pressurise them to eat (encourage them to finish the food on the plate) have higher intakes of fat.²¹ At the other end of the spectrum, mothers who take a permissive approach and allow more choice tend to have children with a higher BMI.² Less well researched is the relationship between parenting practices and TV viewing and levels of physical activity, although a relationship is not surprisingly found.¹

The situation is complex, as parenting is inevitably determined by parents' own personal issues as well as their theories about effective parenting. Parents' personal concerns (for example about obesity) and their own childhood experiences mould their approach. One study showed that mothers who use dietary restraint for themselves tend to use restrictive feeding practices, and this is also associated with their children being overweight.⁵

Given the relationship between parenting style, obesity and eating behaviours there is sound rationale for an approach that helps parents develop an authoritative approach to mealtimes. This approach entails adults determining which foods enter the home, how they are prepared and offered, and where they are eaten. Children however need to determine the amount eaten.



Interventions that provide supporting evidence

Parenting programmes are designed to help parents develop their parenting skills. They typically focus on changing parent reinforcement strategies, problem solving abilities and parent child interactions. They help parents develop new strategies on how to relate to their children while increasing the use of techniques such as positive reinforcement. Parenting programmes have been rigorously evaluated and show clear evidence of effectiveness in improving parenting skills²² as well as improvements in parental affect, involvement with the child and use of praise.⁴

There is now emerging evidence that programmes that aim to enhance parenting skills also can have an impact on children's obesity.

- Golley et al conducted a randomised controlled trial involving parents of obese children and their parents attending the Triple P parenting programme in Australia. They augmented the programme with an extended module addressing lifestyle issues and found that children whose parents took part showed significant reduction in their obesity compared with children whose parents were on the waiting list.²³
- The randomised controlled trial of the PATCH obesity programme conducted by Moria Golan in Israel provides additional evidence. This programme places a strong emphasis on authoritative parenting. Children who took part had an impressive reduction in weight compared to controls and this was maintained at follow up 7 years later.¹³ In a further trial she found that there was an even more significant effect when PATCH was delivered to parents alone without any child involvement.¹⁴ Apart from good weight reduction, changes were found in food brought into the home, the type of foods eaten and problematic eating behaviours. The parents themselves lost weight with improvement in comorbidity. Interestingly children whose parents had a more permissive style of parenting did less well.
- Stein et al. explored the relationship between levels of control and weight loss in children attending a family based weight management programme. The children were asked to assess their parents' levels of control at the start and end of the programme. The children reported that their parents had become more accepting as a result of the programme. Interestingly children who rated their fathers as being most accepting achieved greater weight loss.²⁴
- Harvey-Berino et al carried out the only (although small) randomized controlled trial of a home based intervention for infants and preschool children. The programme provided 16

weekly visits focusing on parenting skills to prevent obesity. As a result, mothers' feeding skills were less restrictive, children reduced their energy intake and tended to gain less weight than the controls.²⁵

- A study from the UK provides further supporting evidence. Families for Health is a group programme for parents of obese children and their siblings with a particularly strong parenting component. A pilot study showed significant reduction in the children's weight.²⁶
- The Cochrane systematic review of interventions for obesity was updated in 2009. 64 randomised controlled trials were included. On close analysis, those interventions with a strong focus on parent participation tended to achieve better results than those focusing on lifestyle behaviour in a more general way.²⁷ This finding was noted in another systematic review.²⁸

There is therefore ample evidence that enhancing parenting skills has an important influence on the success of achieving weight reduction in school aged children who are already obese. Evidence is lacking for preschool children and the primary prevention of obesity, but it seems reasonable to assume that promoting an authoritative approach to parenting would be a powerful strategy that would help children develop healthy lifestyle behaviour and decrease their risks of obesity. Given that parenting skills are rooted in one's own childhood experiences, benefits could well be seen into the next generation.

Key considerations

It is important to emphasise that parents do not fall into one parenting style or another. Parents adopt different styles in different circumstances and with different children. It is important not to stereotype parents, but to encourage a generally more authoritative approach.

Parenting is a two way process. Different children provoke their parents to utilise one style over another. For example children who are naturally compliant may well allow their parents to take an authoritative style; while children with chronic illnesses may induce a permissive style, and those with ADHD are in danger of provoking authoritarianism. Parents of an obese child may misguidedly employ restrictive and controlling approaches which they would not use for a healthy weight sibling.

Authoritative parenting helps parents cope with many stressful situations such as picky eating, poor sleep patterns and temper tantrums. These common family problems can be a good 'way in' to introducing the benefits of attending parenting education programmes.

Family harmony and long term well being and achievement for children are further benefits that accompany positive parenting

Potential actions

- Educate parents that an authoritative parenting style is optimal. The motto *Parent provides and child decides* is helpful in many situations (see section on responsive feeding)
- Introduce the concept of authoritative parenting in antenatal classes as it is such an important strategy for so many aspects of child and family wellbeing.
- Direct parents to parenting programmes such as Webster Stratton Incredible Years or Parenting Links before there are concerns about children's behaviour or weight
- Where families are at higher risk of obesity, parenting programmes that focus on lifestyle, such as Let's Get Healthy with HENRY, are particularly appropriate.

3. Encourage parents and carers to take a whole family approach

Background

Young children's worlds primarily centre on the home and family, with parents taking the central role in determining food preferences, what is eaten and attitudes towards food. It is worth considering whether their influence is augmented when a whole family approach is taken and

the entire family is engaged in healthy eating and activity. This is particularly relevant when obesity or eating difficulties are an issue for a particular child. Clinical experience suggests that there is commonly a tendency (often supported by health professionals) to direct energies to the 'problem' child while allowing siblings more freedom.

Rationale for promoting a whole family approach

There is some evidence that a broader approach brings benefits. In one of her hallmark studies, Birch^{5, 29} looked at the effect that other children had on children's food preferences. When preschool children observed others eating vegetables that they did not like, older children were found to be effective in persuading them to try new foods. If this extends beyond the classroom, older siblings may well have an effect on widening young children's food preferences. Other adults in the family may add to this effect. As described previously Jansen and Tenney looked at the influence adults other than parents have on children's acceptance of novel yoghurt drinks. Children preferred those flavours that were given with a teacher present who was drinking and praising the product.¹²

The recommendation to take a whole family approach is not necessarily straightforward. Good family functioning is crucial for managing daily routines, accomplishing tasks, communicating with family members and controlling child behaviours.⁴ When there is family dysfunction efforts may well be undermined by greater levels of stress and an environment that is generally less capable of supporting healthier lifestyles. The relationship to obesity is suggested by the finding that families with overweight children have significantly more difficulty managing family mealtimes.³⁰

The emphasis on involving the whole family reinforces parents' attempts to model a healthy lifestyle. Children of all ages are likely to benefit and may in turn influence their younger siblings.

Interventions that provide supporting evidence

Evidence for the effectiveness of taking a whole family approach is principally derived from trials of interventions for older obese children.

- Once again the PATCH programme¹ provides important pointers. A family approach provides the basis for the intervention. Indeed Golan emphasises the added value of both parents attending the programme rather than one alone.
- Epstein et al reported the ten year outcomes for obese children who took part in four randomised treatment studies. He found that 68% of the children had successful outcomes and these were observed when a family approach was taken targeting both parents and children.³¹
- The Cochrane systematic review of interventions for childhood obesity involving 64 randomised controlled trials concludes that a family approach is more effective than targeting the obese child for support.²⁷ This finding applied to physical activity as well as eating behaviour. By extension it is likely that the family approach is critical for preventing obesity too.

Potential actions

- Educate parents about the importance of taking a whole family approach
- Increase awareness about the influence that significant others in the family (including older siblings) can have on young children's lifestyle choices
- Encourage family mealtimes (see Action Point 5) as a natural setting where healthy food choices and eating behaviour can be modeled. This concept should be ideally introduced antenatally
- Make parenting programmes that focus on lifestyle, such as Let's Get Healthy with HENRY, more available.

PARENTING: Resources and References

Resources

- The PATCH Programme by Moria Golan. Published in 2008 by the Maxana Press, Israel. Info@zivgroup.co.il
- The Nurturing Programme, a programme that offers courses for parents and for children in Early Years settings and schools. Family links: www.familylinks.org.uk
- Incredible Years parenting training programme (Webster-Stratton) aimed at reducing behaviour problems and increasing social competence. www.incredibleyears.com
- HENRY – Health Exercise Nutrition for the Really Young – a programme that trains professionals to help carers develop the parenting skills required to establish a healthier family lifestyle
 - Tackling Child Obesity with HENRY by Candida Hunt and Mary Rudolf. Published in 2008 by the Community Practitioners' and Health Visitors' Association.
 - HENRY website: www.HENRY.org.uk
 - HENRY e-learning course: <http://www.ukvirtual-college.co.uk/>

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EATING AND FEEDING BEHAVIOUR

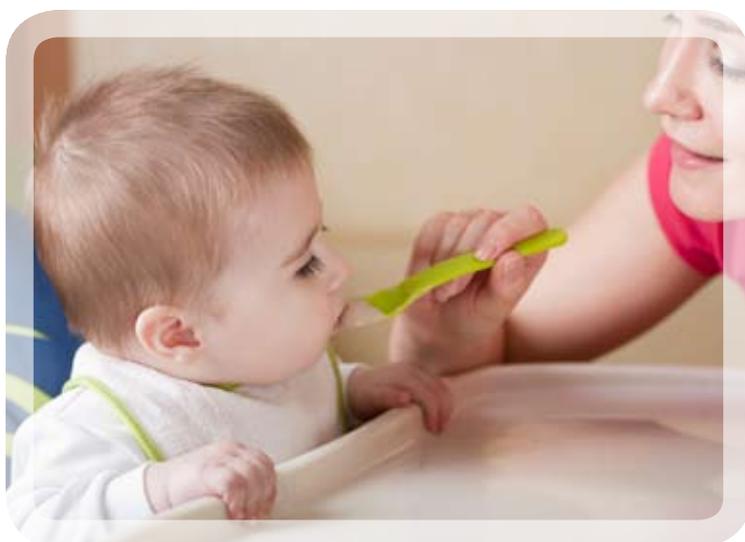
4. Encourage responsive (authoritative) feeding

The relationship between parents or carers and young children at mealtimes is important for the development of a healthy approach to eating. Responsive (or more accurately authoritative) feeding involves carers being attentive to children's needs and cues, and responding sensitively to them in a timely way. This ensures that children are not over- or under-fed and helps them develop independent eating skills.

Background

Perhaps the most significant factor contributing to the current obesity epidemic is our propensity to eat more than we need. Responsive feeding is a way to encourage children to eat more appropriate quantities and help them to keep to their body's requirements.

Appetite regulation



Babies are born with the ability to regulate how much milk they need to drink in order to grow healthily. Landmark studies by Fomon et al showed that infants less than 6 weeks old adjust their formula intake in response to being given formulas of differing energy density.¹ This ability to 'compensate' and appropriately eat more or less at a subsequent meal is still present in early childhood as illustrated by a number of studies. For example, when 3- and 5-year-olds in day care were given sweet drinks they compensated for the extra calories by eating less when they helped themselves to snacks.² This was true too when high energy snacks were given before lunch – the children compensated by eating less at the meal.³

This ability to compensate appears to diminish with age. Older children are less able to compensate than younger children, and by adulthood compensation is imperfect (particularly for calories taken as a liquid).⁴ Clearly some individuals are better able to compensate appropriately, and those that compensate less well tend to be heavier. This may reflect inherent differences in genetic make up, but also may be due to early feeding experiences.

Parents' beliefs and feeding styles

Research shows that parents influence their children's ability to protect themselves from overeating in a number of ways including the way they eat themselves, their beliefs and their feeding styles.

Parents often believe that pressurising children to eat a healthy food is an effective way to increase their liking for that food. However, it not only induces a dislike of these foods, it also reduces children's ability to learn to read their own satiety cues. For example, preschool children in day care are less able to regulate their food intake after a high calorie snack if parents are generally more controlling of what they eat.⁵

Restricting intake is another strategy that affects children's ability to regulate appropriately. In the short term it decreases energy intake, but ultimately it leads to children being less able to compensate for an energy dense meal themselves. In fact, restricted access to food and a pressure to eat are both linked to a higher intake of fat.⁶ In addition to leading to obesity, it can also lead to disordered eating behaviour⁷ – 5-year-old girls are already more likely to 'diet' if their parents are restrictive about food.

Controlling what children eat, through pressure or restriction, is common but counterproductive. It particularly occurs when parents are overweight themselves, have problems controlling their own food intake, are concerned about their child's weight, or are particularly invested in their appearance.⁶

Rationale for encouraging responsive feeding

The overwhelming availability of tasty energy dense foods and drinks is a major force that compels children to overeat. However, most young children still have a natural ability to appropriately regulate how much they eat. Preserving this ability would help them to grow up better able to resist the temptation to eat excessively.

Feeding practices appear to be an important influence, and can potentially be changed. Encouraging parents to learn to read their baby's hunger and fullness signals, feed them accordingly and refrain from using controlling or restrictive feeding practices is important. Beyond babyhood it might be possible to help children relearn how to 'listen' to their hunger and fullness cues themselves.

Interventions that provide supporting evidence

Research in the 'laboratory' setting suggests that young children can be encouraged to eat in a way that is more responsive to their hunger and fullness cues. One small trial in the community suggests that mothers of young children can be taught to feed more responsively.

- In a trial by Leann Birch, preschool children were encouraged to focus on their 'internal' cues – their feelings of hunger and fullness; another group were given 'external' cues such as being told to clean up their plates. Over a series of meals children in the first group learned to regulate how much they ate when the energy content of the meal was manipulated. Those who had external cues failed to do so.⁸
- In a further trial, preschool children were explicitly taught about internal cues in an imaginative way. A class of children were given dolls with detachable stomachs that were bursting full, empty or comfortably full. Over a few weeks, they learned to talk about their feelings of hunger and fullness, and reinforced this by learning to 'Velcro' an appropriate stomach to the doll. At the end of the study children who had received the educational programme ate less at lunchtime after they had a high energy snack, whereas the control group failed to do so.⁹
- A home-visiting obesity prevention programme focusing on changing lifestyle behaviours and improving parenting skills was developed for mothers of Native-American 2-year-olds (who are at high risk for obesity). Mothers either received this obesity prevention programme or a general parenting programme. Those who received the obesity prevention programme fed their children in a less restrictive way, and the children themselves decreased their energy intake.¹⁰

Key considerations

The term *responsive feeding* is used in the literature, but authoritative feeding is a more appropriate term. In feeding, as in other aspects of parenting a balance between being responsive and 'being in charge' is the key.

While research indicates that babies are usually born with a natural appetite regulation, some individuals are born with inappropriate appetites. In this circumstance, parents need to be able to firmly set boundaries while maintaining responsiveness. This is exemplified in children with obesity syndromes such as Prader Willi. The challenge is to set boundaries without employing unhelpful restrictive practices.

There is sometimes confusion about the concept of restricting foods. Restricting children from eating desired energy dense foods is unhelpful, especially in situations where others are eating them or there is concern about the child being overweight – the food simply becomes more attractive. This form of restriction is quite different from action taken to make sure that energy

dense foods are simply unavailable or inaccessible in the home – a sensible strategy for avoiding arguments and temptation, or the need to restrict.

Potential actions

- Ensure that parents and carers are aware that babies and children need guidance rather than control when eating. This involves
 - Recognising babies' and toddlers' hunger and fullness cues
 - Feeding responsively so that children preserve their ability to sense and respect their fullness and hunger cues
 - Avoiding pressurising or coercing children to eat
 - Avoiding giving 'external' cues. Encourage children to listen to their 'internal' cues
 - Avoiding restriction of certain foods as this makes them more desirable
- Responsive feeding in the weaning period is of such importance that it would be helpful to consider including this subject in antenatal classes
- Children should be encouraged to be aware of their internal cues of hunger and fullness and to avoid eating to overfullness. Talking about this is important in child care settings as well as in the home.
- Explore ways to educate children in childcare to recognize and respond appropriately to their hunger and fullness cues
- Help parents establish clear boundaries around eating behaviour while avoiding restrictive practices

5. Encourage positive family mealtimes



Background

Family meals were once an important daily ritual that involved home-prepared food eaten at a consistent time with the entire family round the table. In recent decades the social context of family meals has changed. Fewer meals are eaten in the home and fewer meals are eaten as a family group. A study in the States showed that only 38% of 13-year-olds have regular family meals (defined as more than 5/week) and this decreases to 22% by the age of 17 years.¹¹

There is also more reliance on convenience foods and meals prepared outside the home. In the United States, 46% of food expenditure is spent on food eaten outside the home,

and 34% is spent on fast foods.¹² Preschoolers eat 1 in 6 of their meals out of the home and this ratio increases to 1 in 3 meals for adolescents – fast food restaurants account for more than half of these meals.¹³ This change in meal patterns has obvious implications for obesity as meals eaten outside the home tend to be more energy dense and are served in larger portions. The impact of this is illustrated by the finding that American adolescents who regularly eat fast foods have a higher total energy intake and also eat fewer vegetables and fruit.¹⁴

Rationale for encouraging positive family mealtimes

Research shows that family mealtimes are linked to a number of benefits, both nutritional and psychosocial. For example:

- Families who consistently have family mealtimes are less likely to have overweight children¹⁵
- Overweight teenagers who eat 7 meals per week with their family are more likely to be successful at losing weight. This is true for white, black and Hispanic Americans.¹⁶

- Older children and adolescents who regularly eat with their families
 - eat more fruit and vegetables, dietary fibre, dairy products, basic vitamins and minerals^{17–19}
 - eat less saturated fat and fast foods^{17–19}
 - drink fewer soft drinks^{17, 18}
- Children who have companionship at mealtimes tend to eat more servings of the basic food groups¹¹
- There is a long term effect – 13-year-olds who have regular family meals continue to have regular meals, eat more healthy foods and eat less fast foods five years later¹¹
- Family meals have been linked to other benefits such as better psychosocial well being, less high risk behaviours and lower academic dropout rates²⁰

One has to be cautious before assuming that family meals in themselves are responsible for all these benefits. Family mealtimes may just be a marker for the quality of family life and how the family functions. Nonetheless family meals clearly provide opportunities for parents to model healthy eating and healthy eating behaviour. As other adults²⁰ and older children²¹ can influence younger children to try new foods the impact may be additionally enhanced.

The quality of the family mealtime is an important factor. Family mealtimes can be stressful, and they have the potential to generate and perpetuate unhealthy attitudes to healthy foods. One example is the finding that it is counterproductive to complain if food is not eaten – it has been shown that negativity decreases rather than increases the chances that that food will be eaten again.²² Television viewing during mealtimes is another factor that has a significant negative impact on the quality and quantity of foods eaten as a family. On the other hand, positive social interactions and comments about food during a meal have been shown to enhance the adoption of healthy eating behaviours.²⁰

The corollary of promoting a return to quality family mealtimes should be an accompanying reduction in the amount of food eaten outside of mealtimes and outside the home. These habits contribute to the amount of energy dense foods that young children eat and are also linked to a reduction in how much fruit, vegetables and dairy foods are eaten.²³

Lastly, as for many of the action points in this document, there is evidence that eating patterns, at least from adolescence, track into later life.¹¹ There is therefore potential that promoting family meals could have long term effects. As for most lifestyle behaviour, parents are likely to find it easier to introduce the concept of regular family meals while their children are young, rather than attempting to do so later on when their children are older.

Interventions that provide supporting evidence

There are no interventions that focus specifically on promoting family mealtimes although they are likely to be an intrinsic component of a number of obesity management programmes

- The PATCH programme emphasises the importance of family mealtimes and encourages parents of obese children to introduce them into family life. This programme is successful in helping children and their parents achieve weight reduction.^{24, 25}
- The HELP programme that underpins the WATCH IT intervention has developed two messages that reinforce the importance of healthy eating patterns: 3+2 and the 3Ss. These relate to the importance of having 3 meals and 2 sit down snacks a day, and eating Slowly, Socially and Sitting Down. This appears to be a helpful component of the approach²⁶
- The randomised controlled trial of the Triple P parenting programme in Australia involving parents of obese children provided some focus on family meals for those families receiving the augmented programme. This may have contributed to the success of those children who achieved reduction in their obesity²⁷

Key considerations

It has already been highlighted that regular family mealtimes may be a marker for general family functioning.

It is important to emphasise the quality of interaction at mealtimes as much as the frequency of family meals – a negative or stressful atmosphere can generate unhealthy attitudes to eating.

Mealtimes provide an excellent opportunity for parent modeling of enjoyment of healthy foods and positive eating behaviours.

Potential actions

- Encourage the concept of family meals early on
- Health education messages should extend to include:
 - The importance of a positive atmosphere at family mealtimes
 - The negative effect that television has on mealtimes
 - 3+2 (children require three meals and 2 sitdown snacks a day)
 - The 3 Ss (ensuring meals are eaten Sitting down, Slowly and Sociably)
 - The fact that complaining if food is not eaten is counterproductive and reduces the chances of a child eating that food at a subsequent meal
 - The poor nutritional quality of foods commonly eaten outside of the home.
- Encourage regular family mealtimes and help parents acquire the necessary skills which include:
 - Parenting skills – especially avoidance of becoming a short-order cook to pander to children's requests
 - Time management skills
 - Cooking skills and guidance about preparation of easy and quick meals for working parents
- Encourage the concept of 'family meals' in preschool settings too

6. Find alternatives to food for comfort and to encourage good behaviour

Food is commonly used for non-nutritional reasons. It is used as a reward for good behaviour or achievement, as bribery or coercion to encourage children to be good and for comfort at times of distress – both physical and emotional. This is unhelpful as the foods used are invariably energy dense (often chocolate and sweets) and when given in these circumstances gain a special value and become more desirable. The effects may be long term as food preferences track into adult life and it is likely that a dependence on food to satisfy emotional needs does so too.

There have been good studies that demonstrate how children's attitudes to foods change when they are used as rewards, so that even foods that children prefer can become disliked if they are promised a reward for eating them. Interventions that specifically focus on using alternatives to food for comfort and to encourage good behaviour have not been reported

Potential actions

- Make parents and carers aware of the disadvantages of using food for reasons other than nutrition
- Help parents and carers develop alternatives to food when comforting children or encouraging good behaviour
- Increase awareness that the strategy of using reward foods to encourage healthy eating increases the desirability of the reward food and decreases liking of the healthier food. (for example 'if you eat up all the broccoli on your plate you can have some icecream')
- Emphasise that hugs and attention may be as or more effective than food for comfort when children are in physical or emotional distress.

EATING AND FEEDING BEHAVIOUR:

Resources and References

Resources

- Tackling obesity with HENRY. Candida Hunt and Mary Rudolf. Published by Community Practitioner and Health Visitors Association 2008
- Eating Behaviours of the Young Child. Ed William Dietz and Leann Birch. American Academy of Pediatrics 2007
- Tuning in to Mealtimes – a DVD for practitioners illustrating how responsive feeding can be encouraged. Available through HENRY training: www.henry.org.uk
- Baby led weaning – a DVD promoting an approach to weaning whereby infants are only presented with food that they can eat themselves and have control over quantities Produced by Gill Rapley and available at sales@markittelelevision.com
- Taking Steps to Healthy Success. A child care learning package to promote healthy eating and physical activity. Module 2 Your role in promoting healthy eating and physical activity. Nemours Health and Prevention Services, Delaware, USA. www.GrowUpHealthy.org
- How to get your kids to eat...but not too much. Satter E. Bull Publishing Company 1987
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NUTRITION

7: Encourage exclusive breast feeding for 6 months

Breast feeding provides a wide range of benefits one of which is a measurable degree of protection against the development of obesity, with the protective effect increasing according to the duration of breastfeeding and how exclusively the baby is breastfed. The mechanisms by which breastfeeding has this effect appear to relate to the amount of milk breastfed babies consume, their appetite control and hormonal levels.

Breastfed babies are in control of how much milk they take – mothers do not know how much they have had and it is hard to get breast fed babies to take more than they want. At weaning breastfed babies reduce the amount of milk they take to adjust for the extra calories they get from solid food. By comparison, bottle fed babies do not, suggesting that their appetite regulation diminishes. Hormonal differences between bottle and breastfed babies have also been found. Hormones, such as leptin, which regulates appetite, alter and it is thought these early changes may affect the programming of metabolic pathways throughout life so predisposing to obesity.

Apart from healthier weight gain, breastfeeding brings an additional and less appreciated benefit. Breastfed babies experience a variety of food flavours that pass from their mothers into the milk. This exposure to flavours positively influences babies' acceptance of healthy foods at weaning (see on).

The recommendation to encourage exclusive breastfeeding for 6 months is based on good evidence from longitudinal studies that exclusive breast feeding is linked to healthy weight gain later in life. Obesity prevention adds to the many other benefits that breastfeeding brings to babies' health and wellbeing.

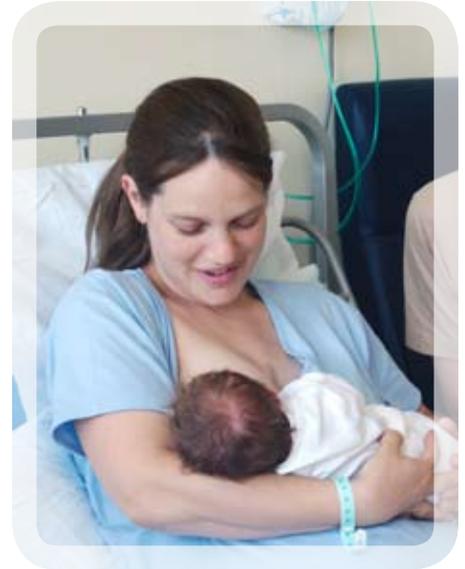
Potential actions

- Ensure that parents and professionals are aware that breastfeeding brings additional benefits to babies in terms of healthy weight gain in childhood and beyond
- Educate mothers to appreciate that they can positively influence their children's food preferences by what they eat while breastfeeding

8. Introduce solid foods at 6 months

The World Health Organization introduced a recommendation that weaning should take place at 6 months of age. This is often challenged by health professionals as being unrealistic. Studies now show that babies who are weaned early are more likely to develop obesity. The underlying reasons are thought to be due to young babies taking more energy dense foods than they need in the first months of life, and the consequent hormonal responses that promote laying down of fat.

Early weaning commonly occurs because of a perception that a baby is hungry and milk feeds are inadequate. This often happens around growth spurts where babies temporarily require an increase in feeding. In order to encourage a delay in starting solids, parents and carers may need help in developing other tactics to calm crying babies and encourage them to sleep through the night.



Weaning at 6 months would promote optimal nutrition in the early months of life as well increase the chance of healthier weight gain. The evidence underpinning this recommendation comes from epidemiological studies that show that weaning before 16 weeks is associated with later obesity, and that babies who are weaned at 6 months tend to have healthier weight gain.

Potential actions

- Ensure professionals and parents are aware of the link between early weaning and obesity
- New parents and carers may need help in
- recognizing when babies' distress is due to needs other than hunger and
- developing tactics other than feeding to calm the baby

9. Ensure portion sizes are appropriate

An increase in portion sizes is considered to be an important contributing factor to the obesity epidemic. Studies show a parallel between increasing portion sizes and rising obesity rates for children and adults. The increase in portion size is particularly evident for energy dense foods such as snack foods and servings in fast food restaurants, although there has also been an increase in portion size documented in cookery books. Research with both adults and children shows that the quantity of food eaten is influenced by the amount of food presented on the plate.

The general increase in portion sizes has been accompanied by a distorted perception of the nutritional needs of babies and young children. While helpful information has been produced regarding the importance of balancing the different food groups, there is little available for parents regarding portion sizes for children under the age of 5 years. Presentation of appropriate portions will discourage children eating more than they need and will help reduce a common parental anxiety that their young children are not eating enough.

The evidence for this action point comes from epidemiological studies that show the change in portion sizes for older children and adults over time. Intervention studies in the preschool years have tended to focus on the quality rather than quantity of food provided.

Potential action

- Make information regarding appropriate portion sizes for babies and preschool children available to parents and professionals. In doing so it must be emphasized that requirements vary from time to time and child to child. The recommended portion sizes should be used as a guide to how much needs to be presented on the plate, but not used to restrict intake inappropriately.
- Advise parents and carers to avoid using adult size plates for younger children as this encourages inappropriately large portions

10. Increase acceptance of healthy foods – including fruits and vegetables.

'Initially there are biological tendencies to consume pleasant tasting and familiar foods. However children rapidly begin to learn to associate taste with both the physiological and social consequences of eating. This learning process results in the development of beliefs and attitudes about food that may dominate adult life.' Benton 2004

Background

Most parents want their children to eat healthily, yet many feel they fail in this task. Reports show that eating difficulties are common with 30% of children reported as being 'picky eaters' – eating only a limited variety of foods or very small quantities.² The challenge is to try to influence children's food preferences so that they are inclined to eat less energy dense foods and more fruit and vegetables. Role modelling and parenting style are important influences covered elsewhere in this guidance document. Other factors are also involved and an understanding of these is important in any attempt to influence children's eating preferences.

Predisposition to like sweet and salty foods

Babies are born with a predisposition for sweet foods,¹ and by 4 months they develop a liking for saltiness. They also have a tendency to dislike sour and bitter tastes. There are good evolutionary reasons for this aversion as noxious substances often taste bitter or sour, whereas sweet tasting plants are generally benign, and provide a good source of calories needed for growth and energy. Unfortunately this predisposition to sweetness is not advantageous in an obesogenic environment.

Genetic influences

Cultural and environmental factors account for much of the variation between individuals' food preferences but genetic factors also have a role. An understanding of genetic taste markers may help parents when they are trying to wean their babies on to healthy foods. One genetic marker is the ability to taste a substance called propylthiouracil (or PROP). Individuals with the PROP gene have a heightened taste for bitter foods such as coffee, broccoli or olives, finding them to be quite unpalatable.³ This capacity to taste bitter foods may explain why some babies reject foods like green vegetables. Pressurising them to eat those foods could be counterproductive and could lead to long lasting aversion. Reassuringly, PROP tasters tend to learn to like bitter foods over time.

Neophobia

Another factor that can affect the development of food preferences is the natural tendency for babies to develop neophobia (the rejection of new foods). This tends to occur around the age of 12 to 15 months for good evolutionary reasons. At this developmental age young animals begin to forage for themselves. A wariness of new tastes can protect against noxious substances – confining themselves to foods encountered when they were dependant on their parents is likely to be safer.¹ This natural tendency to reject novel foods plays into a preference for energy dense foods and contributes to young children's rejection of healthier options.



Learnt aversions

Aversions to food can also be learnt for other physiological reasons. There is a tendency to dislike foods eaten at the time that illnesses develop, particularly if they cause vomiting. This is seen when children receive chemotherapy for cancer.⁴ Once again the evolutionary rationale is clear – if the body perceives that a food causes vomiting, it is best avoided thereafter. It is common for children to begin to avoid previously accepted healthy foods after a bout of illness

Rationale for trying to increase the acceptance of healthy foods

The development of eating habits and food preferences are complex and at times falter. Many parents fall back on giving energy dense foods to their children out of concern that growth and health will be affected if their child does not eat. If children can be encouraged to like and eat healthier foods this anxiety can diminish, so allowing parents to provide their children with a more nutritious diet and ensure that less energy dense foods are given when they are hungry. As

early food choices predict adult food preferences⁵ the benefits might be very long term.

The rationale for trying to increase the acceptance of healthy foods is clear; the difficulty is in achieving this goal, given the biological factors that militate towards a preference for sweet and energy dense foods. The research literature provides some clues on how to encourage a liking for healthier foods.

Clues to influencing food preferences

- Avoid sweetened food and drinks from the start – babies who are not given sweetened foods or drinks early on have a reduced preference for sweetness later¹
- It makes sense to familiarise babies to a wide variety of new foods early in weaning before the tendency towards neophobia develops. Combining new food tastes with familiar ones increases acceptance¹
- Babies need to taste frequently and not just look at a new food before accepting it.¹ One study showed that carers had to present food up to 89 times before it was accepted!⁶ Another study showed that when preschool children had repeated exposure to a new food, it became more familiar and their preference tended to increase.⁷ While it is important to respect babies' dislikes, perseverance may overcome them
- Food preference is not only a matter of taste – visual, olfactory and tactile senses are important too. Allowing young children to see, smell and handle foods as well as taste them helps acceptance
- Dislikes commonly develop for food that was previously liked during or after an illness. Gradual re-introduction of the food may be helpful
- Parents often believe that pressurising children to eat a healthy food is an effective way to increase the child's liking for that food. However pressure and coercion clearly promotes dislike of these foods⁸
- Complaining when food is not eaten is counterproductive and decreases the chance of the food being eaten subsequently⁹

Interventions that provide supporting evidence

Randomised controlled trials show that educational and social marketing tactics are effective at influencing food preferences positively. These have been delivered in school and day care settings, rather than the home. Examples include the following:

- Food Friends is a 12-week program that aims to increase children's willingness to try new foods. It blends educational and marketing strategies with opportunities to explore, experience and eat new foods. Four Head Start programmes (3–5-year-olds) took part in a randomised controlled trial of Food Friends. Children receiving the programme came to like new foods more than control children did.⁵
- In another trial, 3–5-year-olds were read stories that depicted kohlrabi, a vegetable they were unlikely to have tasted before. Those who were read a story positively depicting the vegetable were more willing to taste kohlrabi than those who listened to a negative story.¹⁰
- Wardle et al carried out a trial with preschool children to see how asking parents to offer vegetables daily to their child for 2 weeks compared with being given a useful information leaflet. They found that children were more likely to like the vegetable when they had been offered it frequently.¹¹
- The Food Doods is another educational intervention (not evaluated by RCT) that aimed to increase fruit and vegetable intake in 3 primary schools in the UK through a fun group of cartoon characters. It showed promise in increasing children's liking and consumption of these foods.
- Marketing has powerful effects on children's food preferences. Borzekowski et al highlighted this through a randomised controlled trial in Head Start where children were randomised to see a cartoon with and without 30-second commercials. There was a clear effect on food preference from these brief advertisements.¹²

Potential actions

- Provide parents with more guidance about the development of food preferences. Antenatal classes and contacts for preventive health care provide important opportunities for offering guidance on how to encourage healthy food choices
- Guidance should include:
 - Encouraging mothers to eat healthy foods during pregnancy and breastfeeding to expose their babies to flavours
 - Modelling healthy eating
 - Combining new foods with familiar foods to increase acceptance
 - Familiarising babies to family foods and a wide variety of tastes from the start, rather than giving them special children's foods
 - Allowing babies to see, smell and touch as well as taste new foods in order to help acceptance
 - Offering new foods at least 15 times before considering that rejection is a true dislike
 - Respecting an increase in food dislikes following illnesses and reintroducing the food gradually
 - Avoiding pressure and coercion or complaining if food is not eaten
 - Avoiding using food as rewards
 - Avoid using food as a contingency or 'bribe' (e.g. – if you finish your peas you can have dessert)
- Child care facilities and staff need to be aware of how food preferences develop and follow the guidance too

11. Reduce availability and accessibility of energy dense foods in the home

Energy dense is a term used to describe foods that have high caloric value due to added sugars or a high fat content. 'Healthier' foods have lower energy-density with less calories, sugar, fat, and sodium. They include fruits and vegetables, low-fat dairy products, whole grain products and lean meats, fish, and poultry.

Background

An important contribution to the obesity epidemic has been the increased availability of energy dense foods. Epidemiological studies indicate the extent of the problem. Between 1977 and 1998, preschool children, aged 3 to 5 years, in the United States increased their energy intake, with a notable excess of added sugar in food and through drinking juice.¹³ Other studies have shown that children who have energy-dense, low-fibre, high-fat diets have more body fat and are more likely to develop obesity later on in childhood.^{14, 15}

Clearly a reduction in the consumption of energy dense foods by children of all ages is required. This is easy to recommend but extraordinarily difficult to achieve as it involves overcoming biological, emotional, social and metabolic mechanisms.

Preference for sweet foods

One of the contributory factors that makes change to a less energy dense diet difficult is our innate preference for sweet foods. This is already present at birth, and persists through childhood (often beyond). In contrast to adults, children do not find that a food can be too sweet, and, given a choice, will choose the most intensely sweet food available.¹ This tendency for sweet food can be seen as adaptive in our history when food was scarce, particularly for young children requiring energy to grow. Reassuringly this preference for sweet can be modified by experience. Research shows that babies who are given sweetened water from birth prefer

it more at 6 months than those who have only been given water.¹⁶ By preschool age children given sweetened, salty or plain tofu, prefer the version with which they are familiar, and do not automatically opt for the sweet variety.¹ These studies provide some optimism that exposing young children to less energy dense foods may help to modify a preference for sweet flavours.

Appetite regulation

Babies are born with the ability to regulate their energy intake so that they eat a constant amount of food over the course of a day. If they are given a high energy formula at one feed, they will take less at a subsequent feed.¹⁷ By adulthood this ability to compensate is imperfect, however encouragingly, children still have it. At the age of 4–5 years children are able to compensate, but it seems to diminish by the age of 9 to 10.¹ Preservation of this ability to regulate energy intake so that children neither overeat nor undereat is the underlying rationale for recommending responsive feeding (see Theme 4).

The effect energy dense foods have on the body

Beyond the simple addition of unneeded calories, other reasons have been put forward to explain why energy dense foods contribute to the development and maintenance of obesity. One relates to the sense of satiety which is regulated by the volume of the stomach. Energy dense foods are highly caloric but are low volume so a sense of satiety is not so readily experienced. By comparison low energy dense foods tend to be more filling.

Another explanation involves the concept of the glycaemic index. Foods that have a high glycaemic index, such as sugars and refined starchy foods, are rapidly digested leading to a rise in glucose which provokes insulin secretion so stabilising blood sugar levels. The high insulin levels and swings in blood sugar cause hunger and a craving for food, making it hard to resist the temptation to eat. Low energy dense foods by contrast lead to a slower digestive process without the swings that contribute to excessive eating. Change to a low glycaemic diet reduces a craving to eat with good effect for those trying to lose weight.¹⁸

Rationale for advising that the availability and accessibility of energy dense foods are reduced in the home

Because of the inherent palatability of energy dense foods, the effect high glycaemic foods have on our metabolism and the decreased ability to regulate consumption with age it is hard to cut back on eating energy dense foods. Advice that families reduce the availability and accessibility of high energy snacks is made for the entirely practical reason that it reduces temptation and the likelihood of mindless eating. Some support for this approach comes from research into eating behaviour, where it has been shown that making food less readily available results in a reduction in eating.

This strategic theme has the advantage that it contributes to a whole family approach (Theme 3) and also reduces the likelihood that parents will resort to restrictive parenting practices (see Theme 2).

Interventions that provide supporting evidence

A reduction in consumption of energy dense foods would contribute greatly to a reduction in obesity. Evidence for the effectiveness of trying to reduce their availability and accessibility in the home is somewhat limited and principally derives from trials of multi-component interventions for obese children.

- The PATCH Programme¹⁹ has a strong focus on making changes in the home and providing obese children with a healthier, less obesogenic environment. A change in foods brought into the home was found to be a key factor that contributed towards successful weight reduction
- A systematic review of randomised controlled trials showed that adoption of a low glycaemic diet is effective in reducing weight in obese adults.²⁰ The evidence is lacking for children, although the results of one small trial look promising. While this intervention does not relate directly to foods in the home, it does provide evidence that changing eating habits relating to energy dense foods can affect obesity.

Key considerations

This strategic theme relates to the availability of energy dense foods in the home. It is also an important principle for childcare settings.

Energy dense foods are often less costly as well as being very palatable. A reduction in purchase of these foods requires political and economic action to make tasty, healthier foods more affordable and available at point of purchase, particularly in disadvantaged communities

Potential actions

- Providing information and education for parents:
 - Helping parents understand which foods are energy dense
 - Helping parents appreciate the value of substituting high energy dense foods with lower energy dense foods.
 - Emphasising the benefits of simply avoiding bringing energy dense foods into the home:
 - It promotes better nutrient intake
 - It diminishes arguments
 - It decreases the need for enforcing restraint which is effective in the short term but increases the food's desirability in the long term
- As ready-made meals are generally more energy dense, cooking classes for parents where they learn to prepare less energy dense meals may help to reduce the amount of energy dense foods in the home.

12. Reduce consumption of sweet drinks and increase the consumption of water

Background

Sweet drinks (also known as sugar-sweetened beverages [SSB]) are an important source of added sugar to our diets. They include fizzy drinks, fruit drinks, sports drinks, tea and coffee drinks, energy drinks and milky drinks to which sugar has been added (typically high-fructose corn syrup or table sugar). There is a direct link between sweet drinks and adult health. Adults who heavily consume sweet drinks are more likely to develop obesity, diabetes, heart disease and low mineral bone density.²¹ High consumption has also been linked to dental caries and calcium deficiency, perhaps particularly relevant to the childhood years.²¹

Various metabolic mechanisms have been put forward to explain the link between sweet drinks and obesity. They include the following:

- i. When we eat energy dense food we usually compensate by eating less at the next meal. When the calories are in the form of a drink, rather than food, compensatory mechanisms work less well and so energy intake increases.
- ii. Sweetened drinks are digested rapidly causing a rapid rise in blood sugar which triggers a sharp insulin response. Blood sugar levels then drop causing a craving to eat.
- iii. Fructose has a weaker effect than other sugars on hormones that help regulate sensations of fullness.



Artificial sweeteners are widely used by those attempting to control their weight. An interesting controversy persists as to whether they are helpful in obesity management: some studies suggest that they may actually promote obesity.²² There is also recent renewed concern that artificial sweeteners may be harmful.²³

Rationale for reducing sugar-sweetened drinks and increasing the consumption of water

Sugar-sweetened beverages account for as much as 16% of American adults' daily intake and 50% of these are drunk at home. Very young children in the USA regularly have sweet drinks (other than juice) – 28% of babies at 12 months increasing to 44% at 2 years.²¹ UK figures show that sweet drinks (excluding juice) amount to 15% of beverages drunk by children aged 5–7 years.²⁴ The amount of sugar ingested in drinks contributes significantly to children's caloric intake and high consumers of soft drinks have been shown to consume more total calories, more sugar and less milk.¹

Innate preference for sweetness

The natural preference that babies have for sweetness inevitably has a part to play. Given the opportunity, they are likely to drink sweet drinks rather than water. Habit and exposure then have an important role in perpetuating this. In a study of 6-month-old babies, only those who had routinely been given sweetened water showed a preference for sweetness when tested.¹ This gives important support for recommending avoidance of sweet drinks in babyhood.

Parental role

Parents have a strong influence on their children's drinking habits – through availability in the home, their own consumption of drinks and their parenting style. Studies show that children drink more sweetened drinks when they are freely available at home,²⁵ and there is a direct relationship between mothers' consumption of soft drinks and their children's.²⁶ Parenting style also has an impact – children whose parents are permissive about food and drink tend to drink more sweet drinks. On the more positive side when parents refrain from having soft drinks in the presence of their children, their children drink less too.²⁶

Soft drinks are widely consumed by preschool children and may contribute considerably to their daily caloric intake. Studies show that, just as in adults, there is a link between drinking sweetened beverages and childhood obesity.²¹ The significant health risks from drinking sweetened drinks in the long term, and the absence of benefits, provides a sound rationale for recommending that their consumption is reduced in young children.

Artificial sweeteners do not provide a good alternative. The long-term effect of sweeteners on children's health is not known and there is the possibility that they may have an adverse effect on fullness cues and may sustain a preference for sweetened drinks. Plain drinking water, on the other hand, is free of calories and also satiates thirst better than other drinks. Interventions to reduce sweet drinks and increase water consumption have the potential to play an important role in increasing the health of young children. As it is reasonable to assume that, like food, patterns for later consumption of drinks are linked to early experiences there could be long term benefits too.

Interventions that provide supporting evidence

Interventions for preschool children are lacking. There are a number that have targeted older children both at home and at school, with some having an encouraging impact on weight as well as the consumption of healthier beverages. These appear to be more effective when alternative drinks are provided rather than relying on an educational approach alone.

- The Memphis Girls Health Enrichment Multisite Study (GEMS)²⁷ randomly assigned African American adolescent girls to weekly group sessions promoting a healthy lifestyle for 12 weeks, group sessions with their parents or a comparison group that focused on self esteem. Sweet drinks in the parent-targeted group reduced to 1.5 servings/day, compared with 2.4 servings/day for the child only group and 3.0 servings/day for the controls.

- An RCT in Chile examined the effect of increasing the availability of milk in the home. 98 children aged 8 to 10 years who regularly drank sweet drinks were randomly assigned to having milk delivered home for 16 weeks, and were instructed to drink 3 servings per day and to avoid sweet drinks. Milk consumption increased significantly by 453 g/d and sweet drinks decreased by 711 g/d. Sweet drinks increased by 72 g/d for the controls with no change in the milk that they drank. There was no change in percentage body fat.²⁸
- 103 adolescents aged 13 to 18 years who regularly drank sweet drinks were randomly assigned to having sugar-free drinks delivered for 25 weeks and were discouraged from drinking sweet drinks. Daily consumption of sweet drinks decreased by 82% (–286 ml) and did not change in the controls. Those who were obese or overweight increased their BMI less than the controls.²⁹
- Choice, Control, and Change (C3), a middle school curriculum designed to foster healthful eating and physical activity, was conducted in 19 science classes within 5 U.S. middle schools over a period of 7 to 8 weeks. The evaluation showed that pupils' diets improved, with consumption of soft drinks decreasing a little from 4.5 to 4.2 days per week.³⁰
- A cluster RCT of an education programme in six UK primary schools aimed at reducing consumption of carbonated drinks. Intervention children drank less (0.6 glasses less over 3 days as compared with controls who increased by 0.2 glasses). At 12 months a positive effect was seen on the percentage of overweight and obese children although this was not sustained 3 years later.^{31, 32}

Key considerations

Given the lack of nutritional benefit to be gained from sweetened drinks, there should be no significant considerations. For some reason it is a controversial issue. Health professionals and parents often consider that fruit juice is a healthy option, even though juice has significantly less benefit than eating fruit itself, can increase caloric intake considerably and reduce a liking for water.

If avoidance of sweetened milk or milkshakes is included in this strategic theme, there are potential health implications as some children rely on this milk for their calcium requirements. The drinks industry would not be supportive of this approach and could counteract efforts to introduce it

Potential actions

- Increase the availability of drinking water in public facilities used by young families
- Recommend that only plain drinking water and milk are available in day care settings
- Discourage the use of artificially sweetened drinks in young children
- Educate parents:
 - To avoid giving sweet drinks (including juice) for babies
 - To encourage children to drink water
 - To limit young children's consumption of juice and sweetened milks to 4oz (120mls) at any serving
 - To discourage drinks while watching TV
 - To understand that they are powerful role models and that children will follow them in what they drink
- Ensure that the opportunity to discourage sweet drinks is made when children receive dental care

NUTRITION: Resources and References

Resources

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- Portion size chart. HENRY toolkit. www.HENRY.org.uk
- Eat more, Weigh less? Publication in the CDC's Research to Practice series providing information on recognizing the energy density of foods http://www.cdc.gov/nccdphp/dnpa/nutrition/pdf/Energy_Density.pdf
- Best Practices for Healthy Eating: A Guide to Help Children Grow Up Healthy prepared by Nemours in collaboration with Delaware's Child and Adult Care Food Program. Available at: <http://www.nemours.org/department/nhps/child-care/healthy-habit.html> and <http://www.nemours.org/department/nhps/five-two-one/almost-none.html>
- Color Me Healthy An imaginative pack of teaching resources about nutrition resources for use in child care settings. Available through: <http://www.colormehealthy.com>
- Healthy habits for life A fun pack of resources utilizing Sesame Street characters designed for use by parents or child care settings. Produced in conjunction with Sesame Street by Nemours Health and Prevention Services. <http://www.sesameworkshop.org/initiatives/health/healthyhabits/>
- 5-2-1- and almost none website to engage parents and children in adopting the message: 5 fruits and vegetables – <2 hours screentime – 1+ hours physical activity – and almost no sweet drinks <http://www.mcchildrensalliance.org/5210/>
- Best Practices for Healthy Eating. Nemours Health and Prevention Services, Delaware, USA. .An excellent nutritional guide for babies and preschool children. www.GrowUpHealthy.org
- My Fats Translator (American Heart Association) provides a tool to determine calorie needs (ages 3 and older) based on height, weight and activity level. This site also provides tips for making healthier food choices. www.myfatstrlator.com
- Wise up on Water! is a document published by Water UK to highlight the importance of adequate water intake: <http://www.water.org.uk/home/water-for-health/resources/wise-up---children-web.pdf>

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PLAY, INACTIVITY AND SLEEP

13. Encourage active play

Background

The term 'physical activity' has widely replaced 'exercise' as a concept for adults and older children in an attempt to encourage ways of being active that focus less on organised sports and boring repetitive behaviour. For similar reasons it is preferable to work on a concept of 'active play' (rather than exercise or physical activity) for preschool children. In this way we will hopefully avoid the pitfall of overly and prematurely promoting supervised and structured activities for young children, which do not bring the full benefits of play and carry a potential for reduced enjoyment of being active.

There is also an argument that physical activity in the early years will promote later physical activity and health. The evidence indicates that physical activity levels and sedentary behaviour (notably television viewing) tracks into the early primary school years at least.¹⁻⁵

Definition and characteristics of play

Every Child Matters⁶ emphasises the importance of play and includes enjoyment of time and space to play as one of its key outcomes. While much of children's play is physical, characteristics of play also include spontaneity, experimentation, exploration, self-imposed goals, and risk taking.⁷ 'Active play' refers to play that includes some element of physically active movement. It can range from games with small, infrequent movements (such as clapping movements) through to activities demanding large amounts of energy such as running games or climbing trees. Preschoolers' play differs from older children's play as preschoolers tend to have brief bouts of varied activity with frequent rest periods^{8,9} and are not developmentally at a stage for engaging in sustained physical activity such as running or sports. This means that opportunities for activity need to be frequent and intermittent throughout the day.



Benefits of play

There is a vast literature that extends back for more than a century emphasising the benefits of play for human experience and development,⁷ which go way beyond an impact on physical development and motor skills. The outcomes are broad and include: happiness and wellbeing, friendship formation, cultural understanding, social, emotional and cognitive functioning, development of imagination, healthy brain development, creativity, exploration, practicing adult roles, developing multiple competencies, academic performance, handling challenges, working in groups, decision making, developing leadership skills, engaging fully and joyfully in childhood imagination, and passion.⁷

Time spent playing

Between 1981 and 1987 children's free playtime dropped by an estimated 25% in the USA.⁸ This change seems to have been driven by increases in the amount of time children spend in structured activities, along with a reduction in outdoor play both at home and in day care. It is also a consequence of television. Preschool children who watch 2 hours or more TV a day spend on average 30 minutes less time playing outside each day. The change in play patterns has been attributed by the American Academy of Pediatrics to hurried lifestyles, changes in family structures, and an increased emphasis on academics in educational settings.¹⁰

Policy context

Unlike nutrition, there are no official guidelines in the UK for physical activity in pre-school children. Guidelines do exist for children and young people from the age of 5 onward, although these are slightly different for each of the four Home Countries of the UK.^{11–15} We cannot simply extrapolate this guidance to pre-school children because:

- infants (aged 0–12 months) are not capable of the frequency, intensity, time and type (FITT) of activity as are children aged 5 and over;
- Preschool children are likely to need longer cumulative amounts of physical activity than children aged over 5 and may need a different intensity of physical activity because:
 - Unstructured energetic play is the main aspect of physical activity in the early years, and this decreases over time as children enter and progress through formal schooling.
 - Younger children’s natural movement patterns are sporadic and intermittent which makes it difficult in practice to accumulate a specific time dose of moderate-to-vigorous physical activity (MVPA).
 - Physically active play has many additional benefits, and guidelines for children of 5 and over do not have the emphasis on play – nor devote the appropriate amount – that is required for pre-school age children.
- there was insufficient evidence on which to base authoritative guidelines for the Early Years when the Chief Medical officer made his recommendations in 2004.¹⁵

These issues are now being addressed. The Department of Health in England is currently leading a process to develop appropriate UK-wide guidelines for children from birth through the first five years of life drawing on the latest evidence and international expert opinion: these are expected to be available in draft form in spring 2010 following discussion at the UK Physical Activity Consensus Event in October 2009 and a web-based consultation with experts through November and December 2009.

Unstructured outdoor play

Because conventional ways of measuring activity levels are not applicable to preschool children, a direct link between physical activity and obesity in preschool children has been hard to demonstrate.^{8, 16} Preschool children are typically intermittently active and need frequent periods of recovery⁹. Despite the difficulties this creates for measuring activity at this age, levels reported both in Britain and the USA are concerning – children in day care spend 80% of the time being sedentary and only 2% being vigorously active.¹⁷ The importance of encouraging active play in childhood is highlighted by the finding that children who do not develop patterns of regular physical activity are at risk of becoming sedentary adults.⁹

The solution for younger children needs to differ from approaches taken with older children. Given the opportunity, young children will be active.^{9, 18} Their inactivity often results from being constrained or restrained because of prioritising the development of cognitive skills, concerns for safety and demands for quiet behaviour. If these constraints are lifted and children are provided with an environment and setting where they can play, activity will follow.

Most interventions for young children adopt the approach of introducing structured physical activity into the preschool curriculum intermittently through the day. While this has its place, a structured and supervised approach to activity does not allow the broader benefits of play, such as exploration and social development to be realised. Structured activity also has the disadvantage that it is likely to be less effective than spontaneous active play at encouraging lifelong enjoyment of activity.

Children are more active outdoors.

There is good reason to promote unstructured outdoor play, not least because children are more active outdoors^{8,19} and gain additional benefits from this form of play. While indoor space often constrains gross motor movements and allows less opportunity for exploration, outdoor play encourages activity such as climbing, jumping, doing stunts and tumbling that promote muscle fitness and flexibility.⁹

Systematic review of the evidence shows that there is an association between the time spent outside by children and their level of physical activity^{19,20}. Outdoors is where free play and gross motor activity in young children are most likely to occur.^{8,19,21} One study¹⁹ showed that moderate to vigorous physical activity in American child care settings increased from 1% indoors to as much as 11% outdoors. During the time that outdoor play was child led, the amount of time further increased to 17%. Encouraging children to play out of the home is strengthened by reports that walking and playing provide older children with more physical activity than any other activities, whereas organised activities often encourage car use.²²

Much of the literature has focused on the relative benefits of different forms of outdoor play and has concluded that green open settings are more beneficial than play in playgrounds.

In 2004 Fjurtoft in Norway compared play in playgrounds by children aged 5 to 7 years with play in outdoor 'open environments'. Children who played in a natural outdoor environment had significantly better motor fitness, balance and coordination than their peers who played in playgrounds.²³ Further studies with preschool children in Norway and Sweden found that children who played in natural environments (among trees, rocks and uneven topography) showed greater motor fitness gains over a year.⁷

These findings are reflected in a systematic review that examined associations between the physical environment and physical activity in children.²⁴ The review concluded that children's participation in physical activity was linked to the provision of publicly provided recreational settings.

Additional benefits to outdoor play

A number of studies have shown that play in 'green spaces' brings additional benefits to children. Because outdoor spaces are often more varied and less structured than indoor spaces, children encounter all sorts of opportunities for problem solving and creative thinking. Benefits extend to their behaviour and ability to concentrate. In a trial in Sweden, preschool children were assigned to playing either in a traditional playground or to a play area in a field and orchard. Those allocated to the natural play areas had greater levels of concentration at the end of the year.⁷ Other studies in the United States found that children with ADD and ADHD had fewer symptoms of hyperactivity and inattentiveness after playing outdoors in green settings. It has also been suggested that outdoor natural play may help children to resolve inner conflict and cope with potentially stressful events.²⁵

Green environments in addition may have important cognitive benefits. In one study in America teenage girls with green views outside their window performed better on tests of concentration than those with barren views. In another study green home surroundings (independent of socioeconomic status) were linked to children being more resilient to stress and adversity.⁷ Even pictures of green spaces have been found to have a beneficial effect. Adults shown pictures of nature while they were exercising had lower blood pressure and better mood than when they exercised without these pictures.²⁶

Physical activity interventions in preschool settings

There are a number of interventions that focus on physical activity for preschool children. All of them involve programmes of activity that are incorporated in a structured way into the preschool curriculum rather than promote active play.

- Hip Hop to Health Junior is a multicomponent programme that was evaluated by RCT in Chicago Head Start Centers. The activity component involved instructed warm up sessions followed by directed physical activity. The results showed a reduction in overweight which held for two years.²⁷
- Eliakim et al conducted a trial with 54 preschool children who received a programme of activity, some of which was outdoors (but did not consist of free play). He found a good increase in physical activity as measured by pedometers and a reduction in BMI.²⁸
- Reilly et al conducted an RCT of MAGIC, a physical activity intervention in nurseries and home involving 545 children. He found an improvement in movement skills but no change in BMI. This intervention did not include an outdoors component.²⁹

- Mo-suwan et al conducted a trial of a 6 month intervention in 2 kindergartens in southern Thailand. It involved daily walks and aerobic dancing for 6 months. A reduction in prevalence of obesity was found in the intervention children. Although the walks were outdoors, there was no unstructured time for play outside.³⁰
- I am Moving I am Learning is being implemented widely in Head Start Centers across the USA. It involves 2½ days training with provision of a resource kit. Moderate to vigorous physical activity tripled in some classes^{3#1}

Interventions that provide supporting evidence for encouraging unstructured outdoor play

Despite the substantial evidence that outdoor play is associated with increased physical activity there is little in the way of interventions that promote free outdoor play for young children. This in part may be due to the fact that it is hard to reliably measure the amount of activity when free play consists of brief bouts of varied activity with frequent rest periods.

- Alhassan et al attempted to measure the effect of increasing preschoolers' free outdoor play time on their activity levels. The trial involved 32 children and was conducted over 2 days. Physical activity levels did not appear to increase.³²
- Hannon et al explored the effects of introducing portable play equipment into a preschool playground and measured the effect using accelerometers. Children's sedentary behavior decreased, and their light, moderate, and vigorous physical activity increased.³³

Key considerations

Unstructured play does not mean unsupervised play. Clearly adequate adult supervision is needed even if there is less involvement and direction.

If the strategy of promoting structured activity rather than active play is taken, there is a danger that children will find this less enjoyable and motivating in the long term.

There is a lack of safe, stimulating and challenging outdoor areas for children. Playgrounds are often 'overdesigned' and so restrict discovery and experimentation.

Parents are often anxious about allowing young children the opportunities to explore and play freely because of anxiety about their safety. Interestingly this is less of a problem in countries like Denmark⁷ where there is a greater emphasis on the importance of developing independence than there is in the UK.

Injuries may be more likely to occur during active play, but there is little evidence that outdoor play results in significantly more harm. This theoretical risk needs to be weighed against the considerable benefits.

Potential actions

For parents and carers

- Provide parents with information about the broader benefits of play and how to access imaginative and stimulating spaces.
- Help parents appreciate that modelling is less important than their support and encouragement of active play
- Make parents aware of recommendations that:
 - infants who are not yet walking should be encouraged to be physically active, particularly through floor-based play
 - toddlers and pre-school children should be physically active for at least 3 hours every day
 - Preschool children should not be sedentary for more than one hour at a time during the day, except when sleeping. This includes time in a high chair, small playpen, car, pram or buggy, watching TV etc.

- The development of safe outdoor play spaces should be addressed at a community level. Natural objects need to be more available in playgrounds to encourage creativity in play

For daycare and preschool settings

- Ensure that children spend time each day in active play with an appropriate amount of this time spent outdoors. Most of this play needs to be free play, with some time for orchestrated activity, the rest being incidental as opportunities arise.
- Ensure that daycare and preschool settings aim to provide at least the amount of active play that is proportionate to the length of the child's waking day spent there.
- Make portable 'props' and equipment available rather than relying on fixed equipment
- Ensure that outdoor play is less focused on 'crowd control' and more about stimulating play opportunities

14. Create safer play-space at home



Active play, particularly in outside settings, depends on parents and carers creating the opportunities to access the outdoors. By necessity most active play will need to take place indoors, and it is clearly important that preschool children have the opportunity to play freely and creatively in the home setting. While much will be quiet play, activity levels can generally be sustained providing television is kept at bay.

The key is space and safety so that children can play creatively without injuring themselves or damaging property and belongings. Equipment does not need to be expensive, and impromptu household items are often more stimulating than bought toys. For the full benefits of active play to be realised play should not be overly parent-led. Children need time where they have autonomy to develop their creativity. Playing within the home also provides additional benefits and opportunities for developing family relationships, communication skills, and building confidence.

The promotion of active play starts with earliest movements so that babies can develop their motor skills from the start with only a limited amount of time spent constrained and restrained in infant seats, buggies, swings, walkers and car seats.

Interventions promoting physical activity for preschool children have all taken place in daycare settings. Good studies on how best to promote active play in the home are much needed.

Potential actions

- Help parents appreciate the importance of active play from early babyhood and the necessity for defining appropriate space. Advice needs to include
 - Safety requirements
 - Ideas for inexpensive and household 'props'
 - Limiting time spent constrained and restrained
 - Avoiding television as a distraction
 - Allowing play to be child led

15. Reduce sedentary behaviour and screentime

The obesity epidemic and its effect on young children, is a major driver for the development of guidance regarding physical activity for the Early Years. In the UK, levels of physical activity and sedentary behaviour among young children are clearly 'obesogenic' (obesity promoting).^{34,38} While the need for children to be physically active as part of the 'calories out' element of the energy balance equation is well understood, less obvious is the need for them to also avoid being sedentary.

Sedentary behaviour can cover a wide range of activities but each is characterised by passivity and very low levels of physical activity. The cross-Government Obesity Unit has sought advice on this from a panel of national and international experts and the Department of Health is consulting on their draft recommendations. Much of the research into sedentary behaviour has focused on the amount of time children spend watching TV, or have unsupervised access to TV, often in their bedrooms. However, television and other forms of screen time, such as computers and DVDs, are not the only forms of sedentary behaviour. Babies and young children are also sedentary when they spend time in high chairs, small playpens, cars, prams, buggies, rockers, baby carriers and other constraining situations. The expert panel is currently reviewing all evidence to produce a recommendation by March 2010.

Screentime

There is a paucity of research into levels of sedentary behaviour in the preschool children. Most has focused on television, with little consideration as yet to other forms of screen time. In the USA 83% of babies and preschool children watch TV and viewing time averages two hours per day. As many as 26% of children under the age of 2 have a TV in their bedroom and this increases markedly with age.

Numerous studies have demonstrated a link between the amount of TV watched and obesity in childhood. The more TV watched the greater the degree of overweight, and having a TV in the bedroom is a strong marker. The influence of TV viewing in childhood has been reported to track over time and children who watch excessive amounts are more likely to be obese as adults.

The mechanisms by which television influences weight gain are not fully understood but there are a number of possibilities: TV viewing is a very sedentary activity; energy dense food is often eaten mindlessly while watching – one study in the USA showed that one quarter of children's total food intake is consumed while watching TV – and young children are very susceptible to advertising of foods (generally energy dense) on television

Clinical interventions that have decreased TV time are effective treatments, and school based interventions aimed at decreasing TV viewing time have resulted in a decrease in the prevalence of obesity. The direct effect of interventions on preschool obesity is less evident, although interventions have been effective in terms of the amount of time spent engaged in screentime. Because of the strength of this evidence base, the American Academy of Pediatrics has produced clear guidance that babies and children under the age of two years should watch no television and older children should be restricted to less than 2 hours each day.

The Department of Health has set up an expert review group to review the evidence on the impact of 'screen time' on children's outcomes within a UK context – including their physical health and activity levels. The group is considering the case for offering specific guidance to parents in the UK. A web-based consultation is due to begin in December 2009 and the work should be completed in Spring 2010.

Potential actions

- Make parents and carers aware of the potentially harmful effects of excess TV viewing – relating to behaviour, academic performance and language development as well as obesity.
- Pending the publication of guidance for the UK, parents and professionals may find it helpful to know that the American Academy of Pediatrics recommends:
 - No television for babies and children under two years

- <2hours TV viewing per day for children over the age of two years
- Encourage the separation of TV viewing and screentime from meals and eating, and keep children’s bedrooms free of TV
- Provide other experiences as alternatives to screentime.
- While it is understandable that parents may use television to keep children occupied, the place of TV in preschool settings needs careful consideration

16. Ensure children get a good night’s sleep

Background

Sleep, like physical activity and nutrition, plays an important role in the growth, maturation and health of children. Sleep allows the mind and body to rest and be refreshed and brings many benefits. When children do not get adequate amounts of sleep, fatigue, daytime sleepiness, hyperactivity, learning problems and attention difficulties can result.²⁴ Physiological changes also occur; sleep deprivation leads to changes in hormonal levels and rhythms, particularly for the hormones that control growth, development and energy balance.²⁴ Poor sleep patterns not only affect the child, they are a major cause of family stress and parental exhaustion.

There is considerable variation in the amount of sleep different children need and this changes as children get older. Recommendations for how much sleep children of different ages need is shown in the table.²⁴

Age	Recommended amount of sleep
<5 years	≥11 hours
5–10 years	≥10 hours
>10 years	≥9 hours

Rationale for recommending adequate sleep

A clear relationship has been shown linking the amount of sleep children have and their weight gain. Children of all ages who sleep less than the recommended amount are more likely to be overweight or obese. Seventeen studies from across Europe, North America, Asia and Australia demonstrate this and show that the relationship between sleep duration and obesity is particularly clear in childhood although somewhat less for adolescence.^{35–37} Some studies have found that the relationship for boys is stronger than for girls and have hypothesized that

this may have occurred because girls evolutionarily need to be more resilient to sleep deprivation.³⁵

A systematic review of the 17 studies³⁵ has shown that there is a ‘dose response’ so that the less children sleep the greater their chances of obesity. The difference is significant. Children with shorter sleep duration (defined as 10–11 hours for preschoolers) were 58% more likely to be overweight. Those with the shortest amount of sleep (defined as <9 hours for preschoolers) almost doubled (92%) their chances of obesity. When looked at from a different angle, the chances of a child being overweight or obese was



reduced by 9% for every hour increase in sleep that they had.

Many of the studies look at children at one point in time and simply demonstrate that there is a link between sleep and weight. These studies do not allow one to conclude the direction of the link. The question is – do obese children tend to sleep less, or do children who sleep less tend to develop obesity? Studies carried out over periods of time answer this and show that inadequate sleep is an indicator for later obesity. One study in the UK showed that children who had less than 10.5 hours sleep at the age of 3 were more likely to be obese at the age of 7.³⁸ Other studies in the United States showed similar results,^{39, 40} and one study has shown a link between childhood sleep patterns and obesity in adulthood.

Various mechanisms have been suggested for how sleep and weight gain might be linked. Both sleep and appetite control are located in the hypothalamus so a physiological relationship is plausible. Research shows that sleep deprivation leads to alterations in a number of hormone levels, including leptin, ghrelin, insulin, cortisol and growth hormone. These hormones are involved in appetite control, body composition and energy balance, so changes in their levels may well contribute to the development of overweight and obesity.

Interventions that provide supporting evidence

Whatever the mechanisms, the link between sleep in the preschool years and weight gain is clearly present, and is accompanied by evidence that poor sleep patterns in early childhood are linked to the development of later obesity. In order to take this action point forward with confidence, we ideally need research evidence showing that increasing the amount that children sleep leads to a reduction in obesity. Intervention studies of this nature do not exist.³⁶ Nonetheless, the link between lack of sleep and obesity is strong, the additional benefits of sleep are clear and the chance of harm from the recommendation is unlikely, therefore ensuring children get adequate amounts of sleep is an important issue.

Key considerations

Babies who sleep less are likely to be fed more often because they are awake for longer, and those who wake frequently at night are likely to be fed to help them return to sleep. This may reflect differences in hunger and appetite control, rather than simply unhelpful parenting practices. Nonetheless helping parents establish good sleep routines may help reduce excessive energy intake.

Potential actions

- Ensure parents are aware of the importance of adequate sleep and recommended amounts at different ages.
- Help parents establish good sleep patterns in the early months of life
- Increase the provision of sleep clinics where parents can receive guidance on how to manage children with disrupted sleep patterns

PLAY, INACTIVITY AND SLEEP:

Resources and References

Resources

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- *Color Me Healthy* An imaginative pack of teaching resources about physical activity and nutrition resources for use in child care settings. Available through: <http://www.colormehealthy.com>
- *Healthy habits for life* A fun pack of resources utilizing Sesame Street characters designed for use by parents or child care settings. Produced in conjunction with Sesame Street by Nemours Health and Prevention Services. <http://www.sesameworkshop.org/initiatives/health/healthyhabits/>
- 5-2-1- and almost none website to engage parents and children in adopting the message: 5 fruits and vegetables – <2 hours screentime – 1+ hours physical activity – and almost no sweet drinks <http://www.mcchildrensalliance.org/5210/>
- *Taking Steps to Healthy Success. A Child Care Learning Collaborative to Promote Physical Activity and Healthy Eating.* A training kit for childcare providers. Nemours Health and Prevention Services, Delaware, USA. www.GrowUpHealthy.org
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ENHANCING PRACTITIONERS' EFFECTIVENESS

17. Recognising babies and toddlers who are at particular risk of obesity

Background

There is incontrovertible evidence that childhood obesity tracks into adulthood¹ and is linked to adult obesity, cardiovascular disease, diabetes and the other obesity-related problems.^{2, 3} There is evidence too that adults whose obesity started in childhood are at greater risk than those who develop obesity later.³

The chances that a child will develop obesity is clearly determined by their family lifestyle, however there are a variety of other circumstances that affect their risk. These relate to the family's social and ethnic background, the pregnancy and events in infancy.

Family and social circumstances

The risk of developing obesity increases when parents are obese, particularly when both parents are affected.¹ The likelihood of later diabetes and heart disease is also related to family history.³ Ethnic and racial backgrounds are another important factor – for example Asian children in the UK and Hispanic and Black children in the USA⁴ are at significantly higher risk for both obesity and obesity-related health problems. Poverty increases children's likelihood of developing obesity further.³

Pregnancy

Pregnancy is now emerging as a critical period when events and circumstances may alter babies' metabolic programming and increase the likelihood of later obesity. Maternal obesity and rapid weight gain during pregnancy have an influence, particularly if gestational diabetes develops. This leads to babies being born with more body fat,⁵ altered glucose metabolism, higher blood pressure^{5, 6} and being large for gestational age. Smoking during pregnancy also increases a baby's risks.⁷

Birth weight and events in infancy

Size at birth is another factor. Babies who are born large for gestational age have an increased risk for obesity,⁸ with alterations in glucose metabolism already evident in the early months. At the other end of the spectrum babies born small for gestational age are also at increased risk for both obesity and type 2 diabetes, especially when rapid catch up growth occurs.^{9, 10} Prematurity is less clearly a risk factor unless there is rapid weight gain.

The rate of weight gain is an important factor. Obese babies have ten times the risk of later obesity, and babies who gain weight rapidly (even if they are not obese) have 6 times the risk.¹¹ A recent study from Holland showed that babies who gain weight rapidly in the first 3 months were significantly more likely to obese by the time they were 19 years old.¹² This upward centile crossing in weight in infancy and early childhood predicts adult obesity and also type 2 diabetes and heart disease.¹³

The influence of infant feeding has already been discussed. Systematic review has shown that the benefits of breastfeeding increase with duration,



plateauing after 9 months.^{14, 15} This is true too for babies born following gestational diabetes. Breastfeeding for at least 3 months reduces the chances of obesity at the age of 5 years.¹⁶

The circumstances and events that predispose babies to developing obesity at some point in their life course are summarised in the table.

Circumstances that make a baby more likely to develop obesity and its associated health risks

Family and social factors	Pregnancy	Infancy
<ul style="list-style-type: none"> • Parental obesity • Family history of heart disease or diabetes • Poverty • Race and ethnicity 	<ul style="list-style-type: none"> • Maternal obesity • Excess weight gain in pregnancy • Gestational diabetes • Smoking 	<ul style="list-style-type: none"> • Birth weight • Rapid weight gain • Bottle feeding • Early weaning

Rationale for the recommending that babies at high risk are identified early

The Healthy Child Programme¹⁷ is underpinned by the principle of progressive universalism whereby a package of health care is provided universally to all babies, with increasing input according to need. Obesity is a condition, par excellence, that exemplifies the need for this approach. All children are at considerable risk for obesity over their life course and would benefit from health promotion efforts to protect them from excessive weight gain. However, because of the circumstances into which they are born, some children are at greater risk and so require more intense support to ensure that they develop and sustain a healthy lifestyle.

It follows that health professionals and parents need to be aware when children are at greater risk. One way is to recognise when children are overweight from their appearance. However health professionals are singularly poor at doing this, particularly with younger children. In one study only 31% of preschool children were correctly identified as overweight by paediatricians in the United States¹⁸ and in another study from the UK only 55% of paediatricians and nurses correctly identified the weight status of school aged children in swimming costumes.¹⁹ This perhaps should not surprise as research shows that as many as 49% of paediatricians failed to identify that they were overweight themselves.²⁰

It would be helpful to provide health professionals with guidance about acceptable weight gain for babies and younger children. Rather than relying on a cut off for obesity alone, it would be useful to have guidance based on centile crossing (in a similar way to weight faltering and failure to thrive). Given the other factors that determine whether a baby is predisposed to obesity, identification of risk should not depend on weight gain alone. Health professionals and parents also need information about these other factors so that appropriate effort can be invested to ensure that obesity does not develop.

Interventions that provide supporting evidence

The evidence is not yet available that weight monitoring and identification of risks, in themselves, are effective means for reducing obesity. However the principle that prevention is better (and easier) than cure is generally sound.

- EMPOWER a specialist health visiting programme involving home visiting for babies who are at high risk (because their mothers were extremely obese prior to pregnancy) has been developed and piloted. It is currently undergoing a phase 2 randomised controlled trial.²¹
- MYOC The Maine Overweight Youth Collaborative is an initiative that aimed to improve clinical decision support and weight counseling in pediatric primary care settings in Maine, USA. Tracking of BMI centiles with identification of overweight children were part of the intervention. The rate of identification of obese children dramatically increased along with parental satisfaction with providers' behaviour and rates of counseling. The providers also reported improvements in knowledge, attitudes, self-efficacy, and practice.²²

Key considerations

Some caution is required when considering if formal monitoring or screening for obesity in the early years is helpful because of the potential for harm. Promotion of healthy lifestyle must not become another cause of worry and guilt in already pressurised parents.

Because of the sensitivity of the subject and the potential for harm, due emphasis must be placed on how information is given to parents. Training on how to counsel parents is essential to ensure that the process is beneficial and harm is minimised.

Potential actions

- Develop guidance for practitioners regarding the recognition of obesity risk and factors such as:
 - Unhealthy weight gain
 - Family background
 - Pregnancy
 - Infant feeding choice
- Train practitioners to more accurately identify overweight and obesity clinically
- Train practitioners about how to counsel parents when they have identified babies and young children at risk
- Consider investigating the value of introducing a screening programme during the preschool years

18. Provide training on how to help parents make lifestyle changes

Background

The first section of this report offers practical messages that have the potential to reduce babies', toddlers' and preschool children's chances of becoming obese later in life. The challenge is transmitting and translating these suggestions into practice. Professionals working in primary care and the community have a definite role. However a number of reports show that they lack confidence and skills when counselling parents around lifestyle change.^{23–25} Studies also show that parents are commonly dissatisfied with the help they receive when seeking advice about their children's obesity.²⁵

In 2006 a document was produced for the Royal College of Paediatrics and Child Health on parents' and health visitors' views about preschool obesity.²⁶ Parents reported that they were often made to feel guilty for their children's weight when they sought help in primary care for their obese preschool or were dismissed as being unnecessarily anxious. The document went on to highlight health visitors' discomfort about raising the issue when babies gain weight rapidly particularly when mothers are obese themselves. Health visitors also reported that they lacked the training, skills and time to work with parents on the problem.

Lack of confidence and skills

The lack of confidence appears to be widespread and is accompanied by a sense of low self efficacy. In the UK a survey of 137 Children's Centre staff embarking on HENRY



training revealed markedly low confidence scores (average 4.1 on a scale of 10) when working on issues related to obesity prevention.²⁷ An earlier survey of community paediatricians in Leeds showed that 17 of 18 surveyed felt they were ineffective in managing obesity and perhaps not surprisingly that they found the work unrewarding.²⁸

More substantial research has been carried out in the United States. A survey of 939 paediatricians, paediatric nurses and dietitians found that many perceived themselves as lacking proficiency in behavioural management, giving guidance around parenting and addressing family conflicts.²⁹ In other studies involving primary care paediatricians 80% felt 'very frustrated' treating child obesity³⁰ and less than 15% reported high self efficacy.³¹

Other barriers to counselling parents

Professionals have considerable awareness of the difficulties of helping parents around lifestyle change. Alongside their lack of skills they identify a number of other barriers to incorporating obesity and lifestyle management into their daily work.^{29, 31–33} These are of a practical nature and also relate to perceptions of patient or client interest and motivation. They include:

- Lack of time
- Lack of availability of dietetic colleagues
- Lack of materials
- Lack of funds.
- Literacy problems
- Language and cultural barriers
- A perceived lack of motivation by parents
- A view from primary care physicians that prevention and treatment of obesity is not part of their role

Practitioners' own weight

Interestingly professionals' own weight may influence their ability to work effectively with parents. In a study from North Carolina, paediatricians' body mass index was compared with the difficulty they reported in counselling parents about obesity. Those who were overweight or obese were 4 times more likely to report discomfort or difficulties in counselling than those of average weight, and those who were thin were 6 times more likely.²⁰

Facilitators to tackling obesity

Encouragingly research also provides some optimism regarding professional attitudes. The survey described earlier of 939 paediatricians, nurses and dietitians in the USA showed a high expression of interest in undergoing additional training into the management of obesity, especially in the area of behavioural management strategies and parenting techniques. The interest was particularly high among experienced professionals who had been practicing for more than ten years.^{29, 30}

This study also resonates with the survey of paediatricians in North Carolina where, despite the reported lack of self efficacy, 90% still expressed that they felt they had a role to play in obesity management.³¹ This positive attitude goes beyond paediatricians – in another study in Illinois, child care directors and parents expressed their belief that health promotion activities in childcare centres would improve the knowledge and behaviour of preschool children.³² Of course caution is required before assuming that these findings apply to the UK.

Rationale for addressing training needs

The combination of a lack of self efficacy by professionals and families' discontent with the help they receive in primary care points to the need for new, more effective approaches to training health and community professionals. A number of studies suggest that the traditional 'expert' model that doctors and dietitians have traditionally used to treat childhood obesity is not helpful.^{30, 34} The awareness that nutritional counselling alone is unlikely to be helpful is also well

acknowledged. For example, health care professionals working in WIC (the national nutrition program for Women Infants and Children in the USA) clearly recognised the limitations of dietary advice and in a qualitative study described that they felt a more coherent patient-centred approach was required.²³

Considerable effort has been devoted in recent years to developing approaches that are likely to be more effective. These to a large extent have been informed by methods that have proved helpful for other complex behavioural and health problems. The Family Partnership Model³⁵ and Motivational Interviewing³⁰ are two such approaches. The Family Partnership Model was originally developed as a means for training professionals working with parents of disabled children. Through a step-by-step process professionals are trained over the course of 5 days to build a solid relationship with parents, explore their issues and help them to develop their own achievable strategies. Motivational Interviewing is another patient-centred method of counselling that helps clients explore their level of motivation and encourages them to understand and resolve any ambivalence to change.

Both these approaches are underpinned by respect for the client and an acknowledgement that what is required is *guiding* the client, while suppressing the professional instinct to direct. The tone adopted for both is non-judgemental, empathetic and encouraging. Both have been successfully evaluated in circumstances other than obesity.

These approaches have now been incorporated into training programmes to help professionals work more effectively with parents of preschool children around lifestyle issues. Although it is too early to know whether they have an impact on reducing children's risks of later obesity, both have found high satisfaction from professionals and parents, and are preferred over a more traditional directive educational style.^{21, 36}

Interventions that provide supporting evidence

- EMPOWER (Empowering Mothers to Prevent Obesity at Weaning) is underpinned by the Family Partnership Model. It is a 16 month home intervention programme for babies at high risk of obesity due to their mothers' obesity (BMI >35 pre-pregnancy). It is delivered by Specialist Health Visitors who have received 5 days Family Partnership training³⁵ and 2 days HENRY core training.³⁷ The pilot in Leeds demonstrated that mothers found the visits were helpful and were very satisfied with the support they received.²¹ EMPOWER is now undergoing a feasibility trial (RCT) in Leeds and Birmingham.
- Healthy Lifestyles^{30, 36} is an intervention developed in partnership with the USA Centers for Disease Control and Prevention, the American Academy of Pediatrics and the American Diabetes Association. Paediatricians and dietitians participated in 2-day workshops in Motivational Interviewing and offered parents of preschool children guidance of varying intensity in the primary care setting. A feasibility trial (RCT) showed encouraging results in terms of reduced weight gain. Parents reported that they found the input helpful and professionals' self evaluation scores were good, particularly for those delivering the more intensive programme. A full RCT is underway.
- HENRY – Health Exercise Nutrition for the Really Young – is a training programme funded by the Department of Health and the Department for Children Schools and Families.³⁷ The HENRY approach is based on the Family Partnership Model,³⁵ combined with solution focused working and reflective practice. A pilot with 137 health and community practitioners from 12 Sure Start Children's Centres in Oxfordshire indicated a significant increase in practitioners' confidence scores, high satisfaction with the training, long term changes in the Centres and healthy lifestyle change in the professionals.²⁷
- HENRY e-learning course³⁸. HENRY has also produced an e-learning course that has been piloted on 535 community and health professionals from 115 Children's centres. While it aimed to provide professionals with up to date information about the complexities of lifestyle change, 94% of learners reported that they thought the course had enhanced their skills too. This finding clearly needs to be explored more fully.³⁹

Key considerations

Experience as well as common sense indicates that the skills required to enhance motivation can only be acquired through face-to-face training where participants have the opportunity to practice skills. This form of training and the level of skill required to be effective demand allocation of adequate time for professional development. The motivational training needs to be combined with a focus on lifestyle change and accompanied by materials and resources to support professionals' work with parents.

Given the inevitable barrier of time it is important that other paradigms for achieving behaviour change are also explored. Examples might involve group work with parents or triggered alerts when growth measurements are entered into child health surveillance systems.

Potential actions

- Ensure that adequate training opportunities in approaches such as HENRY or motivational interviewing are available to health and community professionals. Any training process needs to address professionals' personal issues around self efficacy, overweight and lifestyle.
- Develop workshops for lead/champion health visitors and dietitians who can influence colleagues and encourage a move away from the 'medical model' of health care
- Explore other paradigms of health care such as group work (which requires a high degree of training to be effective)

19. Encourage practitioners to model healthy lifestyles themselves

Reports from the Department of Health show that a large proportion of the NHS work force is obese. While there is no evidence that obese professionals are less effective at lifestyle counseling, there is evidence that obesity affects their sense of self efficacy. Adopting a healthier lifestyle, whatever their weight, would increase professionals' sensitivity to the challenge of making lifestyle changes and make their advice more convincing. This carries the added benefit of enhancing the personal lives of the workforce, many of whom have young children themselves.

One small trial (FitWIC) in the United States included 'staff wellness' as part of the intervention.⁴⁰ Staff reported changes in their personal lives and an increase in self efficacy when counseling parents about lifestyle. It goes without saying that modeling healthful behaviours is especially important for practitioners working directly with young children, who are always quick to copy their carers' lifestyle habits.

It is encouraging that evaluation of HENRY training showed that apart from an increase in knowledge and skills, many practitioners reported that they had also made lifestyle changes in their personal lives.²⁷ Exploration is needed as to whether this made them more effective at helping their clients.

Potential actions

- Emphasise the importance of modeling healthy behaviours when working with parents
- Ensure that policies are in place regarding professionals' lifestyle behaviour when working directly with young children

ENHANCING PRACTITIONERS' EFFECTIVENESS: Resources and References

Resources

- The HENRY handbook and toolkit of resources for professionals when working with parents around lifestyle change
- The HENRY e-learning course which offers on-line training for health and community practitioners in an interactive way. It can be accessed at: www.ukvirtual-college.co.uk

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SUMMARY OF THE EVIDENCE BASE UNDERPINNING THE THEMES

Themes for action	Epidemiological or experimental evidence	Practical evidence from interventions
PARENTING		
1. Encourage parents and carers to model a healthy lifestyle	An association between parents' lifestyle and their children's has been demonstrated	An RCT of PATCH, an intervention directed at parents of obese children showed parental lifestyle change was a key component for successful obesity management
2. Help parents enhance their parenting skills and develop an authoritative approach towards their children's lifestyles	An association between parenting styles and children's obesity has been demonstrated	Two RCTs that focus on promoting authoritative parenting (PATCH and Triple P) were effective in both lifestyle change and reduction of obesity
3. Encourage parents and carers to take a whole family approach		The Cochrane systematic review for treatment of obese children concluded that interventions taking a family approach were more effective than those primarily targeting the obese child
EATING & FEEDING BEHAVIOUR		
4. Encourage responsive feeding	The association between the development of obesity in childhood and authoritarian, indulgent or neglectful feeding styles in infancy has been demonstrated	A small RCT of an intervention with a focus on responsive feeding shows some promising results. Others are being developed
5. Encourage positive family mealtimes	The association between family meals and healthy weight, diet, success at reducing weight and long term healthy eating habits is reported	Family meals are a component of some effective RCTs e.g. Triple P and PATCH
6. Find alternatives to food for comfort and to encourage good behaviour	There is good experimental evidence that using food for rewards changes children's attitudes to food	
NUTRITION		
7. Encourage exclusive breast feeding for 6 months	Meta-analysis shows an association between breastfeeding and healthy weight through to adolescence and beyond. There is a 'dose response' with protection from obesity increasing with duration and exclusive breastfeeding.	There are no breastfeeding interventions that specifically focus on obesity as an outcome
8. Introduce solid foods at 6 months	An association between early introduction of solids and later obesity has been demonstrated	No interventions have specifically focused on timing of weaning as a means to prevent obesity. A few interventions under development (e.g. EMPOWER) include it as a component

9. Ensure portion sizes are appropriate	Epidemiological evidence from older children and adults that portion sizes have increased over time in parallel to the rise in obesity	
10. Increase acceptance of healthy foods – including fruits and vegetables.	Educational and social marketing tactics have been shown to positively influence food preferences	A small RCT has shown it is possible to influence young children's food preferences (but did not attempt to measure effect on obesity)
11. Reduce availability and accessibility of energy dense foods in the home	Consumption of energy dense foods by preschoolers has increased since the 1970s. Those who eat more energy dense diets are more likely to develop obesity	One RCT (PATCH) focused on foods in the home and found more successful weight reduction when healthy changes in the larder were made
12. Reduce consumption of sweet drinks and increase the consumption of water	There is an association between excess consumption of sweet drinks and childhood obesity, adult obesity, diabetes, heart disease and osteoporosis	School based RCTs have been effective at reducing sweet drink consumption. Some have had an effect on weight too

PLAY, INACTIVITY AND SLEEP

13. Encourage active play	Young children differ in the form that physical activity takes. Play brings many benefits to physical, mental and social development. Epidemiological evidence shows that children are more active outdoors	Most interventions have focused on curriculum development in day care with some impact on obesity. No preschool interventions have had a specific focus on outdoor play
14. Create safer play-space at home	Studies show that preschool children are very sedentary. There is no evidence exploring this in relationship to appropriate play space.	No interventions have focused specifically on play space at home
15. Reduce sedentary behaviour and screen time	The evidence is currently under review by an expert panel. Numerous studies show an association between TV viewing and obesity although it is unclear whether this is due to sedentary aspects of behavior or other factors.	TV focused interventions in school and clinical trials have been effective in reducing obesity. In preschool children watching time was reduced without a demonstrable effect on obesity.
16. Ensure children get a good night's sleep	There is a strong association between duration of sleep in early childhood and obesity.	No research has been carried out

PRACTITIONERS' EFFECTIVENESS

17. Recognise babies and toddlers at particular risk of obesity	Longitudinal studies of high quality show an association between obesity in childhood and genetic, familial, gestational and environmental factors.	An intervention is under development in the UK to see if home visiting can reduce the risk of obesity for at risk babies.
18: Provide training on how to help parents make lifestyle changes	Qualitative research indicates that traditional approaches are unhelpful and that professionals lack confidence and self efficacy	An RCT of motivational interviewing and evaluation of HENRY indicate that these two approaches are promising
19. Encourage practitioners to model healthy lifestyles themselves	Surveys show that professionals' self efficacy is influenced by their weight status.	A small RCT in the USA showed clients awareness of staff engaging in healthy behaviour.

GAPS IN THE EVIDENCE

While there is rich experimental evidence relating to the development of early lifestyle behaviour in childhood and obesity, there are a paucity of well evaluated interventions for children aged 0 to 5 years, especially babies and toddlers.

The following gaps in the evidence base are worthy of note:

Parenting

- More research is needed on the effect of parenting interventions as a preventive strategy for obesity at any age
- Most research explores the mother's role in influencing children's lifestyles. More research is needed on the role and influence of fathers.

Eating behaviour

- There is a need for trials of 'real world' interventions aimed at helping parents learn the skills of responsive feeding

Play and sleep

- The relationship between sleep and obesity is based on cross-sectional and cohort studies. Trials of interventions to help young children attain adequate amounts of sleep and their effect on weight gain are urgently needed.
- RCTs of intervention to promote physical activity in preschool children are confined to structured physical activity in preschool settings. Trials of interventions promoting unstructured outdoor play are much needed

Settings

- There are few RCTs of interventions to prevent or reverse obesity in day care settings and these are small. Adequately powered trials are needed
- Most interventions to prevent obesity in preschool children take place in daycare settings. Interventions in the home are needed too

Health professionals

- Large-scale trials evaluating the effect of motivational enhancing approaches are needed
- A clinical tool to help professionals and parents identify babies at risk needs development and evaluation.

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