A mixed methods study of the early development of childhood overweight and obesity: Understanding the process of infant feeding

A mixed methods study of the early development of childhood overweight and obesity: understanding the process of infant feeding

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy by Catherine Anne Perry

March 2013

Acknowledgements

There are many people who I need to thank for their help in the undertaking and completion of this thesis.

First, I would like to say a very special thank you to my supervisor Miranda Thurston. I really would not have finished this thesis without her help, advice, and constant encouragement. Peter Bundred was also always very encouraging.

For phase one of the study, I am very grateful to Ian Hart (Western Cheshire Primary Care Trust), who retrieved the data that I requested from the Child Health System, and also to Colin Sinclair (University of Chester), who put all of the data into Excel for me. I would also particularly like to thank Barbara Arch, statistician, for her invaluable help and advice.

For phase two of the study, I am very grateful to Corina Casey-Hardman (Head of Midwifery and Supervisor of Midwives, NHS Halton & St Helens), Karen Worthington (Head and Professional Lead for Health Visiting, NHS Halton & St Helens), Julie McIntosh (Midwifery Community Co-ordinator, NHS Halton & St Helens), and Tracy McCann (Runcorn Midwifery Team Leader, NHS Halton & St Helens) who all helped me to gain access to the antenatal clinics and parentcraft classes in order to recruit the mothers for my study. Christine Pye and Alison Tomlinson, and colleagues on reception, were particularly helpful in directing potential participants to me.

I would especially like to extend my heartfelt thanks to the women who agreed to participate in this study. They were all so generous with their time at such a busy and important period of their lives. It was a pleasure to meet them all, and, of course, their babies.

Colleagues from the Centre for Public Health Research, University of Chester, were very supportive, particularly Simon Alford, Jess Hitchcock, Deanna Hughes and Katie Powell.

Finally I must thank the family and friends who have supported me in various ways over the last few years – Wendy, Rhian, Mum, Jean, Gillian, Paul, Lyndsay, Faith, Alex and Leo.

Table of contents

List of figures

List of tables

Abstract

Introduction: Prevalence of overweight and obesity has increased in adult and child populations during the last two to three decades in both developed and developing countries. Childhood obesity is common in the United Kingdom and has become a major public health issue. There is a growing body of evidence to suggest that the development of overweight and obesity in children has its roots in early life, with evidence of increasing weight over time in pre-school children.

Overall study design and methods: The study explored the early development of overweight in infants in Halton, an area of Northwest England. It was a mixed methods study comprising a quantitative analysis of routinely collected infant weight data and a longitudinal qualitative study of the process of weaning.

Phase one - patterns of weight in Halton infants: The retrospective quantitative study utilised birthweight, and weight and length/height at eight weeks, eight months and 40 months of age from Halton infants born between 1994 and 2006 (16,328 singleton births). Analysis of these data provided further evidence of the early development of overweight, and highlighted patterns of infant overweight at eight months of age not previously reported.

Phase two - longitudinal qualitative study of the process of weaning: Given the findings of phase one, factors that may influence early weight gain were considered. Therefore, the second phase focussed upon weaning, which has been little researched in terms of the way in which mothers manage the process. The aim was to explore weaning as a social process, focussing on the experience, knowledge, perceptions and actions of mothers as they weaned, in order to consider whether this could shed light on infant growth and development in general and the early development of overweight in particular. A grounded theory approach was utilised. Twenty one women were recruited and interviewed antenatally and then up to three times after their babies were born. A total of 67 interviews took place.

A grounded theory, or 'plausible account', of the weaning process was developed. The centrality of the baby, and the way in which mothers talk about following the lead of the baby as they wean was highlighted, along with the ways in which this focus may falter or shift because of the complexity of influences on mothers' lives. The primacy of embodied knowledge, that is the knowledge that mothers built up through the experience of feeding and weaning their infant, and the significance of being a mother in terms of being an 'authority' on feeding and weaning, were evident. In addition, the limitations of providing information, such as the feeding and weaning guidelines, without taking account of the individual mother, infant and their context was indicated. This is how some mistrust of the advice of health professionals, and possibly other 'health messages' emerged, as mothers did not see the advice as appropriate to them, their infant, or circumstances. Mothers did recognise babies as 'bigger' or 'smaller', but through valuing weight and weight gain were particularly aware of having small babies, which may have limited their capacity for recognising the significance of early signs of overweight in their infants.

Final conclusions: Using mixed methods in this study allowed a broad picture of patterns of weight and overweight in Halton infants, and what some of the contributory factors to those patterns might be, to emerge, than if a single research method had been used. A number of implications for policy and practice: at an individual level in terms of the way in which women are supported to feed and wean their babies; and at a population level in terms of the monitoring of weight, were identified.

Chapter 1
Introduction

1.1 Background to the study

The prevalence of overweight and obesity has increased in adult and child populations throughout the world during the last two to three decades, in both developed and developing countries: obesity prevention has become an international public health priority (Lobstein, Baur, & Uauy, 2004; Lobstein, 2010; Rokholm, Baker, & Sørensen, 2010; Popkin, Conde, Hou, & Monteiro, 2006). It has been predicted that by 2050 60% of men and 50% of women in the United Kingdom (UK) will be obese (McPherson, Marsh, & Brown, 2007), and obesity has been described as "the latest epidemic" (Mitchell, McDougall, & Crum, 2007, p.153). Although there have been difficulties reaching consensus over a definition of overweight and obesity in children and measurement inconsistencies make it difficult to produce an overview of the prevalence of obesity in this group (Bundred, Kitchiner, & Buchan, 2001; Cole, Bellizzi, Flegal, & Dietz, 2000; McCarthy, Ellis, & Cole, 2003), there is evidence that there has been a rapid increase in the number of children affected in many regions of the world (Lobstein, 2010). Childhood obesity is now common in the UK, and has been identified as a serious public health issue (Balakrishnan, Webster, & Sinclair, 2008; Chinn & Rona, 2001; Reilly, Wilson, Summerbell, & Wilson, 2002).

Children's health is adversely affected by being overweight in a variety of ways, in both the short and longer term (Kopelman, 2007; Maziak, Ward, & Stockton, 2007). Overweight children are more likely than normal weight children to experience both physical and psychological poor health (Dietz, 1988). From a physical point of view, obesity has been associated with orthopaedic abnormalities, idiopathic intracranial hypertension, asthma, sleep apnoea, gallstones, insulin resistance and hyperandrogenemia (Must & Strauss, 1999). In a review of published studies investigating the association between overweight, obesity and poor health, Reilly et al. (2003) reported that the most likely impact of obesity in childhood, in the short term, was psychological morbidity, and Williams, Wake, Hesketh, Maher and Waters (2005) reported lower health-related quality of life scores in overweight and obese young people compared to those of normal weight. There is evidence that obesity present in childhood or adolescence increases the likelihood of adult morbidity and mortality from conditions such as asthma, diabetes and other

metabolic disorders, and cardiovascular diseases (Dietz, 1998; Reilly, 2007; Reilly et al., 2003). Overweight children are therefore at risk of various chronic conditions in later life, a risk that may exist independently of obesity in adult life (Raman, 2002). The extent to which adult obesity is "entrained" by events in early life is unknown (Barker, 1988, p.58), although obese children often become obese adults (Brisbois, Farmer, & McCargar, 2011; Eriksson, Forsén, Osmond, & Barker, 2003; Raman, 2002; Reilly et al., 2003). Thus, the emergence of overweight and obesity in childhood is important to understand, from the perspective of both individual and population health.

At their simplest, overweight and obesity are energy balance disorders caused by an excess of energy intake over energy requirement, leading to the accumulation of fat tissue (Maziak et al., 2007; Reilly, Ness, & Sherriff, 2007). Therefore, obesity is the result of increased energy intake, decreased energy expenditure, or a combination of these two factors (Reilly et al., 2007). In reality, the situation is much more complex than this suggests (Maziak et al., 2007; Reilly et al., 2007). Although energy imbalance may be the cause of obesity at an individual level, Canoy and Buchan (2007) have argued that the widespread nature of the obesity epidemic across geographical, ethnic, age and sex groups suggests that there must be pervasive environmental and/or behavioural changes underlying it. Much research into risk factors for childhood overweight has been limited to examining simple or bivariate relationships (Davison & Birch, 2001), for example television viewing or the consumption of fizzy drinks and overweight, but current thinking seems to indicate that overweight will develop from the interplay of numerous factors (Butland et al., 2007; Gable & Lutz, 2000). Ecological models, that represent multilevel influences on human behaviour, have become well established in public health (McLeroy, Bibeau, Steckler, & Glanz, (1988). These models conceptualise human development in terms of an interactive contextual perspective, in which change in characteristics, or development, are explained and understood in relation to the context, or what Davison and Birch (2001, p.160) refer to as the "ecological niche". Such models have been developed for child weight gain, situating it within the context of the child, her/his family and community, social policies and national legislation (Davison & Birch, 2001; Gable & Lutz, 2000; Hawkins, Cole, Law, & the Millennium Cohort Study Child Health Group, 2009; Sherburne Hawkins & Law, 2006). This is illustrated by Davison and Birch's (2001) ecological model developed for childhood weight shown in Figure 1.1.1.

Figure 1.1.1 The ecological model of childhood weight and overweight

(Source: Davison & Birch, 2001, p.161)

A criticism of such ecological models is that, although they combine multilevel influences on the development of an outcome such as weight status, they do not address how the different levels influence each other and whether such interactions make a difference in overall outcomes (Nader, et al., 2012). In a systems approach, a further step is taken in that there is a focus on the interconnections between different aspects of the environment and between individuals and the environment (Nader et al., 2012). Butland et al. (2007) used a systems mapping approach in order to illuminate the complexity and interrelationships involved in the development of overweight and obesity. Using advice from experts in a range of disciplines they developed an obesity system map, thus producing what they claim to be "the most comprehensive 'whole systems' view of the determinants of energy balance that exists" (Butland et al., 2007, p.7). Within this system there are seven key subsystems or themes: physiology; individual activity; physical activity environment; food consumption; food production; individual psychology; and social psychology. These are linked together, indicating that energy balance or imbalance is underpinned by a complex and dynamic multi-factorial set of determinants. The system map is so complex that there has been speculation that it may provoke

despair and lack of action, but it has also been claimed that it has helped in the development of a better understanding of the complexity of addressing the issue of overweight and obesity (Finegood, Merth, & Rutter, 2010).

For the purpose of this study, the development of overweight and obesity in children was conceptualised within this 'whole systems' approach, in that interconnections between influences were kept to the fore. In children, a wide range of factors and influences have been suggested as shaping the relatively recent increase in overweight and obesity (see Figure 1.1.1). These include factors related to dietary intake such as increases in the availability and marketing of foods and changes in the consumption of fast foods and foods prepared away from home; factors related to physical activity such as reductions in walking and cycling (sometimes linked to concerns about safety in public places and roads) and reductions in physical activity at school; and increases in sedentary pursuits such as television viewing and computer games (Crawford, 2002; Davison & Birch, 2001; Lobstein et al., 2004). However, there is a growing body of evidence to suggest that the development of overweight and obesity in children could have its roots in early life, with evidence of increasing weight over time in children under school age (Barlow et al., 2010; Bundred et al., 2001; Gardner, Hosking, Metcalf, Jeffery, Voss, & Wilkin, 2009; Reilly, Dorosty, & Emmett, 1999; Stenhouse, Wright, Hattersley, & Millward, 2004; Stettler, Zemel, Kumanyika, & Stallings, 2002). Thus becoming overweight is an aspect of development that may occur before many of the factors mentioned above exert much influence. Therefore, this study was designed to explore the issue of the possible early development of overweight in infants. It was a mixed methods study, combining quantitative and qualitative methodologies: a quantitative analysis of routinely collected infant weight data; and a longitudinal qualitative study of the process of weaning. The rationale, aim and objectives, and brief explanation of each of these phases of the study, are given below.

1.2 Phase one – patterns of weight in Halton children

There are a small number of studies that have explored early postnatal trends in overweight, although few involve large data sets over a sufficient duration to explore trends over time. One exception to this is the work carried out by Bundred et al. (2001) who studied 35, 662 Wirral infants and 28,768 Wirral children over the decade to 1998, concluding that overweight was increasing over time in pre-school children and that the excessive weight gain occurred early, between the ages of three months and four years. Therefore, the first phase of this study sought to

explore patterns of weight and overweight in very young infants in Halton, an area of Northwest England, in an effort to establish if there was evidence of the early development of overweight. In part, the impetus for this was concern that had been expressed by Halton Primary Care Trust (PCT) (as was) staff regarding overweight in local children, and their perception that overweight was developing in some children at a very young age. Halton was an area of relative socioeconomic deprivation, and as the risk of overweight is generally higher in children from lower socioeconomic groups, focussing on an area of deprivation may better help to understand the processes that might be underpinning the phenomenon. Use was made of routinely collected infant weight data. Although such data have their limitations, such as missing data and an inability to control data quality (Armstrong, Dorosty, Reilly, Child Health Information Team, & Emmett, 2003), they can, nevertheless, be useful in establishing patterns at a population level.

Weight monitoring and the assessment of growth has become a central feature of infant and child surveillance in the UK (Sachs, Sharp, Bedford, & Wright, 2011). In Halton, birthweight, along with weight and length/height at eight weeks, eight months and 40 months of age, were recorded on the Child Health System maintained at Western Cheshire PCT for all births between 1994 and 2006. Birthweight data were obtained from birth notifications; subsequent measurements were carried out by health visitors during routine health surveillance and returned to the Child Health System manager for entry onto the database. These data were, therefore, a large resource that could be used to investigate patterns of weight in early life. The aim of the first phase of the study was to establish if there was any evidence in these routinely collected data of overweight and obesity in young children in Halton. The objectives were to:

- determine trends in birthweight in Halton between 1994 and 2006;
- determine trends in weight at 8 weeks and 8 months in Halton between 1994 and 2006;
- determine trends in BMI at 40 months (pre-school) in Halton between 1994 and 2006;
- explore any differences in the above trends between males and females;
- explore whether there was any evidence of larger infants becoming larger pre-school children.

As this thesis will demonstrate, the preliminary analysis of the dataset provided evidence of the early development of overweight in Halton infants and children between 1994 and 2006. Although, as mentioned, there is published evidence of the development of overweight in children before school age (Armstrong et al., 2003; Barlow et al., 2010; Bundred et al., 2001; Gardner et al., 2009; Reilly, Dorosty, & Emmett, 1999; Stenhouse et al., 2004; Stettler et al., 2002), the Halton dataset provided evidence of overweight much earlier, by eight months of age. In the development of the obesity system map, Butland et al. (2007) discussed the life course approach. A life course approach considers the long term effects on disease risk, in this case overweight and obesity, of physical and social exposures during gestation, childhood, adolescence, young adulthood and later adult life (Ben-Shlomo & Kuh, 2002). Butland et al. (2007) suggested that there were a number of points during an individual's life where there may be opportunities to influence the development of overweight, including during the first two years. The importance of identifying and understanding very early influences on overweight and obesity has been emphasised (Bonuck, Huang, & Fletcher, 2010; Saunders, 2007). There has been a focus in recent research on growth in early life (Baird et al., 2005; Monasta et al., 2010; Monteiro & Victora, 2005; Stettler et al., 2002), and on infant milk feeding (Gillman et al., 2001; Arenz, Rückerl, Koletzko, & von Kries, 2004; Harder, Bergmann, Kallischnigg, & Plagemann, 2005; Owen, Martin, Whincup, Davey Smith, & Cook, 2005). However, by the age of eight months, the majority of mothers will have commenced weaning (Bolling, Grant, Hamlyn, & Thornton, 2007; Hamlyn, Brooker, Oleinikova, & Wands, 2002; Hetzner, Razza, Malone, & Brooks-Gunn, 2009; Synnott et al., 2007; Tarrant, Younger, Sheridan- Pereira, White, & Kearney, 2010; Wright, Parkinson, & Drewett, 2004), that is, they will have introduced food other than milk into the diet of their infant.

1.3 Phase two – longitudinal qualitative study of the process of weaning

In keeping with the life course perspective, the second phase of the study sought to develop a better understanding of weaning from the perspective of mothers as they negotiated this transition, in order to explore whether this could shed any light on patterns of weight in infancy. Weaning is a major change in diet (Morgan, Lucas, & Fewtrell, 2004), representing a period of adjustment, and helping to lay the foundation for future eating patterns (Savage, Orlet Fisher, & Birch, 2007). Thus, weaning may play a role in the development of infant and childhood overweight. Despite the magnitude of the change weaning entails, there has been relatively little research focussed on this transition (ESPGHAN Committee on Nutrition, 2008:

Morgan et al., 2004; Robinson et al, 2007). Of research that has been carried out into weaning, much has occurred in countries where food is scarce or families are living in extreme poverty and have little access to food that might be available (Rapley, 2006). In developed countries the majority of weaning research has focussed on individual factors associated with weaning, such as the age at weaning or the nutritional adequacy of weaning diets.

The departure point for this study was to conceptualise weaning as a social process that develops over time, involving many actions that are interwoven into the social dynamics of family life as well as being connected to the wider social context. It aimed to understand mothers' experiences of weaning in the context of their everyday lives, bringing to the fore the interactions between babies and their mothers, as well as in relation to women's wider social context in terms of networks of friends, relations, colleagues, health professionals and the wider environment. In addition, as the study was exploring how the process of weaning may help to explain patterns of weight in infants and young children, how mothers thought about the weight of their infants and made judgements about their growth and development was also central.

In keeping with viewing infant feeding as a process, the current study was longitudinal, focussing not just on the *introduction* of complementary foods as many studies have, but engaging with women during the antenatal period and following them as they weaned their infants. In their research exploring the infant milk feeding decision-making processes in the first six weeks after birth, Sheehan, Schmied, and Barclay (2010) state that the mechanisms by which infant feeding decisions are made remain unexplored. The current study was designed to help to fill this gap, and to take the exploration further by looking at infant feeding over the first nine months, approximately, of life. Of research that has been carried out into weaning, much has been retrospective, that is parents have been asked about their practices and experience after the event (Arden, 2010). There is evidence that knowledge of the outcomes of a decision may affect the memory of factors leading up to and affecting that decision (Pieters, Baumgartner, & Bagozzi, 2006). Therefore, studying mothers prospectively through the process of weaning and exploring weaning choices as they unfolded in the field had the potential to give a clearer and more valid picture of how they manage this transition (Arden, 2010).

The longitudinal nature of the study also made it possible to explore whether mothers' antenatal views regarding how they would wean their infant related to how weaning was actually approached and managed. It has previously been documented that the thoughts women have during the antenatal period in respect of milk feeding are frequently followed through: antenatal breastfeeding intention and postnatal behaviour are highly correlated (Chambers & McInnes, 2006). In a study carried out in Ireland, Tarrant et al. (2010) found that mothers' antenatal reporting of when they thought a baby should be weaned was significantly associated with when they actually weaned their baby, the authors stating that few studies have examined this antenatal/postnatal relationship. The current study aimed to take this further, looking at the practice of weaning not only the timing, in order to try to explore ideas such as whether antenatal education about healthy weaning may have any influence on women's practices, which may in turn affect patterns of weight in infants.

The focus on mothers was chosen as, generally, it is mothers who decide when, what and how to feed their infant (Savage et al., 2007; White, 2009). It has been argued that in order to promote infant health, which includes appropriate weight gain, understanding what leads mothers to commence weaning and the reasons that women give for deciding when and how to wean their baby are crucial (Arden, 2010). Generally it is agreed that how mothers wean their babies warrants further exploration (Arden, 2010; Hetzner et al., 2009; Scientific Advisory Committee on Nutrition [SACN], 2008), which this study sought to do.

In this second phase of the study a grounded theory approach was utilised. As will be described and explained in Chapter 4, this is an approach well suited to exploratory research where little is known about a phenomenon, particularly where the interest lies in studying human interaction, and where the aim is to explore practical activity and routine situations from the participants' point of view (Carter & Little, 2007; Charmaz, 2006; Denscombe, 2010; Dykes, 2004; Holloway & Wheeler, 2002). The aim of grounded theory is to generate a theory or theories to explain what is central in the data generated (Bryman, 2008; Robson, 2011), rather than to test any pre-existing theories. However, this study was underpinned by a number of sensitising concepts from the literature (Charmaz, 2006), that is existing literature was used to direct and shape the nature of the investigation, although not to limit it. These ideas will be explored below. They are drawn from different disciplines and in some places are overlapping, but they are complementary to each other, and were

selected because of their potential to illuminate the way in which mothers go about the process of weaning their infant. It should be noted too that they were used within the framework of the 'whole systems' approach to weight status outlined above.

First, just as many studies of infant milk feeding decisions have been accused of being rather "one-dimensional" (Sheehan et al., 2010, p.372), with the milk feeding decision conceptualised as rational and a matter of individual choice, a similar criticism could be levelled at weaning research. Arguably, many commentators assume that decisions about weaning are made logically and rationally, and once made are adhered to. In reality, a more adequate way of conceptualising infant milk feeding is as a managed and negotiated process that is complex and multifaceted (Sheehan et al., 2010), and context and experience may be more important than theoretical knowledge (Hoddinott, Craig, Britten, & McInnes, 2012). Empirical work has suggested that weaning choice too is dependent on a complex interaction of social and psychological factors (Murphy, 2003). Therefore, in this study, the way in which mothers experience and explain the weaning process, and the way in which their changing circumstances affect their decisions and practices, is central.

Second, Coveney (2005) argued that in trying to understand food-related health behaviours, too much emphasis has been placed on science-based understandings of food, with a focus on behavioural risk factors which do not take into account the social circumstances in which choices are made. Instead, an appreciation of lay knowledge and how that informs people's actions may be useful. Lay knowledge consists of the meanings and experiences of people, which are influenced by the social circumstances in which they live (Amir, 2011). It has been argued that the concept of lay knowledge can be more useful than 'attitude' or 'belief' as it is based on an understanding that individuals are interdependent with others to create a social context (Coveney, 2005). Without an understanding of lay knowledge it is possible to misunderstand how an individual's experience and beliefs impact on their behaviour (Henderson, 2010). In relation specifically to infant milk feeding, Amir (2011) states that by recognising the importance of social circumstances, understanding of infant feeding can be improved, and that qualitative studies are needed to achieve this. A similar argument can be applied to an understanding of weaning. Thus, in this study, the lay knowledge of mothers and how they use this to guide their weaning practices was explored, particularly in relation to their experiences with information and advice from health professionals.

Third, Bourdieu's concept of habitus was also considered a possibly useful perspective for exploring and understanding the thoughts and behaviours of mothers, and in a sense can be seen as an extension of the idea of lay knowledge. Habitus is a way of describing the embodiment of social structures and history in individuals, thus people perceive and act according to their social background (Amir, 2011; Power, 1999). Bourdieu (1977, p.95) conceptualised the habitus as an "acquired system of generative dispositions" which reflect external social structures but also shape how an individual perceives the world and acts in it. That is not to say that habitus determines behaviour, but that an individual will be predisposed to act in accordance with the social structures which have informed their habitus (Power, 1999). Therefore, in this study, when listening to the mothers the way in which acquired dispositions, their habitus, could shape their understanding and behaviour was attended to.

Finally, the study was also informed by Hastrup's (1995) ideas of embodied knowledge (knowledge gained through experience) and cognitive knowledge (knowledge gained theoretically). This was applied to breastfeeding by Hoddinott and Pill (1999), who concluded that breastfeeding is best considered as a practical skill and a performing art, and that women are more likely to breastfeed successfully if their knowledge about it is based on positive experience. The extent to which embodied knowledge and cognitive knowledge were relevant sensitising concepts for understanding women's weaning experience and practices was also explored.

A qualitative longitudinal study was therefore set up in which a sample of mothers were recruited from antenatal clinics and parentcraft classes in Halton. They were followed from just before birth through to approximately nine months post-partum, during which time the process of weaning was commenced and managed. The overall aim of the research was to explore weaning as a social process by focussing on the experience, knowledge, perceptions and actions of mothers in Halton in relation to the theory and practice of weaning. The objectives were to:

- follow mothers and babies through the process of weaning, exploring when, why and how actions are taken and whether the perceptions and intentions of mothers change over time;
- explore how women make judgements about the healthy development of their babies in relation to weight gain and growth more generally;

- understand how women develop embodied and cognitive knowledge of weaning and weaning practices;
- understand and locate weaning in the context of women's everyday routines and practices.

Over the period of early data generation and preliminary analysis, it became evident that what was salient to women in the antenatal period was milk feeding in terms of breast and formula feeding, and that it would be difficult to understand weaning without having an understanding of how women thought about feeding their babies *per se*. Therefore, a further objective about feeding practices more generally was developed:

- to understand how mothers think about milk feeding their baby and to follow mothers and babies through this process, exploring when, why and how actions are taken and whether the perceptions and intentions of mothers change over time.

Through the exploration of weaning as a social process, an understanding of weaning as it unfolds as part of everyday life was developed, which could give some insight into understanding the development of overweight in children and, in turn, how to approach preventing it.

1.4 Presentation of the study

In the next two chapters the background literature that has informed this study is presented. Chapter 2 examines issues to do with childhood weight and overweight in order to set the study in context, including how weight and overweight are measured in infants and children, how parents understand weight patterns, what is known about weight and growth in infancy in relation to the development of overweight, and the epidemiology of overweight and obesity in infants and children in the UK. Then, in Chapter 3, contemporary infant feeding and weaning recommendations are reviewed, and what is currently known about how infants are fed and weaned is explored. The way in which the aims and objectives of the study informed the study design and research methods employed are outlined in Chapter 4, which describes and explains how the study was conducted. In Chapter 5 the results of phase one, the analysis of the quantitative data obtained from the Child Health System, are presented and discussed. This is followed in Chapter 6 with the findings from the phase two qualitative study. In Chapter 7, the findings from the

qualitative study are theorised and discussed. Finally, in Chapter 8, conclusions from the whole study are drawn regarding the patterns of weight and overweight in Halton infants, the way in which mothers manage the weaning process, and how this may affect the growth and weight of their children, including implications for policy and practice.

Chapter 2
Infant and childhood weight, overweight and obesity

2.1 Introduction

Overweight and obesity, in adults and children, have been described as a "profound public health challenge" in the UK (Shribman & Billingham, 2009, p.12). Following the 2007 Foresight Report *Tackling obesities: Future choices* (Butland et al., 2007), the Department of Health (DH) published *Healthy weight, healthy lives: A cross government strategy for England* in 2008. This strategy was described as a "comprehensive action plan" to tackle the rise of obesity at every level, from action by individuals to action by the Government (Shribman & Billingham, 2009, p.27). A central aim was stated: "to be the first major nation to reverse the rising tide of obesity and overweight in the population by ensuring that everyone is able to achieve and maintain a healthy weight" (DH, 2008, p.v). In order to realise this ambition, five policy areas on which the Government would focus were highlighted. These were: promoting children's health; promoting healthy food; building physical activity into life; supporting health at work and providing incentives more widely to promote health; and providing effective treatment and support when people become overweight or obese. The initial focus was on children, with the objective of reducing the proportion of overweight and obese children to 2000 levels by 2020 (Cross-Government Obesity Unit, 2010).

A number of initiatives were instituted in the pursuit of this goal. At the centre of all services for children and families is the early intervention and prevention public health policy, the Healthy Child Programme (HCP) (Shribman & Billingham, 2009). The HCP offers every family a programme of screening tests, immunisations, developmental reviews, and information and guidance to support parents (Shribman & Billingham, 2009). In line with the concern about overweight in children, one of the public health priorities of the HCP is:

> to focus on the early prevention and identification of obesity in children through an emphasis on breastfeeding, delaying weaning until babies are around six months old, introducing children to healthy foods, controlling portion size, limiting snacking on foods that are high in fat and sugar, and encouraging an active lifestyle (Shribman & Billingham, 2009, p.12).

In 2006 the National Child Measurement Programme (NCMP) was established (National Obesity Observatory, 2010). This is a countrywide public health surveillance initiative in England run jointly by the DH and the Department of Education (Routen, Edwards, Upton, & Peters, 2011). Each year, children in Reception (four to five years) and Year 6 (ten to 11 years) are weighed and measured. The results are used to inform local planning and delivery of services for children and to gather population-level surveillance data to allow analysis of growth trends and ascertain the prevalence of overweight and obesity (National Health Service Information Service, 2009). It is also an aim of the NCMP to increase parents' understanding of child weight issues through the provision of individual children's results (National Obesity Observatory, 2010).

Finally, in January 2009, the Change4Life social marketing campaign was launched, with the aim of preventing people from becoming overweight by encouraging them to eat more healthily and take more exercise. In the initial stages it targeted young families with children aged five to 11 years, but since its launch it has grown to include parents of one to four year olds (Early Years) and parents with new babies (Start4Life). The Start4Life campaign was developed by the Change4Life team and was initiated in 2010. This provides parents with a single set of messages on nutrition and physical activity from birth to age two (DH, 2010).

It is clear that overweight and obesity in children are firmly on the policy agenda in the UK. However, it is not clear what appropriate policy responses are and there is a lack of evidence on which to base effective interventions (Butland et al., 2007). It is against this background of political concern that, in this chapter, the way in which weight, overweight and obesity in childhood are measured, and some of the difficulties with this, will first be discussed. This will be a platform for the three other major sections in this chapter. An exploration of the extant research on how parents make judgements about the growth and development of their children and how such judgements relate to their recognition, or not, of emerging weight issues, is undertaken. What is known about weight and growth in infancy in relation to the development of overweight is also reviewed. Finally, the epidemiological patterns of overweight and obesity in UK children will be presented. This will all serve to provide a background to the current study.

2.2 The measurement of weight, overweight and obesity in childhood

Growth is a major biological event in infancy. By the age of two an infant has reached nearly one half of her/his final height and body weight has tripled (Lampl & Thompson, 2007). Weight monitoring has generally been viewed as having an integral role in infant health services (Hall & Elliman, 2003; Lucas, Roberts, Baird, Kleijnen, & Law, 2007; Panpanich & Garner, 2009; Sachs, Dykes, & Carter, 2006b), useful as a guide to general progress and development (DH, 2009a), as well as being employed to monitor the sufficiency of infant feeding and the nutritional status of an infant (Royal College of Paediatrics and Child Health [RCPCH], 2009b). Additionally, the routine monitoring and recording of infant weights has enabled links between early growth and later disease to be explored (Barker, 2007). A World Health Organisation (WHO) survey in 2002 found that regular weighing is now part of most Western baby-care systems (de Onis, Wijnhoven, & Onyango, 2004) and the assessment of growth is a central feature of child surveillance in the UK (Sachs et al., 2011).

During the early decades of the twentieth century, the profession of health visiting and the system of 'baby clinics' was established (Sachs, Dykes, & Carter, 2006a). This occurred during a time when maternal and child health was often poor and there was particular concern with the adequate nutrition of infants and the extent to which this might compromise growth and development, particularly in industrial towns. The system became universal state provision (Sachs et al., 2006a). Currently, every mother is allocated a health visitor (Sachs, Dykes, & Carter, 2005) and many women attend baby clinics regularly, every week or fortnight (Hamlyn et al., 2002). Part of each visit is likely to be weighing the baby as it is routine practice for health visitors to weigh infants attending clinics for immunisations or other reasons (Panpanich & Garner, 2009). Weight is recorded on a growth chart in the parent-held child health record (Sachs et al., 2005), which enables comparison of the infant's weight with that of a reference population (Sachs et al., 2006b). In the UK there has been debate about the frequency with which infants should be weighed (Sachs et al., 2005) and it is currently advised that five or six times between the age of ten days and nine months is the optimum (Hall & Elliman, 2003). The DH publication 'Birth to Five' (2009a) states that infants should be weighed at five days and ten days of age, then no more than once a month until the age of six months, once every two months between six and 12 months, once every three months aged over a year and then at the school entry health review aged four to five years. Whilst some infants will be weighed less frequently than recommended,

there is evidence to suggest that many are weighed much more frequently than this (Hamlyn et al., 2002; Sachs et al., 2005).

The weight (as well as the length (height) and head circumference) of UK infants has traditionally been monitored using growth charts. Growth charts are constructed using data from groups of children as a growth reference, with separate charts for females and males, and can then be used in both the monitoring and assessment of individual children and in the screening of whole populations (Sachs et al., 2011; Wright et al., 2002). Modern British growth charts display nine standard centile lines (0.4^{th}, 2^{nd}, 9^{th}, 25^{th}, 50^{th}, 75^{th}, 91^{st}, 98^{th} and 99.6^{th}). The N^{th} centile line marks the weight or height below which N% of children of that age and sex would fall, for example, 25% of children are below the 25^{th} centile. The 50^{th} centile represents the average (median) for the population, and the 2^{nd} and 98^{th} centiles are two standard deviations below/above the median (RCPCH, 2009b). It is quite normal for a child's weight to move up or down a little in relation to the centile lines, moving from one centile to the next, as growth is, in reality, a non-linear, episodic process (Lampl & Thompson, 2007). However, it is less common for an individual's weight to cross two centile lines and this may be an indication that a child needs to be monitored more closely to ensure that there is no problem with her/his growth (RCPCH, 2009c).

Tanner and Whitehouse were the first to develop growth charts for British children (Cameron, 2002) and the Tanner-Whitehouse charts were in use in the UK from the 1960s (Sachs et al., 2005). These, according to Cameron (2002, p.1), achieved the status of a "citation classic" as they explained the techniques to construct growth charts from raw data. The original Tanner-Whitehouse charts were updated in 1976 (Cameron, 2002). During the 1980s concerns were expressed that changes in growth over time, or the secular trend, meant that the Tanner-Whitehouse charts no longer represented the population very accurately (Sachs et al., 2005). There was evidence of a secular trend towards greater height-for-age and weight-for-age in some parts of the UK up until 1979 (Cameron, 2002). It was not until 1996, however, that any alternative to the Tanner-Whitehouse charts was developed (Cameron, 2002). This was the dataset that went on to be known as the UK1990 (UK90) reference data. It was developed using data collected in the 1980s from seven UK sources (RCPCH, 2009b), some of which were nationally representative such as the British Standard Institute data which were collected for a syndicate of UK retailers, and some of which were more localised such as the Cambridge Infant

Growth Study (Sachs et al., 2005). New reference curves were constructed and centiles for weight, height, body mass index and head circumference from birth to 23 years were produced (Freeman et al., 1995). That the data used to construct the UK90 reference were obtained by merging datasets was not viewed as ideal, data from a single dedicated survey would have been preferable, but it was considered the only realistic option due to the cost of obtaining a new national sample dataset (Cole, Freeman, & Preece, 1998). No child was excluded from the dataset on the grounds of ill health, so the UK90 data were seen as truly a 'reference' not a 'standard' (Cole et al., 1998), being a description of typical, although not necessarily healthy, growth in UK children from 1980-1990 (RCPCH, 2009b).

At around the same time as the development of the UK90 growth charts, Tanner and Buckler updated the Tanner-Whitehouse charts to produce the 'Buckler-Tanner' chart (Tanner & Buckler, 1997). However, Freeman et al. (1995) proposed that their growth curves be used as the new UK reference curves as they were relatively up-to-date and largely nationally representative. The first published version of these reference curves was demonstrated to have some sex discrepancies. When comparing the standard curves with the weights of a birth cohort born between 1987 and 1988 it was found that two and a half times as many girls as boys had weights below the 3rd centile during their first year, with a corresponding excess of boys above the 97th centile (Wright, Corbett, & Drewett, 1996). This was subsequently corrected (Preece, Freeman, & Cole, 1996). In 2002 a working group was convened by the RCPCH to review the available growth reference curves (Wright et al., 2002). For each reference, the data on which it was based, when they were collected, how the reference was constructed, what peer reviewed publications had described it and the validity of the data used in so far as it accurately represented current growth norms, were considered. The group recommended the UK90 reference data growth charts for UK use (Wright et al., 2002). They also recommend that further changes to the data on which the charts were based was undesirable, as it was important that comparison over time could take place. Subsequently, the UK90 were the main growth charts in use in the UK until 2009 (RCPCH, 2009b).

In April 2006 the WHO Child Growth Standards for infants and children up to the age of five years were published (RCPCH, 2009b). These were based on data collected from approximately 8,500 infants, exclusively breastfed for the first four months, living in optimal conditions in six different countries (USA, Norway, India, Ghana, Brazil, Oman) (RCPCH, 2009a; RCPCH, 2009b). The aim was to provide a

standard for ‘how children should grow’, rather than the ‘how children are growing’ approach of other growth charts (RCPCH, 2009b). All previous charts had used a mixture of breast and bottle fed infants. It was known that differences in growth between breast and bottle fed infants occur, and also that healthy breastfed infants from around the world show similar growth patterns. Therefore the WHO charts were set up to indicate breastfeeding as the norm and to describe optimal growth (RCPCH, 2009a). In the UK, the Scientific Advisory Committee on Nutrition (SACN) reviewed the WHO charts, assessing how UK children compared to them, and in 2007 recommended that they be adopted (RCPCH, 2009a). The RCPCH was commissioned to design and construct the UK-WHO charts which consist of the UK90 preterm and term birth data, the WHO data from 2 weeks, switching back to the UK90 charts at age 4 (RCPCH, 2009a). Up until the development of the UK-WHO growth charts, all charts available in the UK had smooth curves rising from birthweight (Sachs et al, 2005). This is incorrect, as early weight loss is expected (Sachs et al., 2005), and infants show different patterns of weight gain immediately after birth which cannot be allowed for in growth charts (RCPCH, 2009a). The UK-WHO charts have no lines for 0-2 weeks. These charts describe the ideal pattern of growth for all UK children, for boys and girls, whatever their ethnic origin or whether they are breast or bottle fed. The DH recommended that the UK-WHO charts should be used for all births from May 2009 (RCPCH, 2009a).

Whether these growth charts are suitable for all ethnic groups has, however, been questioned (Cameron, 2002). Although some researchers have expressed the opinion that due to possible differences in growth patterns separate growth charts for different ethnic groups would be useful (for example Chinn, Price, & Rona, 1989), it has been suggested that the majority of differences in growth between ethnic groups can be explained by socioeconomic rather than genetic reasons (WHO, 1995). The recently published WHO growth standards demonstrated that healthy children from different parts of the world who live in healthy environments and are fed optimally show very similar patterns of growth (de Onis, Garza, Onyango, & Rolland-Cahera, 2009). Therefore, the need for separate growth charts is questionable.

Although weight is an important focus of growth monitoring during an infant’s early life (Sachs et al., 2005), weight by itself is a poor indicator of obesity (Cole, Freeman, & Preece, 1995). Body mass index (BMI) is a measure of weight adjusted for height, calculated as weight in kilograms divided by the square of height in

metres (Must & Anderson, 2006). For adults, there is widespread acceptance of the use of BMI as a measure of overweight and obesity (Scottish Intercollegiate Guidelines Network [SIGN], 2003), with the definition of overweight a BMI of >25kg/m^2 and obesity a BMI of >30kg/m^2 (Cole et al., 2000). However, BMI has limitations in that it cannot distinguish overweight due to excess fat mass from 'overweight' due to excess lean mass or muscularity, and does not account for the site on the body where fat is deposited, which is relevant to deciding on the health implications of excess fat (Barker, 2007; Must & Anderson, 2006). Although, therefore, there is a possibility of the misclassification of those with a high lean muscle mass, most individuals with a high BMI do have excess body fat (Must & Anderson, 2006). There are other measures of adiposity that are more accurate (for example bioelectric impedance), but due to their nature they have limited applicability for routine screening or studying large populations (Must & Anderson, 2006). In addition BMI shows reasonably good correlations with more direct measures of adiposity and has consistent linkages with adult overweight and obesity co-morbidities (Must & Anderson, 2006; SIGN, 2003).

In adults, the BMI cut-off points that define overweight and obesity are not linked to age and do not differ for females and males (Must & Anderson, 2006). In growing children, however, BMI is not a static measurement and varies with age and sex. Therefore, in children the BMI cannot be used in isolation (SIGN, 2003) but must be compared to a reference standard that takes account of child age and sex (Must & Anderson, 2006; SIGN, 2003). Despite this, and despite its documented limitations, BMI, involving as it does relatively simple height and weight measurements, is a practical way of monitoring childhood weight gain (Barker, 2007). Although there has been some discussion about the utility of developing measures based on the actual measurement of body fat mass (Prentice & Jebb, 2001), there is generally international agreement on the appropriateness of BMI to define overweight and obesity in children (Monasta, Lobstein, Cole, Vignerova, & Cattaneo, 2011; SIGN, 2003). It is likely to remain the main measure of weight status in this group (Must & Anderson, 2006), although it has not generally been used under the age of three in the UK (Sachs et al.,2006b) as it is more difficult to interpret in young infants (Bundred et al., 2001). It has been suggested that the addition of an anthropometric indicator of central adiposity might be useful, and reference standards for waist circumference and waist-hip ratio have been developed, so it may be that these would be useful in combination with BMI (Must & Anderson, 2006).

Various BMI-for-age reference standards for children are now available, both national and international (Must & Anderson, 2006). From the UK90 dataset (Freeman et al., 1995), centile curves for BMI in British children were developed, becoming available in the mid-1990s (Cole, Freeman, & Preece, 1995). These allow BMI in individual subjects to be expressed as an exact centile or standard deviation (SD) score. From a clinical perspective, an individual is usually classified as overweight if their BMI is ≥ 91st centile and obese if their BMI is ≥ 98th (SIGN, 2003). At the population level, overweight and obesity are defined using, respectively, the 85th and 95th centiles of the UK90 standards (Chinn & Rona, 2002). Currently there are also two international datasets used to define overweight and obesity in pre-school children in terms of BMI; the International Obesity Task Force (IOTF) reference and the WHO standard (Monasta et al., 2011). The former is used for children and young people aged 2-28 years and was developed from a database of 97,876 boys and 94,851 girls from six countries (Brazil, Great Britain, Hong Kong, the Netherlands, Singapore and the USA) (Cole et al., 2000). The accepted BMI values for overweight and obesity in adults of 25 and 30 at 18 years of age for males and females were tracked back to define BMI values for overweight and obesity at younger ages. Thus the analysis provided cut-off points for BMI in childhood, based on international data and linked to the widely accepted cut-off points for overweight and obesity in adults (Cole et al., 2000). The WHO BMI standard was published in 2006, as detailed above, and can be used for children 0-59 months of age (Monasta et al., 2011). However, when used on the same dataset, the IOTF reference and the WHO standard produce different results in terms of the prevalence of overweight and obesity (Monasta et al., 2011). The difference has arisen because of differences in the samples of children used to construct the datasets and differences in the approach to defining the cut-offs. Monasta et al. (2011) conclude that currently the IOTF reference may be most useful for the identification of overweight and obesity at a population level because the cut-offs are based on an association with ill health in later life (the definition of overweight and obesity at 18 years). They also state that research needs to be carried out on the WHO standard dataset to identify BMI cut-offs associated with ill health later in life.

Although there is agreement that national BMI reference curves needed to be replaced with an international standard in order to allow international comparisons (Monasta et al., 2011), it is generally considered that national data are more useful in some situations. For example Reilly (2002) has concluded that as international

reference data were designed for international comparisons, not clinical or national epidemiological use, using national reference data for making national comparisons was the best way forward (Reilly, 2002). This conclusion was also reached by Chinn and Rona (2002) who compared the published international BMI cut-off points for overweight and obesity in children with the cut-offs based on the UK90 reference data. The UK90 reference data were used in the current study.

2.3 Parental understanding of weight gain and recognition of overweight and obesity in children

Sachs et al. (2011) claim that most parents are very interested in their child's growth. However, there is much evidence to suggest that parents are not good at recognising overweight in their own children (Crawford, Timperio, Telford, & Salmon, 2006). This has been demonstrated in a variety of studies in the UK (Jeffery, Voss, Metcalf, Alba & Wilkin, 2005; Carnell, Edwards, Croker, Boniface, & Wardle, 2005), America (Baughcum, Chamberlain, Deeks, Powers, & Whitaker, 2000; Etelson, Brand, Patrick, & Shirali, 2003), Australia (Fisher, Fraser, & Alexander, 2006; Wake, Salmon, Waters, Wright, & Hesketh, 2002) and China (Wen & Hui, 2010). There is also evidence to suggest that the recognition of overweight can be affected by the age and sex of the child. For example, in an American study of the parents of children aged three to ten, Wald et al. (2007) found that older children were more likely to be recognised as overweight than younger children. In relation to sex, an Australian study of the mothers of children aged between two and six years found that the mothers reported more concern over their daughters' weights in general than the weights of their sons (Crouch, O'Dea, & Battisti, 2007), and it has been observed that overweight is more likely to be recognised in girls than in boys (Wald et al., 2007). Wald et al. (2007) hypothesise that societal standards of attractiveness are more likely to influence the parents of older children, hence why they are more able to identify overweight; and that attractiveness standards are likely to be more rigid for girls, explaining why more girls were recognised as overweight than boys.

Empirical studies have suggested that some parents may have an emotional unwillingness to admit that their child is overweight (Maynard, Galuska, Blanck, & Serdula, 2003), and Chamberlin, Sherman, Jain, Powers, and Whitaker (2002) reported that parents can be offended if such a possibility is suggested to them. Jain et al. (2001) found that mothers described overweight children of either sex as thick or solid. Crouch, O'Dea, and Battisti (2007) have suggested that mothers may often

be able to recognise overt obesity in their children but not overweight, and confusion amongst parents over what constitutes overweight in infants and children has been identified (Pagnini, Wilkenfeld, King, Booth, & Booth, 2007). In the study by Jain et al. (2001) mothers did not consider children to be overweight if they had no limitation in physical activity and were not teased about their weight. There is also the possibility that overweight is becoming normative so parents just do not notice it in their child (Carnell et al., 2005; Crawford et al., 2006).

Even if they do recognise their child as overweight, parents may be unconcerned about this (Crawford et al., 2006). In a qualitative study utilising focus groups with Australian mothers of children aged two to five years, Pagnini et al. (2007) reported that not all mothers thought that overweight was an important issue for preschool children and were reluctant to label this age group according to their weight. Mothers have been reported as thinking that their overweight preschool child would grow out of it by school age (Chamberlin et al., 2002). A perception amongst some parents that a larger infant or child is healthy has been identified (Baughcum, Burklow, Deeks, Powers, & Whitaker, 1998; Chamberlain et al., 2002), that a large infant is a sign of successful mothering (Baughcum et al., 1998), and that it was better to be a little overweight than to be underweight (Pagnini et al., 2007). Pagnini et al. (2007) speculated that this may be an extension of the value often placed on weight gain during the first year of life.

A number of common misconceptions regarding growth charts have been identified and it has been suggested that many parents do not have the knowledge or skills to interpret patterns of infant growth correctly (Ben-Joseph, Dowshen, & Izenberg, 2009; Sachs et al., 2006a). For example, one study found that although the mothers of preschool children could recall the centile position of their child on a growth chart, they could not explain what that meant (Woolford, Clark, Lumeng, Williams, & Davis, 2007). Parents have commented that they found weights recorded in kilos confusing and would prefer to use pounds and ounces (Sachs, 2011). Other studies have indicated that parents are concerned if their child is growing in the bottom quarter of the growth chart and would prefer their infant to be growing along one of the higher centiles (Laraway, Birch, Shaffer, & Paul, 2010; Sachs et al., 2006a). The majority of growth charts have depicted the 50th centile in bold, and this has led some parents to think that growth along this centile was the most desirable (Sachs et al, 2006a; Sachs et al., 2011). In their ethnographic study of women and health professionals' use and understanding of growth charts for breastfed babies, Sachs

et al. (2006a) found that rather than focussing on actual weight gain, there was an expectation amongst parents that weight would follow the shape of the centiles on the growth chart and that concern was expressed if an infant dipped below a previous centile. All of these findings demonstrate a misunderstanding about what position on the growth chart means. During the recent design of the UK-WHO growth charts, parents were consulted to ensure that the charts and accompanying material made sense to them. This has been described as “unique in the creation of child growth charts” (Sachs et al., 2011, p.438) and may contribute to improved parental understanding of their infant’s growth trajectory.

Inaccurate perception of a child’s weight by parents has significant implications as parents have a central role in preventing childhood overweight and obesity, and interventions to prevent or ameliorate the condition cannot be successful without their involvement (Wald et al., 2007). This is particularly so when children are very young. Relatively little is known, however, about parents’ strategies to prevent overweight (Crawford et al., 2006), or indeed how they ensure that their child is not underweight either. In their study of 1210 Australian families Crawford et al. (2006) found that 31% of parents of 5-6 year olds and 43% of parents of 10-12 year olds reported that they employed strategies to help prevent their child from gaining too much weight. This was regardless of the child’s weight status: the use of preventive strategies was not related to the current weight of their child. Thus, this indicates a concern about overweight, but coupled with the evidence presented above indicating parental difficulty in recognising overweight and obesity, the ways in which this is put into practice are not clear.

Therefore, there is evidence that not all parents accurately understand normal patterns of infant growth or are able to interpret their own infant’s growth pattern as plotted on the growth chart in the parent-held child health record. Combined with research that suggests that parents often find it difficult to recognise overweight in their infant or child, the potential for confusion about what is normal growth and the unwitting ‘allowance’ of the development of overweight in small children is apparent. This is salient background to the current study, as the ways in which mothers understand growth in relation to feeding their very young infants, a group not much studied in this way, is to be explored.

2.4 Weight and growth in infancy and the development of overweight

An independent positive association between higher birthweight and obesity in infancy and childhood has been demonstrated in a number of studies (Blair et al., 2007; Moschonis, Grammatikaki, & Manios, 2008) and a recent systematic review and meta-analysis concluded that high birthweight is associated with an increased risk of obesity in both childhood and adulthood (Yu et al., 2011). This is likely to be exacerbated as, with increasing overweight and obesity amongst the adult population, women are likely to be heavier when they become pregnant than in previous years. It has been demonstrated that high maternal BMI before and during pregnancy is a strong predictor of childhood obesity (Catalano et al., 2009; Whitaker, 2004), and an association between the weight of a mother at her first antenatal visit and the weight of her baby has been demonstrated (Bundred, 2008). Also, a low birthweight can place some infants at risk of obesity. Ong, Ahmed, Emmett, Preece, and Dunger (2000) demonstrated that full-term babies with lower birthweight, who showed catch-up growth between birth and two years, were fatter and had more central fat distribution at five years than other children.

Studies have also consistently shown an association between early rapid weight gain and an increased risk of obesity in babies with a normal birthweight (Monasta et al., 2010). For example, Stettler et al. (2002) demonstrated that rapid weight gain during the first four months of life in European-American formula-fed infants was associated with an increased risk of being overweight at age seven years. The study also indicated that 20% of the risk of obesity at age seven could be accounted for by having weight gain in the highest quintile during the first four months of life. Stettler et al. (2005) went on to demonstrate that in formula-fed infants, higher weight gain during the first week of life was also associated with obesity in adulthood. Since this work, a number of systematic reviews have been carried out, indicating an association between rapid infant weight gain and later overweight or obesity in both breast and formula fed infants, although formula fed infants are more likely to display rapid weight gain in early infancy than breastfed infants (Baker, Michaelsen, Rasmussen, & Sorensen, 2004). For example, Baird et al. (2005) conducted a systematic review of published literature and concluded that infants who are at the highest end of the distribution for weight or BMI, or who grow rapidly during infancy, were at an increased risk of obesity in childhood and/or adulthood; and Monteiro and Victora (2005) conducted a systematic review which indicated an association between rapid infant weight gain and increased BMI in ages ranging from three to 70 years. Subsequently, in a meta-analysis of individual level data

from 47,661 participants in six countries Druet et al. (2011) demonstrated that infant weight gain had a consistent positive association with subsequent obesity. What is not so clear is the predictive ability of different weight gain cut-offs (Monasta et al., 2010), although Druet et al. (2011) developed a risk score combining birthweight, infant weight gain, sex and mother's BMI which they claim may allow early stratification of infants at risk of childhood obesity.

The importance of growth in early life in relation to the development of overweight is also reflected in research demonstrating that compared to those who were not overweight, children who were ever overweight at 24, 36 or 54 months were five times as likely to be overweight at age 12 years (Nader et al., 2006); that children who reached the 50th centile for BMI at any time during their preschool years had a sixfold increase in the likelihood of being overweight in later childhood (Nader et al., 2006); and that there was an association, more significant in males than females, between large infant size at one year (and early rapid infant growth) with overweight at 7-9 years (Péneau et al., 2011).

2.5 Overweight and obesity in children in the United Kingdom: epidemiological patterns

The WHO estimated that worldwide in 2007 there were 22 million children under 5 years who were overweight (Kipping, Jago, & Lawlor, 2008) and since 1970, the greatest annual increases in childhood overweight and obesity have been in North America and Western Europe (Wang & Lobstein, 2006). In this section, what is known about the epidemiology of overweight and obesity in UK children will be presented in order to provide a background to and context for this study which explores patterns of overweight in young infants in Halton.

Using data from the National Study of Health and Growth (NSHG), which commenced in 1972, and the internationally based BMI cut-off points for overweight and obesity produced by Cole et al. (2000), Chinn and Rona (2001) demonstrated that there had been little change in the prevalence of overweight or obesity in primary school children aged 4 to 11 years between 1974 and 1984. However, between 1984 and 1994, overweight increased from 5.4% to 9% in English boys, 6.4% to 10% in Scottish boys, 9.3% to 13.5% in English girls, and 10.4% to 15% in Scottish girls (Chinn & Rona, 2001). The prevalence of obesity in children was low, although increasing between these dates, from 0.6% to 1.7% in English boys, 0.9% to 2.1% in Scottish boys, 1.3% to 2.6% in English girls and 1.8% to 3.2% in Scottish

girls (Chinn and Rona, 2001). Stamatakis, Primatesta, Chinn, Rona, and Falascheti (2005) also explored the NSHG data, along with data from the Health Survey for England (HSE), produced yearly from 1996 to 2003. Their analysis demonstrated that the upward trends in overweight already noted over the 1980s and 1990s (Chinn & Rona, 2001) were continuing into the 2000s. They analysed the data using both UK 1990 BMI reference data (Cole et al., 1998) and the international BMI cut-offs (Cole et al., 2000) and the upward trend was evident in both. By 2002/03 the percentage of English children aged 5-10 years who were overweight, using UK and international cut-offs respectively, was 22.6% (16.4%) in males and 23.7% (23.3%) in females. The corresponding figures for obesity were 6% (4.6%) in males and 6.6% (6.8%) in females. It was also noted that the rate of increase in overweight, and particularly obesity, was accelerating in the latter decade (Stamatakis et al., 2005). The beginning of this acceleration had been originally reported by Lobstein, James and Cole (2003) who used the 1998 HSE data to illustrate the acceleration of the increase between 1984 and 1998.

As mentioned earlier, since 2006/07 the Government's NCMP has measured the height and weight of children aged four to five years (Reception) and ten to 11 years (Year 6) each year in England (Dinsdale, Ridler, & Rutter, 2012). From these data, prevalence rates for overweight and obesity have been calculated, using the UK90 reference data. Overweight was defined as greater than or equal to the 85th centile but less than the 95th centile (so 'overweight' means 'overweight but not obese' in these data); and obese as greater than or equal to the 95th centile (The NHS Information Centre, Lifestyle Statistics, 2009). Over the three years 2006/07 to 2008/09, the proportion of overweight and obese children in Reception was very similar (13.2% overweight and 9.6% obese in 2008/09), as was the case for Year 6 (14.3% overweight and 18.3% obese in 2008/09). The slight changes observed were not significant (The NHS Information Centre, Lifestyle Statistics, 2009). However, in 2009/10 it was evident that there had been a small but significant increase in obesity prevalence between 2008/09 and 2009/10 in males and females across both school years (Dinsdale, Ridler, & Rutter, 2011). The picture had changed again slightly by 2010/11, when the prevalence of obesity had decreased for males and females in Reception (10.1% in males and 8.8% in females, in males looking as though it may be part of a longer term trend) but increased for all children in Year 6 (20.6% males and 17.4% in females), also possibly a longer term trend (Dinsdale et al., 2012; The NHS Information Centre, Lifestyle Statistics, 2011).

Reilly (2007) has cautioned that trends in the prevalence of paediatric obesity mask important changes in body fat content and body fat distribution which have occurred across the whole of the population: children in general are fatter. Therefore, rather than looking just at the prevalence of overweight or obesity, an advantage of looking at BMI across the whole population is that it can detect changes in the BMI of children who are under the threshold for obesity (Dinsdale et al., 2012). Therefore, the NCMP analysed mean BMI SD scores (BMI adjusted for age and sex based on the BMI reference in the UK90 reference data). When examined over all five years of NCMP measurements, for the Reception year there was a small non-significant increase in BMI for males and females. In Year 6 there is an increase in BMI for males and females over the five years. If this is a real population change, it equates to a rise of over one BMI centile for this age group since 2007/08 (Dinsdale et al., 2012).

These studies have all been based on BMI. There is evidence that using this method may have underestimated the prevalence of obesity in young people (McCarthy et al, 2003). McCarthy et al. (2003) suggest that waist circumference may be a more accurate measure. They analysed waist circumference and BMI in young people aged between 11 and 16 years in 1977, 1987 and 1997 and found that whilst both measures increased, trends in waist circumference exceeded those of BMI, indicating that BMI may be a poor measure of central fatness and using it may underestimate the prevalence of obesity.

Data presented thus far relate to school-age children but there is also evidence of increasing weight in those younger, although younger children have not been so extensively studied, a gap which this study was designed to help fill. A cohort study of 1031 children born in the Bristol Avon area in 1991-2 demonstrated an excess of overweight and obesity before the age of school entry, using UK data as standard and taking a standard deviation score for BMI of >1.04 (above the 85th centile) as overweight and >1.64 (above the 95th centile) as obese (Reilly, Dorosty, & Emmett, 1999). Differences in prevalence between males and females were not significant. For the whole cohort, the percentage of children who were overweight or obese respectively were: 15.8% and 6.0% at 24 months of age; 20.3% and 7.6% at 49 months; and 18.7% and 7.2% at 61 months. All of these percentages, except for overweight at 24 months, were statistically significantly more than the 15% and 5% which would be expected. Stenhouse et al. (2004) reported on a sample of 4665 Plymouth infants aged 24-30 months in 1996-97, who had a higher BMI standard

deviation score than the UK90 reference population, indicating the development of overweight. Similarly, Bundred et al. (2001) studied 35,662 Wirral infants and 28,768 Wirral children over the decade to 1998. They identified significantly higher proportions than would be expected of overweight and obese children aged 2.9-4 years of age in a population based series of cross sectional studies between 1989 and 1998, also using the UK90 reference data as standard and the 85th and 95th centiles as cut-off points. Furthermore, the proportions were increasing over the ten year period studied, from 14.7% and 5.4% respectively overweight and obese in 1989, to 23.6% and 9.2% in 1998. They concluded that as the increase in the proportion of children above the 85th and 95th centiles for weight was not present in infants, the excessive weight gain occurred between infancy and preschool (Bundred et al., 2001), that is between the ages of three months and four years. This conclusion was subsequently supported by the work of Gardner et al. (2009) who reported that in a cohort of 233 British children measured at birth, five years and nine years, most excess weight was gained by five years of age.

In terms of any relationship between overweight and socioeconomic status, Jebb, Rennie and Cole (2003) demonstrated that the risk of obesity was significantly higher amongst children and young people from lower socioeconomic groups in a nationally representative sample of young people aged four to 18 years. In their study utilising NSHG and HSE data, Stamatakis et al. (2005) reported that between 1997 and 2003 the increase in the prevalence of childhood obesity which they had demonstrated was more noticeable among lower socioeconomic groups. This work was followed up using HSE data up until 2007, and Stamatakis, Wardle and Cole (2010) reported that whilst the prevalence of overweight and obesity amongst children in England appeared to have stabilised overall, this trend was not evident in lower socioeconomic groups. The NCMP has also reported disparities between socioeconomic groups. If the whole NCMP five year dataset is examined, it is evident that there was a decrease in obesity prevalence among children in Reception living in the least deprived areas whereas there was little change for those living in the most deprived areas, a pattern that is more pronounced in boys. In Year 6, obesity prevalence among those in the least deprived areas was fairly constant over time whereas it increased in those living in the most deprived areas. Therefore, there is evidence of increasing inequalities (Dinsdale et al., 2012). The current study was undertaken in an area of relative deprivation, and focus on such areas may be important in order to better understand the processes that may be underpinning the disparities between socioeconomic groups.

Ethnicity and overweight in children has also been explored. Using data from the 1999 HSE, Saxena, Ambler, Cole, and Majeed (2004) investigated ethnic group differences in overweight and obese young people. They found that the percentage of 5689 children and young adults (aged two to 20 years) who were overweight or obese differed by ethnic group and sex, although not by social class. British Afro-Caribbean and Pakistani girls had an increased risk of being obese and Indian and Pakistani boys had an increased risk of being overweight than the general population (Saxena et al., 2004). Jebb et al. (2003) found that Asian young people were almost four times as likely to be obese as white young people in their nationally representative sample of 1836 young people aged four to 18 years. In a five year longitudinal cohort study of an ethnically and socioeconomically diverse sample of young people (aged 11-12 years) in London, Wardle et al. (2006) found that there was a higher prevalence of overweight and obesity in girls compared to boys and in young people from lower socioeconomic backgrounds, but that the highest prevalence of all was in black girls. The NCMP also provides some information relating to ethnicity. Using the whole NCMP dataset, it is evident that in Reception there is a significant trend of an increase in prevalence of obesity amongst boys of Indian ethnicity. In Year 6, amongst girls classed as White British, Bangladeshi, and Any Other Asian, background there is also a significant trend of increasing obesity. There is a similar pattern for boys, although this is not quite statistically significant (Dinsdale et al., 2012). El-Sayed, Scarborough and Galea (2011, p.e517) claimed that the literature exploring overweight and ethnic groups was “disparate and disorganised” and they carried out a systematic review of literature in the area. They found no consensus about obesity prevalence relative to Caucasians among South Asian or Black children, whilst Chinese children had a lower risk than Caucasians.

Recently, there has been evidence that increases in the prevalence of obesity may be levelling off among some groups of children. Mitchell et al. (2007) were amongst the first to demonstrate a declining prevalence of obesity, between 1997 and 2004, in a study of 334 Scottish primary school children with a mean age of 5.66 years. In a much larger sample of a slightly older age group (26,782 9-10 year old Liverpool schoolchildren), Boddy, Hackett and Stratton (2009) explored changes in mean BMI and prevalence of obesity between 1998 and 2006. They found that although the prevalence of overweight and obesity was increasing in both males and females, there was some evidence of levelling off in the last three years of the data. Using data collected in the HSE between 1997 and 2007, Stamatakis et al. (2010)

demonstrated that the prevalence of overweight and obesity amongst school-age children had stabilized between 2002 and 2007, although not in children from lower socioeconomic groups. This is supported to an extent by the NCMP data, which, as reported above, indicated that the prevalence of obesity had decreased for males and females in Reception (Dinsdale et al., 2012).

A stabilising or reversal of trends in the prevalence of childhood obesity has also been demonstrated in other countries (Stamatakis et al., 2010), although looking at overall prevalence rates may mask sub-group differences, for example in relation to socioeconomic group. Rokholm et al. (2010) reviewed 52 studies from 25 countries in order to investigate the possibility that obesity prevalence is levelling off. They found that the prevalence of obesity has levelled off among children in various parts of the world, including Australia, Europe, Russia and the USA, with an actual decrease identified in Japan (Rokholm et al., 2010). Amongst adults the findings were more mixed. However, despite this, the prevalence of obesity remains "unacceptably high" (Rokholm et al., 2010, p.843). For example, in their Scottish study Mitchell et al. (2007) cautioned that although demonstrating a declining rate of obesity in schoolchildren, the prevalence remained twice as high as predicted from the UK90 reference data for BMI in childhood.

The reasons for the stabilisation reported are uncertain. There is evidence that the obesity epidemic in England has developed in a non-linear manner, therefore it may be that the current stability in prevalence rates will not last (Rokholm et al., 2010) and could simply be variation around an ongoing increase (Kipping et al., 2008). Alternatively, the levelling off may be a result of changes in both the incidence and duration of obesity: a stable prevalence rate could be generated if the incidence rate of new obesity cases was high but the duration of obesity reduced (Rokholm et al., 2010). Differences across socioeconomic groups could be explained in this way, if those in higher socioeconomic groups are better able to prevent obesity developing or to recover from it if it does (Rokholm et al., 2010). Finally, the stabilisation could be real. Stamatakis et al. (2010) speculate that the extensive media attention given to weight issues, and/or central policy targets and messages around overweight and obesity, may be having an impact, and, if this is the case, they are reaching socio-economic groups differentially. This all needs to be investigated further in order to inform both the causes of the epidemic and public health initiatives to address it (Rokholm et al., 2010). By exploring mothers' understanding about the growth, weight and development of their infants, the current study will contribute to this.

It is evident, therefore, that there has been an increase in the prevalence of overweight and obesity among children in the UK over the past three decades, and that those from lower socioeconomic groups are more affected. Although there is some evidence of the increasing prevalence levelling off, it remains at a high level. There is also some evidence of the early development of overweight, before school age, although least is known about very young children, and the current study aims to build upon this with the exploration of the Halton dataset. The size of this dataset, along with the longitudinal nature of the data and the early ages for which data are available, are an opportunity to add substantially to the body of knowledge.

2.6 Conclusion

Overweight in childhood is a public health concern in the UK, as evidenced by the epidemiological evidence presented here and what is known about the adverse effects of overweight on both physical and psychological health. There is some epidemiological evidence that the development of overweight may begin in early life, and this study aims to explore this, as well as processes which may contribute to it. As argued in this chapter, it is evident that parental understanding of infant growth and growth charts, and recognition of overweight in children, can be incomplete. The potential, therefore, for the unnoticed development of overweight in young infants is apparent. In the following chapter, contemporary infant feeding and weaning recommendations and practices are reviewed, in order to set the scene for an exploration of whether and how the infant feeding process, and particularly weaning, may contribute to the development of overweight in young infants.

Chapter 3
Milk feeding and weaning in the infant feeding process

3.1 Introduction

Infant feeding has been described as having “fundamental importance” in public health nutrition (SACN, 2008, p.i; Department of Health [DH], 2003, p.1), and the significance of infant feeding practices and early nutrition has been widely recognised (Fewtrell, Wilson, Booth, & Lucas, 2011; Hetzner et al., 2009). Much research has been conducted regarding breastfeeding and feeding with breast milk substitutes, and it has been repeatedly confirmed that, ultimately, “breast is best” (Foote & Marriott, 2003, p.489; Hoddinott et al., 2012). It is universally agreed by researchers that breast milk is the ideal first food in that it supplies complete nutrition for the human infant (Lanigan, Bishop, Kimber, & Morgan, 2001). In addition, breastfeeding provides immunological proteins thus offering the infant some protection against infection; confers a decreased risk of asthma, Crohn’s disease, ulcerative colitis, cancers such as Hodgkin’s disease, and juvenile onset diabetes; confers a lower risk of obesity; prevents the risk of infection via feeding vessels and prepared milks; and can contribute to promoting bonding between mother and child (Hetzner et al., 2009; Lanigan et al., 2001).

However, as an infant develops the ability of breast (or formula) milk to meet requirements for both macro and micronutrients becomes limited, and the introduction of a wider variety of foods is necessary for nutritional and developmental reasons (European Society for Pediatric Gastroenterology, Hepatology, and Nutrition [ESPGHAN] Committee on Nutrition, 2008). This process, commonly known as weaning, represents a major change in dietary pattern for infants: from a diet of a high fat, low protein single food - breast or formula milk - to a more complex mixture of foods likely to be relatively high in protein with a low to medium fat and fibre content (Bentley, Aubrey, & Bentley, 2004; Morgan et al., 2004; Rapley, 2006). As outlined in Chapter 1, there has been relatively little research focussed on the weaning period, the nature of foods given, or whether this period of dietary change influences later health, morbidity, growth and development (ESPGHAN Committee on Nutrition, 2008; Fewtrell et al., 2007; Morgan et al., 2004; Robinson et al., 2007; Sachs, 2011). The process of weaning itself has not been well described (Fewtrell, Lucas, & Morgan, 2003), an issue this study was designed to address. Weaning is increasingly being recognised as a critical period for child

health (Lanigan et al., 2001; Reeves, 2008), that is to say, a period during which an 'exposure' may have lasting or lifelong effects (Ben-Shlomo & Kuh, 2002). Appropriate nutrition in the early years is essential for optimal growth and development (Reeves, 2008; White, 2009), as are, arguably, appropriate weaning practices as an infant is first introduced to foods other than milk. However, information regarding weaning, and practical advice about feeding very young children, is much less plentiful than that about breast and formula feeding (Weaver, 2007).

In this chapter, the definitions of terms associated with infant feeding will be given, as necessary background to the study, followed by an account of contemporary infant feeding and weaning recommendations in the UK and the evidence that underpins these. This will be followed by a description of current milk feeding practices in the UK and some discussion of how mothers decide whether to breast or formula feed their infant. What is known about the relationship between milk feeding and the development of overweight is also reviewed. Weaning practices in the UK will be explored, including what is known about when, why and how parents wean their infants; where parents seek information about weaning from; a review of the role that health care practitioners play in relation to the weaning of infants; and what is known about the introduction of complementary foods and the development of overweight. Finally, a short review of what is known in general about parental feeding practices and the development of overweight in children as they get older is presented. In so doing, the intention is to provide a picture of the social context within which mothers in the UK feed and wean their infants and the background against which they negotiate the transition from milk feeding to weaning foods.

3.2 Definitions

The terminology used to define different aspects of infant feeding can be confusing. Infant milk feeding can be by breast or formula milk. Exclusive breastfeeding refers to an infant's consumption of human milk with no supplementation of any type, including no water, juice, non-human milk or foods (Becker, Remmington, & Remmington, 2011). According to Rapley (2006) weaning, in its literal sense, refers to the process by which dependence on the mother nutritionally (in the form of breast milk) is transformed into independence from the mother, nutritionally speaking. Hence, it is a process which begins when anything other than breast milk is introduced into the diet and ends with the last breastfeed of an infant's life. The World Health Organization [WHO]/NUT (1998) define weaning as the period during

which foods or liquids are given to an infant along with breast milk (Lanigan et al., 2001), and they define complementary foods as anything other than breast milk. Both of these definitions, therefore, represent the ideal of the breastfed infant.

In the developed world, formula milk is often used instead of, or in combination with, breast milk. Formula milk is milk designed for infants based on the composition of mature breast milk (Simmer & Askie, 2009). Infants can be exclusively formula fed, or they can be mixed fed, with breast and formula milk (Hamlyn et al., 2002). Consequently, the term 'weaning' usually refers to the process whereby an infant's diet is expanded to include food other than breast *or* formula milk (Bentley et al., 2004; Lanigan et al., 2001; Rapley, 2006). The giving of supplementary drinks of water or juice is not generally referred to as weaning; the term tends to be reserved for the introduction of solid or semi-solid foods (Rapley, 2006). As there are some differences in the way these terms are used, the WHO has recommended that the terms 'weaning' and 'weaning food' be avoided, being replaced by the terms 'complementary feeding' and 'solid food' (Fewtrell et al., 2007). However, the term 'weaning' is much used in the literature, and in this review 'weaning' will be used to describe the introduction of foods other than breast or formula milk, and the process this entails. The terms 'complementary foods' or 'solids' will be used to describe food other than breast or formula milk.

3.3 The development of infant feeding recommendations

Recommendations on infant feeding have been developed at both an international level (e.g. WHO, 2001; WHO/NUT/98, 1998; WHO/UNICEF, 2002) and at a national level in the UK (e.g. DH, 1994; 2003; 2007; 2009a). These recommendations and guidelines cover two major areas: the timing of the introduction of food other than milk and appropriate weaning foods. On the whole, the focus of advice about weaning has been on when, rather than how, to wean (Rapley, 2006; Townsend & Pitchford, 2012).

3.3.1 Timing of the introduction of food other than milk

Historically, British infants have been subject to a variety of fashions in relation to the introduction of food other than milk, with recommendations varying from the age of one month to nine months for the cessation of exclusive milk feeding (Davies & O'Hare, 2004; Rapley, 2006). Weaning often took place at an age and stage of development which necessitated careful preparation of food in order that babies could physically cope with ingesting it (Sachs, 2011). By the 1960s and 1970s, the

accepted age for introducing food other than milk was three months. In 1974, the Infant Feeding Practice report was published (Department of Health and Social Security, 1974) and this recommended that mothers should be encouraged to breastfeed and discouraged from introducing solid foods to infants before the age of four months. This was followed, in 1980 and 1988, by pronouncements from the Department of Health and Social Security that usually infants should not require solids before the age of three months and most would require them by six months (Department of Health and Social Security, 1980; 1988).

In 1994, the DH confirmed that the recommended age for weaning an infant was between four and six months (DH, 1994). However, robust evidence to underpin this recommendation was lacking (Lanigan et al., 2001). Although it was generally agreed that complementary feeding should not be commenced before four months, there was uncertainty regarding recommendations for an appropriate age range (Lanigan et al., 2001), and More, Jenkins, King, and Shaw (2010) claim that the DH's recommendation was misinterpreted by many health care professionals to mean that all infants should begin weaning at 16 weeks of age. Then, in 2000, the WHO commissioned a systematic review of the published scientific literature on the optimal duration of exclusive breastfeeding (Kramer & Kakuma, 2002). Kramer and Kakuma's findings indicated that exclusive breastfeeding to six months could be beneficial to an infant (reduced gastrointestinal infection), neither beneficial nor harmful (in relation to atopic eczema and asthma) or possibly harmful (compromised iron status) (Morgan et al., 2004). Although they concluded that there were no apparent risks in recommending as public health policy in developed countries exclusive breastfeeding for the first six months of an infant's life, small adverse effects of exclusive breastfeeding could not be ruled out and Kramer and Kakuma (2002) cautioned that infants should be managed individually.

Nevertheless, based largely on this evidence (Fewtrell et al., 2011) the WHO revised its guidance in 2001 to recommend exclusive breastfeeding for the first six months of life (World Health Organisation, 2001; WHO/NUT/98, 1998; WHO/UNICEF, 2002). No age for weaning was specified for formula-fed infants (Allcutt & Sweeney, 2010), and the WHO recommendations are difficult to apply to this group as formula milk is, in itself, deemed by the WHO a complementary food (Fewtrell et al., 2007). Following the WHO guidance, in the UK in 2001, the SACN stated that there was sufficient evidence, at the population level, to indicate that exclusive breastfeeding for six months (26 weeks) was nutritionally adequate and

that weaning should be delayed until this time, and the recommendation was adopted by the DH in 2003 (DH, 2003). It advised that breastfeeding, and/or breast milk substitutes if used, should then continue beyond the first six months, along with appropriate types and amounts of solid foods. A wide range of professional and voluntary bodies supported this recommendation, including the Royal College of Midwives, and the Community Practitioners and Health Visitors' Association (DH, 2003). The current infant feeding recommendations are:

- breast milk is the best form of nutrition for infants;
- exclusive breastfeeding for the first six months of an infant's life;
- six months is the recommended age for the introduction of solids for infants;
- breastfeeding (and/or infant formula if used) should continue beyond the first six months, along with appropriate types and amounts of solid foods.

(DH, 2003, p1).

This has become one of the most debated areas of infant nutrition (Fewtrell et al., 2007), and the evidence underpinning feeding recommendations regarding the timing of the introduction of food other than milk remains contested. Fewtrell et al. (2011) suggest that in 2001, when SACN made their statement about exclusive breastfeeding, they had not been asked to consider formally the scientific evidence on which the WHO based its recommendation. They state that "the evidence base supporting a major, population-wide change in public health policy underwent surprisingly little scrutiny" (Fewtrell et al., 2011, p.209). The systematic review on which the WHO recommendations were largely based (Kramer & Kakuma, 2002), accessed a relatively small number of studies (16), of variable methodological quality (Foote & Marriott, 2003). The studies included were observational in the main, so proof of causation for the outcomes could not be provided, because of the possibility of residual or unidentified confounding factors (Fewtrell et al., 2011). In addition, the review was of infants exclusively breastfed for six months. Globally, such infants represent a small, potentially biased, subgroup, and so generalising from this subgroup is problematic (Fewtrell et al., 2011). Kramer and Kakuma themselves stated that there was a lack of good data and a need for further research in the field (Kramer & Kakuma, 2002).

In fact, a systematic review of the literature concerning the age of introduction of complementary foods to the healthy full-term infant, carried out in the UK at much the same time as the Kramer and Kakuma (2002) study, concluded that there was a

lack of clear evidence to refute or support a change from the four month guideline to six months (Lanigan et al., 2001). The authors also identified subgroups of the population that could benefit from the introduction of complementary food sooner than the majority, for example low birth weight and pre-term infants, emphasising the importance of assessing infants on an individual basis. Since 2001 there has been other research published on infant feeding, however, as with earlier work, most studies have been observational and so the caution about proof of causality applies (Fewtrell et al., 2011). Whether exclusive milk feeding until six months (breast or formula) is nutritionally adequate for all infants and the effect of age at weaning on the growth, development and health of infants remain uncertain.

Kramer and Kakuma updated their systematic review in 2007 and the previous recommendation for exclusive breastfeeding until six months was endorsed, with the caveat that infants should still be managed individually to prevent any adverse circumstances (Kramer & Kakuma, 2007). However, many Western countries, including 65% of European member states and the United States, decided not to follow the WHO's 2001 recommendation fully, or at all (Fewtrell et al., 2011). For example, in Europe some countries recommend the commencement of complementary feeding between four and six months of age (European Food Safety Authority [EFSA] Panel on Dietetic Products, Nutrition and Allergies, 2009). The ESPGHAN produced a commentary on complementary feeding in 2008, and concluded that complementary feeding should not be introduced before 17 weeks or after 26 weeks, in addition making recommendations about food groups and when they should be introduced (ESPGHAN Committee on Nutrition, 2008). In 2009 the EFSA Panel on Dietetic Products, Nutrition and Allergies were asked by the European Commission to deliver a scientific opinion on the appropriate age for the introduction of complementary food to infants. They concluded that for healthy infants the introduction of complementary foods between the age of four and six months was safe and posed no adverse health risks; and, whilst exclusive breastfeeding is nutritionally adequate up to six months for the majority of infants, some may need complementary food before six months (EFSA Panel on Dietetic Products, Nutrition and Allergies, 2009). For example, Marriott, Foote, Bishop, Kimber and Morgan (2003) found that a weaning strategy specifically for preterm babies, which included an early introduction of solid foods, had beneficial effects on growth in length and iron status when compared to preterm babies weaned according to the then agreed best practice. Beyond Europe, in America, the American Association of Pediatrics (AAP) recommends the introduction of solid

foods (e.g. jarred baby food) and finger foods (e.g. biscuits or cheerios) beginning at 6 months of age (Hetzner et al., 2009).

There is, therefore, some inconsistency between countries in infant feeding guidelines (ESPGHAN Committee on Nutrition, 2008). Lanigan et al. (2001) have suggested that nationally produced guidelines, as opposed to the WHO guidelines, may be more applicable to developed countries, and in fact, in 2000, the WHO recommended that countries should review, update, develop and implement national nutrition and feeding guidelines based on the international scientific evidence (Lanigan et al., 2001). This would seem particularly applicable in developed countries where many babies are formula fed: there are virtually no data available to form evidence-based recommendations for the introduction of solids in formula-fed infants (Fewtrell et al., 2007). Fewtrell et al. (2007) also suggest that the consequences of the WHO recommendation should be monitored in different settings to assess compliance and record any adverse events.

Finally, in the UK in 2010 the British Dietetic Association Specialist Paediatric Group produced a position statement on weaning infants on to solid foods (More et al., 2010). It was stated that the need for the document arose because of the lack of consensus around weaning which had led to inconsistency in health professionals' practice, and it was designed to provide consistent advice to health professionals. In terms of the age at which infants should be weaned on to solid foods, the position statement held that solid food should be started by six months but not before four months (17 weeks) (More et al., 2010). It also concluded that further studies to clarify the ideal age for weaning should continue, and that the recommended age should not be changed unless there was strong scientific evidence, as further changes in policy would undermine the credibility of health professionals with parents (More et al., 2010). In 2011, a new systematic review of the literature to assess the benefits and harms of supplementary milk and/or food prior to six months of age was published (Becker et al., 2011) reporting no evidence for disagreement with the recommendation for exclusive breastfeeding for healthy infants for the first six months of life.

3.3.2 Appropriate weaning foods

The purpose of introducing solids alongside milk feeds is to provide extra calories and nutrients when breast or formula milk can no longer supply them in sufficient quantities to support normal growth and development (More et al., 2010).

Historically, initial foods commonly given to infants were paps (made of flour and bread cooked in milk with additives for flavouring or added nutrition) and panadas (stews of bread, broth, milk and eggs) (Davies & O'Hare, 2004). It was also common for infants to be given alcoholic drinks: before the development of clean supplies water was rarely drunk and families often drank ale or beer with a meal (Davies & O'Hare, 2004). In more recent years, the DH (2007; 2009a) has produced guidelines concerning appropriate foods which should be offered to infants in the weaning process. It is recommended that, generally, weaning should be carried out as a gradual transition, over about six months, from spoon-fed pureed foods and baby rice, to foods prepared with a range of textures and tastes, finger foods, and eventual consumption of family foods by about 12 months of age (DH, 2007; DH, 2009a; Foote & Marriott, 2003; Reeves, 2008). Currently, purées and mashed foods are the early weaning foods of choice worldwide (Reeves, 2008) and the use of purees first, moving on to finger foods and family foods, is advocated in the majority of weaning guidelines (DH, 2007; DH, 2009a; European Network for Public Health Nutrition [EUNUTNET], 2006).

In order for weaning to be successful, an infant has to have reached a certain level of physical development, so the food offered needs to reflect this. Purees have been seen as a bridge between liquid and solid food. At around the age of four months, infants gain more stability in the jaw, neck and shoulders (Meyer, 2000): infants need good head control in order to maintain the optimal position for swallowing and this control should be well developed between the ages of four and six months (Lucas & Zlotkin, 2003). The ability to move food around the mouth and chew does not develop before three to four months, at this age primitive sucking patterns begin to modify (Meyer, 2000) and the secretion of saliva increases which facilitates the swallowing of solid foods (Lucas & Zlotkin, 2003). By the age of six months the majority of infants can clear a spoon with their upper lip, rather than just sucking the food (Reeves, 2008).

At the age of eight months infants can chew and swallow food in greater quantities (EUNUTNET, 2006), and can be offered more food with lumps, and solid foods. This is important for a number of reasons. First, chewing is an important skill which improves mouth and tongue coordination, important for speech development (MacDonald, 2003), and purees alone may not offer opportunities for the infant to practise this (Reeves, 2008). It may also be that there is a critical window for the introduction of lumpy foods: introduced too late it is more likely that an infant will

initially reject them (Reeves, 2008); Northstone, Emmett, and Nethersole (2001) reported that infants introduced to lumpy foods earlier (before 6 months) ate a greater variety of family foods and were less fussy eaters at 15 months than those introduced later, after 10 months of age; Coulthard, Harris & Emmett (2009) reported that children introduced to lumpy foods after the age of nine months ate less of the major food groups including ten categories of fruit and vegetables and were more likely to be reported to have feeding problems at age seven than those introduced to lumpy foods between six and nine months; and White (2009) also reported feeding problems in infants introduced to lumpy and solid food later. Finally, if an infant is offered only solids there may be a limit to the amount of nutrients s/he can absorb, but nevertheless studies have indicated that infants who are fed foods which require chewing are likely to have higher intakes of all macronutrients than those who are not (Carruth, Ziegler, Gordon, & Hendricks, 2004). Table 3.3.2.1 indicates the texture of foods generally recommended at each weaning stage.

Table 3.3.2.1 The texture of foods to be introduced at each weaning stage

Stage	Age guide	Skills to learn	Food textures to introduce
1	Begin by six months, but not before four months (17 weeks)	Taking food from a spoon. Moving food from the front of the mouth to the back for swallowing. Managing thicker purees and mashed food.	Smooth purees. Mashed foods.
2	Six to nine months	Moving lumps around the mouth. Chewing lumps. Self-feeding using hands and fingers. Sipping from a cup.	Mashed food with soft lumps. Soft finger foods. Liquids in a lidded beaker or cup.
3	Nine to twelve months	Chewing minced and chopped food. Self-feeding attempts with a spoon.	Hard finger foods. Minced and chopped family foods.

(Adapted from Shaw & Lawson, 2007, in More et al., 2010, p.6).

Weaning guidelines suggest that initial weaning foods such as rice, baby porridge and cereal should be followed by vegetables, fruits and finally meat and alternatives, although this sequence is not based on empirical research and varies between cultures (Lucas & Zlotkin, 2003; Robinson et al., 2007). As infants become more competent in eating solids it is recommended that they should be offered a variety of foods from four food groups: fruit and vegetables; starchy foods such as potatoes, pasta, rice, oats, bread and other cereals; non-dairy sources of protein such as meat, fish, eggs, smooth nut butters and pulses such as lentils, dhal and hummus; and dairy products such as full fat yoghurt and cheese, with full fat milk used in cooking (DH, 2009a; More et al., 2010). The DH (2007; 2009a) recommends the use of home-cooked and fresh products wherever possible, stating that it is important to give home-prepared food as this introduces infants to a wider range of flavours and textures. However, the DH (2009a) also suggests that commercially available infant weaning foods are acceptable, and advice is provided on the use of these.

Although the aetiological origins of food intolerances remain unclear, caution is usually employed over the introduction of foods associated with atopic disease (Foote & Marriott, 2003): it is currently recommended by the DH that care is exercised with nuts, fish, shellfish and eggs because of possible allergic reactions (DH, 1994; DH, 2007; DH, 2009a). However, recent evidence has indicated that potentially allergenic foods such as egg, fish, milk used in food and cooking, cheese, yoghurt, wheat and other gluten containing cereals do not need to be delayed until a certain age (Grimshaw, 2009), as reflected in the BDA Paediatric Group position statement on weaning infants onto solid foods (More et al., 2010). There is also evidence that tolerance to some food allergens is driven by regular early exposure during a critical window, most likely to be between 4 and 6 months (Prescott et al., 2008). The DH (1994; 2007; 2009a) recommends that babies under one year should not be given salt (partly because their kidneys are not mature enough to cope with it and partly because of its association with cardiovascular disease), sugar (largely because this is the major dietary risk factor for dental caries) or honey, because of an association with infant botulism (ESPGHAN Committee on Nutrition, 2008). Finally, it is also recommended that babies should be given breast milk or formula milk until they are at least a year old, which means that there should be no need to offer follow on formula or other drinks such as water or juice during this time (SACN, 2008).

Recently, it has been suggested that this transition from purees, moving on to finger foods and family foods, has become less prominent in DH publications (Sachs, 2011). If it is recommended that babies should be milk-fed until six months of age, then the food appropriate for a six month old may well be different to that appropriate for a four month old (Sachs, 2011). In the DH weaning leaflet (DH, 2007) both purees and chunks of fruit and vegetables are suggested as first foods, and other recent publications such as Birth to Five (DH, 2009a) and the Start4Life campaign (DH, 2009b) suggest ordinary family foods such as pieces of fruit or vegetables or food mashed with a fork as first foods.

3.3.3 Conclusions: infant feeding recommendations

Fundamentally, research evidence to date provides support for exclusive breastfeeding as the best way to feed an infant initially (Hetzner et al., 2009). In developing countries there is evidence to support the continuation of exclusive breastfeeding in early life as an approach to reduce morbidity and mortality amongst infants, due to factors such as the lack of availability of suitable alternatives to breast milk and its displacement by less nutritious alternatives, the possibility of microbial contamination of foods and fluids, and the return to fertility of the mother associated with ceasing lactation (Foote & Marriott, 2003). However, in developed countries the picture is less clear cut, the risk of gastrointestinal problems associated with weaning remains much lower than in developing countries, and it has been questioned whether the WHO guidelines are wholly appropriate (Fewtrell et al., 2007; Foote and Marriott, 2003; Lanigan et al., 2001). The WHO global recommendation has been described as a “one size fits all” approach to weaning (Foote & Marriott, 2003, p.488). It may not take sufficient account of the special needs of some infants and does not allow for the different problems encountered in industrialised nations compared with economically developing countries. In addition, the WHO recommendation was based on a consideration of the adequacy of exclusive breastfeeding for six months, rather than any detrimental effects of introducing solid foods between four and six months (Foote & Marriott, 2003; Lanigan et al., 2001). Research does not provide clear evidence for the timing of the introduction of solid foods (Hetzner et al., 2009): the optimal length of exclusive breastfeeding and optimal time for the introduction of solid food and/or formula milk to promote healthy outcomes are debated (ESPGHAN Committee on Nutrition, 2008; Fewtrell et al., 2007; Foote & Marriott, 2003; Hetzner et al., 2009; Lanigan et al., 2001, Ward Platt, 2009).

Some researchers have argued that there need not be a prescribed age for weaning and that babies should be weaned on demand (Ward Platt, 2009). From a biological perspective it would seem logical that the point at which breast milk was no longer nutritionally adequate would vary from infant to infant and that the signalling of hunger by the infant is an evolved mechanism (Fewtrell et al., 2011). There is, however, some evidence that there should be a lower age limit, as weaning before three to four months has been associated with increased fatness and wheeze in childhood, increased risk of allergy, higher rates of coeliac disease and type 1 diabetes in infants at risk. There is therefore consensus in the UK that weaning should not occur before the age of four months, but there is a shortage of information on infants' nutrient needs between four and six months (Hetzner at al., 2009; Lanigan et al., 2001) and no evidence that weaning between these ages is harmful (MacDonald, 2003; More et al., 2010). Consequently it has been argued that there is insufficient scientific evidence to support the recommendation to delay weaning until six months (EFSA, 2009; Fewtrell et al., 2007; Foote & Marriott, 2003; Lucas & Zlotkin, 2003).

Nevertheless, there are two issues regarding the timing of weaning around which there is some agreement. First, that the individual developmental and nutritional needs of an infant should be taken into account when making a decision about the introduction of solids (SACN, 2008) and that there are population sub-groups who may benefit from the introduction of complementary foods sooner than the majority (Lanigan et al., 2001). Both the WHO and the DH have acknowledged that feeding recommendations are at a population level, and that each infant needs to be managed on an individual basis in order to avoid adverse outcomes (More et al., 2010). Individual variability of growth will mean that the appropriate point for introduction of complementary foods for any one infant may be inappropriate for another: recommendations based on age may not be wholly appropriate and it could be that other markers may enable the provision of a more appropriate recommendation (Lanigan et al., 2001).

Second, there is a shortage of information on any differences between primarily formula fed and primarily breastfed infants and the lack of research evidence and information is particularly pronounced for primarily formula fed infants (Hetzner et al., 2009): there is little evidence for the recommendation to delay the introduction of solid food until six months for babies receiving formula milk (Fewtrell et al., 2007). That there may be differences between the two groups has been acknowledged,

although the ESPGHAN Committee on Nutrition concluded that though it might be beneficial, separate recommendations for breast and formula fed infants would present considerable practical difficulties and was therefore undesirable (ESPGHAN Committee on Nutrition, 2008). Arden (2010) argues that more research is required to assess whether a more flexible guidelines-based approach to recommendations about weaning might be justified.

One of the consequences of the continuing debate over optimum infant feeding and the introduction of solid food is that there is the potential for both parents who are aware of the controversies, and health professionals who are responsible for advising mothers, to become uncertain about how to proceed in this regard. Despite the fact that advice is proffered to treat every infant as an individual, feeding guidelines tend to be couched in terms of external, objective factors rather than based on an individual infant's development. It is against this background that mothers are currently making decisions about feeding and weaning their infants. What is known about current milk feeding and weaning practices in the UK, and how mothers make decisions about these, will now be explored.

3.4 Mothers' milk feeding practices

During the past century infant milk feeding practices have undergone many changes due to factors such as the development of infant formulas and associated commercial activities, and the changing lives of women (Dykes, 2005; Dykes, 2006; Dykes 2011). Rates of initiation of breastfeeding are extremely variable between and within countries (Dyson, McCormick, & Renfrew, 2008), and it has been argued that in some countries and communities there is a predominant bottle feeding culture (Dykes, 2006). Historically, breastfeeding rates have been high in resource poor countries, and there are also high rates in many Scandinavian and Eastern European countries, Japan, Switzerland, Luxembourg and Turkey (Dyson et al., 2008). There have been lower rates in North America and much of Western Europe since the early 20th Century (Dyson et al., 2008), with breastfeeding rates at their lowest in the 1960s and early 1970s in many countries (Dykes, 2006).

In the UK, breastfeeding rates are amongst the lowest in Europe (Griffiths, Tate, Dezateux, & the Millennium Cohort Study Child Health Group, 2005). The UK national survey of infant feeding practices has been carried out every five years since 1975: in 2010 the survey demonstrated that the incidence of breastfeeding (defined as the percentage of babies who were put to the breast, even if only on one

occasion) had increased from 76% in 2005 to 81% in 2010 (The NHS Information Centre, IFF Research, 2011). There has been a gradual increase in this figure since 1990 when it was 62%. Initial breastfeeding rates were highest in England (83%), with the figures for Scotland, Wales and Northern Ireland being 74%, 71% and 64% respectively (The NHS Information Centre, IFF Research, 2011). The DH also collects figures about breastfeeding from Primary Care Trusts (PCTs) on a quarterly basis. In England, during 2011/12 Quarter three, the breastfeeding initiation rate was 74.1%, slightly higher than in previous years, with the breastfeeding rate at six-eight weeks being 47.0%, slightly higher than the figure of 45.7% for the same period in 2010/11(DH, 2012). Although breastfeeding initiation has increased over recent years, its continuation has not improved much over the last 25 years and less than 1% 0f UK infants are reported to be breastfed exclusively at six months (Bolling et al., 2007).

A fairly consistent pattern of variation in the incidence of breastfeeding according to various socio-demographic characteristics has been demonstrated. Rates are higher among mothers of first babies than later babies (UK 84%/78%, England 85%/80%), among older mothers than younger mothers, and among those who leave full time education later (The NHS Information Centre, IFF Research, 2011), with educated mothers less likely to stop breastfeeding before four months than less educated mothers (Griffiths, Tate, Dezateux, & the Millennium Cohort Study Child Health Group, 2007). There is an association between any breastfeeding and higher socio-economic status (The NHS Information Centre, IFF Research, 2011; Wright, Parkinson, & Scott, 2006), and from the Millennium Cohort Study Griffiths et al. (2005) reported that socioeconomic status positively correlated with continuation of breastfeeding in white women. In relation to employment, Earland, Ibrahim, & Harpin (1997) reported that in a study of 55 UK mothers those in employment stopped breastfeeding earlier than those who were not, a finding also reported in the 2000 Infant Feeding Survey (Hamlyn et al., 2002). The importance of maternal ethnicity was also highlighted in the 2000 Infant Feeding Survey, and the Millennium Cohort Study has helped to demonstrate this further: in the UK, white women were less likely to breastfeed than women from all other ethnic groups (Griffiths et al., 2005). For white women, having a partner of a different ethnicity or living in an area with high ethnic minority communities were associated with a greater likelihood of breastfeeding, and white mothers were more likely to stop breastfeeding at any point than mothers from other ethnic groups (Griffiths et al., 2005).

3.4.1 How mothers make decisions about milk feeding

Descriptive studies have identified many socio-demographic factors, such as those outlined above, associated with milk feeding decisions (Dennis, 2002; Scott & Binns, 1999). As outlined in Chapter 1, the milk feeding decision has been conceptualised as rational and a matter of individual choice, whereas it is likely to be a much more complex and multifaceted process (Sheehan et al., 2010). Milk feeding decisions can be influenced by many things, for example: culture; social circumstances; the family situation; health of the baby; and the health of the mother, her previous experience, other roles, and employment plans (Hoddinott et al., 2012; Kirkland & Fein, 2003; Murphy, 1999; O'Brien, Buikstra, Fallon, & Hegney, 2009). Studies have reported that women often 'decide' how they will milk feed their baby before conception or early in their pregnancy (Chambers & McInnes, 2006; Earle, 2002), and that this decision is unrelated to any promotion of breastfeeding by health professionals (Earle, 2002). Antenatal breastfeeding intention and postnatal behaviour are highly correlated (Chambers & McInnes, 2006) and women's antenatal statements are often accurate predictors of whether or not they will initiate breastfeeding (Murphy, 1999). In addition, there is some evidence that those who decide to breastfeed before they are pregnant continue to breastfeed for longer than those who make the decision during pregnancy (Andrew & Harvey, 2011). So, what influences may affect a woman's decision to breast or formula feed her baby initially, and to continue or cease breastfeeding?

It is clear that both women who choose to breastfeed and those who choose to formula feed have heard the 'breast is best' message (Andrew & Harvey, 2011; Burns, Schmied, Sheehan, & Fenwick, 2010; Hoddinott & Pill, 1999; Sheehan et al., 2010). Amongst breastfeeding mothers, the 'breast is best' mantra has been identified as influential in their decision to breastfeed (Andrew & Harvey, 2011; Burns et al., 2010). Women report deciding to breastfeed because it is 'natural' (Dykes, 2005), and good for the baby in terms of nutrition and immunity (Murphy, 1999; Dykes, 2005; Schmied, Sheehan, & Barclay, 2001). For some women the 'breast is best' message can be so powerful that they view formula feeding as second best (Murphy, 2000; Sheehan et al., 2010). It has also been suggested that 'breast is best' conveys to women that breastfeeding is the 'right' thing to do (Dykes, 2005; Sheehan et al., 2010). For many women, being a 'good' mother and breastfeeding are linked (Hauck & Irurita, 2003; Murphy, 2000; Schmied et al., 2001; Shakespeare, Blake, & Garcia, 2004). Therefore, not only can women feel pressured externally because of 'breast is best', they can put pressure on

themselves to breastfeed, or continue breastfeeding, because of it (Sheehan et al., 2010). However, some women have viewed the message as propaganda (Hoddinott et al., 2012), and even breastfeeding women have expressed distrust in it. Unsurprisingly, these women are less likely to continue breastfeeding (Andrew & Harvey, 2011).

Formula-feeding women are also usually aware of the 'breast is best' message (Hoddinott & Pill, 1999). However, formula-feeding mothers are more likely to question the benefits of breast milk: these mothers may listen to health professionals' advice and consider it in the light of their own experience, rather than consider it fact (Andrew & Harvey, 2011). Some women who formula feed may feel a need to justify not breastfeeding (Andrew & Harvey, 2011), which can be achieved through expressing distrust in the message.

Dykes (2005; 2006) argues that despite the 'breast is best' message, the UK is a country with a predominantly bottle-feeding culture, although there are geographical variations. This has generated circumstances which impact on a woman's milk feeding decision. For example, research has indicated that many adults and children have never seen a woman breastfeed (Dykes, 2006), and embarrassment or concern about breastfeeding in public are frequently articulated reasons not to commence breastfeeding (Andrew & Harvey, 2011; Dykes, 2006; McFadden & Toole, 2006). Hoddinott and Pill (1999) carried out a qualitative study with 21 women from the east end of London who were expecting their first baby. They concluded that women who had regularly seen a relative or friend breastfeed and described this positively were more committed to and confident about breastfeeding, although those who had only seen a stranger breastfeeding often described this as a negative experience. Hoddinott and Pill (1999) argued that positive experiences allowed mothers to accumulate 'embodied knowledge', that is knowledge gained through direct visual or practical experience of a skill such as breastfeeding. This was more important than theoretical knowledge, in this case knowing what the health advantages of breastfeeding were. More recent work has confirmed these findings. In a study of women in rural Scotland, Hoddinott, Kroll, Raja, and Lee (2010) found that of 259 pregnant women who had not breastfed before, those who reported seeing breastfeeding in the preceding 12 months were more likely to agree with the statement 'It was lovely to see her breastfeed' than those who had not. They concluded that positive attitudes to recently seen breastfeeding were more important determinants of feeding intention than age of first seeing breastfeeding,

the relationship of the person being seen and seeing breastfeeding in the media (Hoddinott et al., 2010). Finally, in another UK qualitative interview study of 12 women with babies aged seven to 13 weeks, Andrew and Harvey (2011) reported that those who had witnessed breastfeeding, or perceived breastfeeding to be the norm, breastfed for longer than those who had rarely seen breastfeeding.

Expectations of breastfeeding can also affect whether a woman breastfeeds and for how long. The idea of breastfeeding as 'natural' means that some women perceive it to be easy, and to think that if they really want to do it they will be able to (Sheehan et al., 2010). Antenatal preparation does not always provide an adequate picture of the difficulties that might be associated with breastfeeding (Burns et al., 2010; Hoddinott et al., 2012). In their qualitative study, Andrew & Harvey (2011) noted that their participants described breastfeeding as a skill that had to be learned, rather than the natural, easy process that some expected. Research has shown that women with realistic expectations are likely to breastfeed for longer than those with unrealistic expectations (Hauck & Irurita, 2003; Hegney, Fallon, & O'Brien, 2008). Other studies have indicated that, far from thinking it will be easy, many women lack confidence in their ability to breastfeed (Bailey, Pain, & Aarvold, 2004; Blyth et al., 2002; Hoddinott et al., 2012; Hoddinott & Pill, 1999). The importance of confidence has been demonstrated in a number of studies (Blyth et al., 2002) and a lack of confidence antenatally is associated with early cessation of breastfeeding (Ertem, Votto, & Leventhal, 2002). Previous experience is also important, and difficulties breastfeeding a first child can precipitate mothers to formula feed a second (Andrew & Harvey, 2011).

Family and personal circumstances also influence mothers' milk feeding decisions. It has been demonstrated that an infant's father and grandmother, particularly the maternal grandmother, are likely to be important influences in the decision to breast or formula feed (Andrew & Harvey, 2011; Reid, Schmied, & Beale, 2010). Stewart-Knox, Gardiner, and Wright (2003) identified having older children as a barrier to breastfeeding, as mothers with older children need to leave the home more often and as outlined many women have concerns about breastfeeding in public places. Some women choose to formula feed as they are planning to return to paid employment (Murphy, 1999). Earle (2002) found that women who wanted to maintain a strong personal identity after giving birth perceived breastfeeding as potentially damaging to this. For example, the time required for breastfeeding contributed to a feeling of loss of independence for some women in Andrew and

Harvey's study (2011), which could be exacerbated if they are not able to go out easily because of anxieties related to feeding in public (Andrew & Harvey, 2011; Murphy, 1999).

Early cessation of breastfeeding is defined as stopping within three months of birth (Shakespeare et al., 2004). Socio-demographic factors associated with early cessation are very similar to those associated with not commencing breastfeeding, so younger women, women leaving education at 16 years or below, and white women have all been identified as likely to finish breastfeeding earlier than other groups (Avery, Duckett, Dodgson, Savik, & Henly, 1998; Hoddinott, Pill, & Hood, 2000). Postnatally, women's confidence in their breastfeeding skills is as important as it is antenatally, and in an Australian study Blyth et al. (2002) demonstrated that maternal confidence was significantly associated with exclusive breastfeeding at one month and four months. However, many women continue to lack confidence in their ability to breastfeed, even after they have commenced doing so (Dykes, 2005) and a major reason given by women for the early cessation of breastfeeding is difficulties with carrying it out (Andrew & Harvey, 2011; Dennis, 2002; Hamlyn et al., 2002; Renfrew et al., 2005). The most commonly mentioned difficulty is perceived insufficient milk supply (Andrew & Harvey, 2011; Avery et al., 1998; Blyth et al., 2002; Dykes, 2005). Wright, Parkinson, and Drewett (2006) found an association between cessation of breastfeeding and frequent feeding, which could be linked to ideas of insufficient supply. Finally, just as in the initial decision to formula or breastfeed, family can have an impact on a woman's decision to cease breastfeeding. In a Canadian study, Morse & Harrison (1987) found that amongst established breastfeeding mothers, the attitude of others such as partners, parents and friends changed over time, initially being supportive of the mother breastfeeding but becoming less supportive when the infant reached six+ months. They suggested that there was social coercion to discontinue breastfeeding based on cultural norms.

There is a vast literature about supporting women who wish to breastfeed, or are doing so, but this is beyond the scope of this review. However, of relevance to this study is how women's relationships with health professionals develop during this early period. Briefly, according to Burns et al. (2010), in Western societies breastfeeding knowledge is delivered principally by health professionals (Burns et al., 2010). However, it has been demonstrated that professional knowledge and support are not always viewed positively by women, who complain about receiving incorrect or conflicting advice (Britton, McCormick, Renfrew, Wade, & King, 2007;

Dykes, 2006; McFadden & Toole, 2006; McInnes & Chambers, 2008). It has been suggested that health practitioners are ill-prepared to support breastfeeding women (McFadden, Renfrew, Dykes, & Burt, 2006) and that there is inadequate integration of embodied, vicarious, practice-based and formal knowledge in strategies to equip practitioners with the education they require to do so (Dykes, 2006). Peer support is sometimes favoured by women, because of the use of lay language and practical suggestions (Britton et al., 2007; McInnes & Chambers, 2008). However, social support may be undermining if there is a lack of breastfeeding knowledge or experience within the social group (McInnes & Chambers, 2008).

3.5 Infant milk feeding and the development of overweight

Formula feeding has been found to be associated with an increased risk of obesity in childhood (Gillman et al., 2001). As far as breastfeeding is concerned, there is a large amount of contradictory evidence about the possible role it may have in protecting against later overweight (Reilly et al., 2007). Many population based studies have identified an association between breastfeeding and a lower risk of overweight in childhood and a number of systematic reviews have demonstrated this (Arenz et al., 2004; Harder et al., 2005; Owen et al., 2005). As these reviews are based on observational studies confounding factors are an important possibility to consider. For example, lower maternal social class and maternal obesity are both associated with formula feeding and associated with obesity in children (Owen et al., 2005). Therefore such studies have been unable to establish causation (Singhal & Lanigan, 2007). Nevertheless, it has been concluded that although the precise magnitude of the association is unclear (Owen et al., 2005), there does seem to be a small but consistent protective effect of breastfeeding against obesity in children (Arenz et al., 2004), although other genetic and environmental determinants such as socioeconomic status and parental obesity may be more important (Butte, 2009). In addition, a dose-response relationship has been demonstrated, whereby a longer duration of breastfeeding is associated with a lower tendency to obesity (Harder et al., 2005), and exclusive breastfeeding seemed to be more protective than combination feeding (Arenz et al., 2004; Owen et al., 2005).

The mechanisms by which breastfeeding may convey a lower risk of overweight have been hypothesised to be behavioural, nutritional, or through effects on growth (Singhal & Lanigan, 2007). A number of behavioural mechanisms have been suggested. Breastfed babies control the amount of milk they consume, and so may learn to regulate their own energy intake better than bottle-fed babies (Savage et

al., 2007; Singhal & Lanigan, 2007). A breastfeeding mother cannot directly assess the amount of milk that is consumed and so has to rely on satiety cues from the infant (Bartok & Ventura, 2009). Conversely, when bottle feeding a mother can monitor how much is consumed, bottle feeding takes less effort for an infant who is arguably more passive, and these factors have the potential to lead to overfeeding (Bartok & Ventura, 2009; Savage et al., 2007). Thus, an infant's ability to self-regulate nutrient intake may be overridden by the behaviour of caregivers (Bartok & Ventura, 2009). There is also evidence that maternal diet can influence the flavour of breast milk, so a breastfed baby will be exposed to changing flavours whereas a formula-fed baby will have a consistent flavour. It has been hypothesised that early exposure to flavours increases acceptance of such foods on commencing solids, especially foods that may not be readily accepted such as vegetables (Savage et al., 2007). Another behavioural explanation is that breastfeeding is more common in families that have healthier dietary and other lifestyle habits anyway (Singhal & Lanigan, 2007).

Nutritionally, it could be that a number of bioactive nutrients present in breast milk, but not in all formula milks, are protective against the development of overweight, for example long-chain polyunsaturated fatty acids (Ailhaud & Guesnet, 2004; Bartok & Ventura, 2009; Groh-Wargo et al., 2005). Breast milk contains less protein than formula milks and a lower protein intake in infancy is associated with less overweight in childhood (Scaglioni et al., 2000), possibly because a higher protein intake stimulates the release of insulin which makes overweight more likely. Finally, Singhal and Lucas (2004) suggested that as breastfed babies have a slower pattern of growth compared to formula-fed infants, it may be this that makes overweight less likely to develop. The growth acceleration hypothesis suggests that faster post-natal growth, crossing centiles, particularly in infancy, can programme several components of the metabolic syndrome, including obesity (Singhal & Lucas, 2004). The evidence relating to faster growth and childhood obesity was reviewed in Chapter 2.

3.6 Mothers' weaning practices

Parents control the timing of weaning and the foods that are introduced: generally, it is mothers who decide when, what and how to feed their infants (White, 2009). However, as is evident, the timing of weaning, (and to a lesser extent which foods should be introduced and when) are debated issues which have the potential to cause uncertainty for parents negotiating this transition, partly underpinned by the

disparity that exists between global, European, UK and other local recommendations about weaning practices (Allcutt & Sweeney, 2010). Against this background, research has indicated that many mothers do not follow published weaning guidelines, particularly regarding the timing of the introduction of solid foods, tending to wean earlier than such recommendations suggest (Arden, 2010; Foote & Marriott, 2003), which will be explored further in Section 3.6.2.

For example, in a study conducted in five European countries (Germany, Italy, Scotland, Spain and Sweden), Synnott et al. (2007) found that although the age at which solid food was introduced varied slightly between countries, with the exception of Germany, most parents had introduced solids by four months of age or less. Similarly, although the AAP recommends six months as the age for weaning onto solid food, one-third of American infants are fed solid foods prior to four months of age) (Hetzner et al., 2009). In a prospective observational study in Ireland, Tarrant et al. (2010) identified that only one woman out of 401 followed the WHO recommendation to breastfeed exclusively for six months and ninety-one infants (22.6%) were weaned onto solids before or at 12 weeks of age. In total, 75% of infants were weaned before the minimum recommended weaning time of four months or 17 weeks (Tarrant et al., 2010).

Similar patterns are evident in the UK. The Infant Feeding Survey carried out in 2000 (Hamlyn et al., 2002) demonstrated that 85% of UK mothers introduced solid foods before the then recommended age of four months. Shortly after the recommended age for weaning had been increased to six months, Wright et al. (2004) studied a cohort of 923 term infants and found that 21% had commenced weaning before three months of age and only 6% were weaned after four months. In 2005 the Infant Feeding Survey (Bolling et al., 2007) indicated that less than 1% of mothers were breastfeeding exclusively for six months and 98% of babies had been given solids by six months of age, with just 2% of mothers delaying the introduction of solids until six months. However, this survey demonstrated a trend towards mothers introducing solids later in 2005 compared with 2000, as the mean age for the introduction of solids was 19 weeks, compared with 15 in 2000 (Bolling et al., 2007; SACN, 2008). This was despite the labelling of commercially available weaning foods as suitable for infants from four months (SACN, 2008). The trend for the later introduction of solids identified was mainly attributable to a shift in the proportion of mothers commencing weaning between four and five months (rather than earlier) (Fewtrell et al., 2011). It could be that knowledge of the WHO

recommendation to delay the commencement of weaning until six months of age has influenced health professionals and mothers and contributed to a reduction in the proportion of infants starting solids very early (Wright, Cameron, Tsiaka, & Parkinson, 2011). In addition, the impact of the UK six month recommendation may become greater over the years (Fewtrell et al., 2011).

There is evidence that weaning is socially patterned and sociodemographic characteristics influence many aspects of infant feeding (Anderson et al., 2007; Davies & O'Hare, 2004; Dubois & Girard, 2003; Griffiths et al., 2007). Poverty may be a factor in determining the age at which complementary feeding is introduced (Lanigan et al., 2001), with mothers living in socially deprived circumstances likely to wean earlier than those living in more affluent conditions (Alder et al., 2004; Savage, Reilly, Edwards, & Durnin, 1998; Tarrant et al., 2010; White, 2009). White mothers have been reported as more likely to introduce solids earlier than most other ethnic groups (Griffiths et al., 2007). There is also evidence that younger mothers wean earlier than older mothers (Alder et al., 2004; Moore, Milligan, & Goff, 2011; Savage et al., 1998; Tarrant et al., 2010) and that formula fed infants are weaned earlier than breastfed infants (Moore et al., 2011; Noble & Emmett, 2006; Savage et al., 1998; Tarrant et al., 2010). In their European study Synott et al. (2007) found that infant feeding guidelines were followed more closely with a first infant than with subsequent infants, a finding reflected by Moore et al. (2011) who found an association between first time parenthood and later weaning in a UK study. However, in a study of 114 Scottish women White (2009) did not find that first time parenthood significantly affected the timing of weaning. Differences have also been identified in the way that weaning is managed in boys and girls. There is evidence to suggest that boys are weaned earlier than girls (Alder et al., 2004; Wright et al., 2004), although this may be related to the fact that boys tend to be larger at birth thus having higher energy requirements and feeding drive (Wright et al., 2004), and therefore possibly appearing hungrier earlier. Other studies, however, have not found this association, for example in White's Scottish study (2009) the baby's sex did not significantly affect the timing of weaning.

In terms of the type of foods that infants are first weaned with, gruels based on a country's staple cereals are commonly used, for example in India (Singh, Sachdev, Nagpal, Bajaj, & Dubey, 2005), Nepal (Moffat, 2001), and Senegal (Simondon & Simondon, 1995). In the UK, iron-fortified infant cereal (Freeman, Hof, & Haschke, 2000), or foods such as baby rice, which has been the most common first food in

the UK, are offered initially (Seaman, D'Alessandro, & Swannie, 1996). The 2005 infant feeding survey in the UK indicated that at the age of four to six months babies were more likely to be given manufactured baby foods than home-prepared (Bolling et al., 2007), with the use of home-prepared food increasing by the age of eight to ten months (SACN, 2008). In addition, the 2005 survey indicated that a higher proportion of mothers were following advice to avoid the use of salt, nuts and honey in their infants' diets than in 2000 (SACN, 2008).

3.6.1 Baby-led weaning

An alternative approach to traditional weaning methods has recently emerged in the UK, that of baby-led weaning (BLW) (Brown & Lee, 2011a). The BLW approach was originally advocated by Rapley in 2003, based on an observational study of six UK infants, all of whom could self-feed by 6.5 months (Rapley, 2003). However, this was a very small sample size, and no information about the amount of food ingested was provided (Brown & Lee, 2011a). Rather than beginning weaning with pureed and mashed food, the BLW approach encourages the introduction of foods in their whole form to an infant from the age of six months (Townsend & Pitchford, 2012). There are three fundamental principles of BLW: food items are offered to the infant in their whole form as finger foods; infants self-feed, ingesting through their own actions rather than spoon feeding; and infants join in family meals and share family foods straight away (Rapley & Murkett, 2008).

A number of reasons for the use of BLW, rather than traditional weaning methods, have been put forward. It has been argued that the use of purees and spoon feeding is an adaptation to the introduction of solids at an inappropriate age, in that 'solids' are offered to a baby before s/he is developmentally capable of ingesting them independently, and that it is preferable to wait until an infant is developmentally capable of feeding her/himself (Rapley, 2006; Rapley & Murkett (2008; Wright et al., 2011). It has also been suggested that the introduction of purees could delay the development of chewing skills, make infants prone to constipation and cause them to be fussy eaters (Rapley, 2006). The approach in BLW is to allow a baby to eat for themselves, as soon as they are able, solid food that they can pick up and manoeuvre to their mouths. By the age of six months most babies have the necessary motor skills to do this, and are also able to chew and swallow. Thus, the baby retains more control of his or her intake, which, according to Rapley (2006), is a natural follow-on from breastfeeding for those babies who

have been fed in this manner, in that breastfed babies control the amount they ingest.

There is very little empirical research on BLW (Brown & Lee, 2011a), and the approach has been criticised on the grounds that there is a lack of scientific evidence on which to base it (Reeves, 2008). Anecdotally, the use of BLW is increasing in the UK (Brown & Lee, 2011a). There is a wealth of information about BLW available online in the form of dedicated web sites, message boards and internet forums (Brown & Lee, 2011a). In a study investigating what influenced mothers to start weaning, Arden (2010) found that a number of her participants, who were recruited through the internet, wrote about BLW. This all suggests that BLW may be being practised by parents on the basis of internet-sourced information, which may not be impartial (Brown & Lee, 2011a).

Of research that has been carried out into BLW, Brown and Lee (2011a) explored the demographic characteristics of mothers reporting the use of BLW methods in a sample of 655 UK women with a child between the age of 6 and 12 months, recruited through internet parenting sites and posters in nurseries and community centres. They found that mothers who used a BLW approach tended to have a higher education, higher occupation, be married, and have breastfed their infant. Brown and Lee (2011a) argued that a higher level of education could be associated with BLW because, as noted above, information about the approach is generally not available from mainstream sources and those with internet access tend to have a higher level of education (Brown & Lee, 2011a). No association was found between BLW and age, home ownership, or income, indicating that it is not only those with a higher socio-economic status who follow the approach however (Brown & Lee, 2011a).

In terms of attitudes towards feeding their infants, levels of anxiety about weaning and feeding were lower in mothers who adopted a BLW approach and they felt more confident in feeding their baby (Brown & Lee, 2011a; Brown & Lee 2011b; Townsend & Pitchford, 2012). A BLW approach was also associated with the later introduction of complementary foods (Brown & Lee, 2011a), with Moore et al. (2011) reporting that following the baby-led weaning approach was the most likely predictor of weaning at 26 weeks. In addition, BLW has been associated with a higher number of milk feeds, increased participation in family meal times, and less concern about mess or the amount of nutrients consumed (Brown & Lee, 2011a). Maternal

concern about food intake and pressure to eat during the pre-school years can be associated with increased fussiness, a poorer diet and lower weight (Ventura & Birch, 2008). Therefore if BLW mothers are less concerned, this may have a favourable impact on the future eating patterns of the infant (Brown & Lee, 2011a). Indeed it has been suggested that BLW reduces food fussiness and allows infants to self-regulate food intake according to their appetite (Brown & Lee, 2011b; Rapley, 2006; Rapley & Murkett, 2008). Although this is fairly speculative and there is little empirical evidence to support it directly (Brown & Lee, 2011a), research reported above would seem to support this assertion. In addition, a recent UK study of 155 children aged between 20 and 78 months demonstrated an association between a BLW feeding style, preference for carbohydrates and a lower BMI, concluding that BLW promotes healthy food preferences and may protect against obesity.

The BLW approach has as a basis the assumption that developmental readiness will reliably coincide with the nutritional need for complementary solids (Wright et al., 2011). It is suggested that an infant can continue to rely on breast milk until it is able to take nutritionally useful amounts of solids, usually at about 8 months (Rapley & Murkett, 2008). There are a limited number of studies which have investigated the age at which infants reach out for food and eat finger foods. In a study of 98 American infants, Carruth and Skinner (2002) found that mean age for 'eating finger foods without gagging' was 8.44 months and for 'feeds self cracker or cookie' was 7.7 months. A subsequent telephone survey of the caregivers of 3022 infants in America (Carruth et al., 2004) indicated that 68% of 4-6 month old children had begun grasping foods, although only 53% of 7-8 month old children were able to eat food that needed chewing. The authors concluded that assuming a variety of nutritious foods are offered to infants, caregivers may encourage self-feeding without concern for jeopardising energy and nutrient adequacy, although foods that needed chewing needed to be offered in relation to number of erupted teeth. This would seem to be supportive of a BLW approach. Similarly, in a UK study with relevant data for 602 infants, Wright et al. (2011) found that about half were reaching out for food and beginning to eat finger foods by the age of 6 months, and the majority were doing so by the age of 8 months.

However, these studies have indicated a range of ages at which infants will acquire the skills necessary to reach out for food and feed themselves, with less developmentally advanced infants doing so at a later age (Carruth & Skinner, 2002; Carruth et al., 2004; Wright et al., 2011). A developmental delay in gross, fine or

oral motor skills will delay the development of the ability to self-feed (Carruth & Skinner, 2002). Therefore, this raises questions about whether a BLW approach would be suitable for every infant and suggests that it may not be for those who have any delay in the development of their motor skills. In addition, Wright et al. (2011) argue that there is published evidence which suggests that the majority of infants need solids by the age of six months, but as indicated not all infants will have developed the ability to self-feed by that age. However, Carruth and Skinner (2002) argued that the developmental patterns of infants are influenced by culture. It may be, therefore, that in some cases infants are not given ample opportunities to exhibit certain behaviours. The Thelan theory (Thelan, 1995, in Carruth & Skinner, 2002) perceives development as the consequence of the system (the infant) and active exploration of the problem and how to solve it (in this case, to pick up and eat food). Some parents may limit their infant's opportunities to explore food because, for example, of the accompanying mess. Thus parents may need encouragement to allow their children to explore food and practices related to the feeding process and eating, and to develop appropriate age-related solutions (Carruth & Skinner, 2002).

Another potential issue with the BLW approach is that delaying the introduction of solids until six months risks missing a critical development window, which could lead to later feeding problems (Wright et al., 2011). There is little empirical evidence to support this, although as already reported the weaning period is increasingly recognised as a critical period for child health (Lanigan et al., 2001; Reeves, 2008). As reported earlier, one study has found that infants who started lumpy solids later (10 months or older) were more difficult to feed than those who were introduced to them earlier (Northstone et al., 2001). However, 10 months is very late for the introduction of lumpy food, and Northstone et al. (2001) point out that there is little else to suggest that the period before six months is a critical window for introducing solids. In conclusion to the BLW debate, Reeves (2008) has argued that to claim that consuming purées is not natural and that all infants should be weaned straight onto solid foods could be misleading, as it is a diet containing a mixture of foods, both purées and solids, that is likely to best satisfy an infant's nutritional requirements.

3.6.2 How mothers make decisions about weaning

How mothers decide to wean their babies warrants exploration (Arden, 2010; Hetzner et al., 2009; SACN, 2008), particularly in terms of understanding the socialisation of babies into patterns of feeding and eating that may be important for

understanding the early origins of overweight and obesity. In order to promote infant health, understanding how women account for their actions around when and how to wean their infant is crucial (Arden, 2010). It is important to understand mothers' thinking if advice and health education that will make sense to them is to be developed (SACN, 2008). Many commentators have suggested that weaning is something that parents worry about (Allcutt & Sweeney, 2010; Arden, 2010; Davies & O'Hare, 2004), and infant feeding depends on a successful interaction between parent and child (Wright et al, 2006). Ward Platt (2009) asserts that few issues in childcare are as emotionally charged as when and how to wean an infant. Indeed, providing food for an infant or small child in general can be an emotional issue and it has been suggested that any information given to parents about feeding their child needs to engage with the parents' emotions (Pagnini et al., 2007). Moving on through the process of feeding to weaning can be perceived as evidence that an infant is intelligent and progressing well (Murphy, 2003). Therefore, weaning is not something that parents are likely to do without some thought.

Much research has focussed on why parents wean their infants earlier than the age recommended by national guidelines. This is particularly important as there is evidence that mothers who wean earlier are also more likely to engage in other weaning practices not considered ideal, for example adding non-recommended condiments to food (Tarrant et al., 2010). Mothers may wean their infant earlier than the recommended age because they are not aware of the guidelines, however there is evidence that many mothers wean early despite being aware of them. For example, in an online survey of 3607 parents recruited from UK parenting websites, Moore et al. (2011) found a high level of knowledge about current weaning guidelines: at least 70% of parents in their sample accurately understood them. In this sample, knowledge of the guidelines was associated with later weaning but did not predict it, as 80% of those who weaned before 24 weeks and 65% of those who weaned before 17 weeks were aware of the guidelines (Moore et al., 2011). Therefore, it has been suggested that the recommendation to wean an infant at six months of age is not realistic for many mothers, that is, there are specific reasons why they decide to wean earlier (Hetzner et al., 2009), and in their recent study of 72 Scottish women it was evident that parents perceived that the six months exclusive breastfeeding recommendation was setting them up to fail (Hoddinott et al., 2012).

In most guidelines on infant feeding, commentators have stated that the developmental readiness of an individual infant should be taken into account when making a decision to commence a weaning diet. Many studies with parents have indicated that perceived signs from the baby are a central factor in the decision to commence weaning, that is, weaning is 'baby led' (White, 2009; Wright et al., 2004). In a questionnaire study completed by 105 mothers in the UK, Arden (2010) reported that mothers experienced a conflict between the recommendation to wait until six months and perceived signs from their babies that they were ready for food: waiting until six months could require mothers to ignore apparent signs of readiness to wean (Arden, 2010). The perceived needs of the baby have been reported to be generally more important to mothers than guidelines or external advice (Anderson et al., 2001; Savage et al., 1998; Synott et al., 2007; White, 2009; Wright et al., 2004), and research indicates that earlier introduction of solids is associated with a focus on signs from the baby (Anderson et al., 2001; Bolling et al., 2007; Synnott et al., 2007; Wright et al., 2004). Later weaning is associated with a focus on the 6 month recommendation as important, rather than a focus on signs from the baby (Arden, 2010).

In their European focus group study, Synott et al. (2007) reported that parents made weaning decisions based on signs from the baby and in a postal questionnaire survey of 114 Scottish mothers, White (2009) reported that the most common reason for the commencement of weaning was the impression that the infant was 'ready' (91%). When exploring what signs, or what parents mean by 'ready', it has been reported that many parents perceive that their baby is hungry (Anderson et al., 2001; Synott et al., 2007), requires more food (Savage et al., 1998), or is showing an interest in food (Synott et al., 2007). Signs such as these have been described as subjective (SACN, 2008), that is they require the parent to make a judgement based on the behaviour of the infant. Alternatively, what can be perceived as less subjective physical characteristics can be interpreted as a sign that an infant should be weaned (Alder et al., 2004). So, perceptions of readiness to wean can be the result of an infant teething (Alder et al., 2004) or reaching a certain age, weight or size (Anderson et al., 2001; White, 2009). Wright et al. (2004) observed that rapid weight gain up to the age of weaning was a predictor for weaning earlier than guideline recommendations. However, there is not a consensus on what signs from a baby indicate that s/he is ready to wean (Arden, 2010). The issue becomes more confusing as for some 'signs', timing may be important. For example, the UK DH weaning leaflet (DH, 2007) advises that if a baby seems hungrier than usual before

the age of six months they may be having a growth spurt and just require extra milk. However, if a baby of six months appears hungry, this is often judged as a sign that solids should be commenced (Arden, 2010).

Some research in the UK has indicated that weaning often occurs at a time which seems appropriate to the care giver (Hamlyn et al., 2002; SACN, 2008). It has been suggested that knowledge and understanding of healthy eating recommendations will influence an individual mother's feeding decisions (White, 2009), and beliefs about introducing solid food will be influenced by factors such as previous experience (Synnott et al., 2007). In an interview study of 338 Scottish women Alder et al. (2004) found that some mothers just did not agree with an age-related weaning guideline and did not believe that weaning 'early' would harm their infant. In addition, Murphy (2003) identified that mothers may have to balance their baby's needs with other obligations, both at home and in external settings. As an example of pressures at home, White (2009) reported that a common reason given for the commencement of weaning was the belief that it would help the baby to sleep better (40% of 114 women): mothers have been reported as often concerned with enabling both themselves and their partners to get a good night's sleep (Murphy, 2003). Hetzner et al. (2009) argue that one explanation for mothers not following weaning guidelines may be limitations of maternal time. This may be especially pertinent for mothers who work outside the home, and whether mothers do so has been observed to have an impact on infant feeding practices (Earland et al., 1997). In the 2005 UK Infant Feeding Survey (Bolling et al., 2007), age of introduction of solids was related to whether and when mothers returned to work, with those not returning or returning after their babies were six months of age introducing solids later than those who worked earlier (SACN, 2008).

As it is evident that many mothers introduce solid foods before the currently recommended age, one qualitative study explored how mothers react to possible accusations of maternal irresponsibility in this situation. Murphy (2003) describes how mothers establish themselves, rather than health professionals, as the experts in caring for their child. She argued that they subordinated the technical knowledge of the health professional to their own practical knowledge, that is to say, they considered the signs that they perceived their infant to be expressing and their knowledge of their own family situation to be more important than the theoretical knowledge of the health professionals. They became more confident in this as they went through the process of feeding and weaning their baby (Murphy, 2003).

Other research has focussed on the types of food that are first introduced to infants and whether parents follow guidelines concerning these. The 2005 UK Infant Feeding Survey indicated that a higher proportion of mothers were following advice to avoid the use of salt, nuts and honey in their infants' diets than in 2000 (SACN, 2008). Mothers stated that they avoided these foods because of concerns about allergies or because they thought that the food could be harmful to the baby. Generally, parents expressed a desire that their infant should be weaned onto 'healthy' foods, but various issues impacted upon this. For example, Synnott et al. (2007) found that whilst all of their focus group participants agreed that a healthy infant diet was important and claimed that they prioritised this when preparing food for their infant, they also explained that hectic lifestyles were a barrier to feeding their infant healthily. The majority of parents liked to prepare their infant's food at home, as this gave control over the ingredients used, fresh ingredients could be included, and they perceived that food tasted better (Synott et al., 2007). Some participants who used pre-prepared food did so because of convenience, and irregular working hours were cited by mothers as a barrier to healthy eating (Synnott et al., 2007). First born infants were more likely to have a diet resembling infant feeding guidelines than infants with older siblings (Robinson et al., 2007). This may relate to the competing priorities of the needs and food preferences of older children. These examples emphasise how competing priorities in a family may impact on infant feeding, and that practices may develop because they are appropriate to and fit in with other aspects of family life.

3.6.3 Where and when parents seek advice about weaning

Given the importance of early nutrition and feeding in the health, growth and development of infants, Weaver (2007) argued that it is crucial that parents are provided with guidance, support and information on good nutrition throughout pregnancy, infancy and early childhood. Formal advice about weaning and feeding very young children is much less plentiful than that about breast and bottle feeding (Weaver, 2007). For example, 34% of 98 women in the study carried out by Arden (2010) and 41% of mothers in Tarrant et al.'s 2010 study reported that they did not receive any professional advice about weaning. In an Irish study, 82% of 195 mothers questioned said that that they wanted more information on weaning (Bennett et al., 2011). Health care professionals can play a critical role in providing this advice, therefore they need to be aware of the latest and best scientific thinking and public health recommendations about infant and child nutrition (SACN, 2008; Weaver, 2007). However, conflicting research evidence and the disparity that exists

between global, European, UK and other local recommendations about weaning practices may be a source of confusion for health professionals (Allcutt & Sweeney, 2010; Hetzner et al., 2009). Although there has not been a lot of research examining the weaning advice provided by health professionals (Allcutt & Sweeney, 2010), evidence available suggests that they are not always aware of the current recommendations (Arden, 2010; Weaver, 2007; Williams & Pinnington, 2003), and may provide parents with inconsistent or incorrect advice (Allcutt & Sweeney, 2010; (Clark & Laing, 1990; Davies & O'Hare, 2004; Wallace & Kosmala-Anderson, 2007).

Health professionals can be very influential in terms of the decisions that parents make about feeding their infant. For example, in a prospective study of 95 educated North American women, Campbell, Soeken and Rankin (2007) concluded that the influence of health professionals on infant weaning practices had the potential to be as great as cultural values or material resources, White (2009) reported that one of the most common external influences on decisions about weaning in a sample of 114 Scottish mothers was the health visitor, and Ewing and Green (2000) demonstrated the significance of the health visitor in the UK in giving weaning advice. In general, later weaning is associated with advice from health professionals such as health visitors (Arden, 2010; Moore et al., 2011; SACN, 2008; Savage et al., 1998; Tarrant et al., 2010), and it has been suggested that receiving inconsistent advice from health professionals may help to explain why some parents choose not to follow weaning guidelines (Hetzner et al., 2009). In one study, later introduction of solid food was associated with rating health visitor support and advice as poor (Arden, 2010) a finding which is at odds with other research in which not agreeing with health professional advice would tend to lead to earlier weaning, for example Bolling et al. (2007) and Synnott et al. (2007). The European study (Synnott et al., 2007) found mixed attitudes regarding the credibility of infant feeding guidelines, but more positive attitudes towards the guidelines were found in countries where parents got most of their infant feeding advice from a health professional (Italy and Spain). In McDougall's study, mothers who had weaned early had usually made a decision to wean or had already started to wean before they consulted a health visitor (McDougall, 2003).

As health professionals can have a role in influencing parental weaning decisions, it would seem important that they receive adequate training in this area. However, Weaver (2007) has argued that subjects like feeding and nutrition are often neglected because of more immediate demands on the time of health care

professionals. In their study in Ireland, Allcutt and Sweeney (2010) concluded that targeted training of health professionals working with young families was necessary in order to improve the support and advice given to parents concerning weaning. Generally it has been suggested that there is a lack of training materials for people such as health visitors, and a lack of attention to feeding and infant nutrition in their training (Weaver, 2007). Continuing professional development in this field has also been described as poor (Weaver, 2007).

Given that formal advice about weaning is not generally plentiful, informal networks of family and friends have been important sources of information for parents considering weaning (Gildea, Sloan, & Stewart, 2009), for example 34.5% of White's (2009) 114 participants reported that their most common influences were family and friends. It is not clear what role fathers may take in decisions about weaning: research has indicated that they can have an important influence on the decision to breast or bottle feed, but there has been little research on their influence on the introduction of solid food (Anderson, Nicklas, Spence, & Kavanagh, 2009). In their interview study of 21 male caregivers, Anderson et al. (2009) found that although mothers were ultimately responsible for making decisions regarding feeding, fathers were important as a filter for information from others, as researchers for information regarding infant feeding recommendations, and as supporters of decisions made by the mothers. Other research has suggested that weaning practices are handed down from family and friends and are intuitive rather than informed (Daly, MacDonald, & Booth, 1998). This means that many parents rely on what could be considered inappropriate advice (White, 2009) and there is evidence that where parents rely on infant feeding advice from family and lay persons that advice is often inconsistent (Synott et al., 2007). However, the influence of family and friends on a mother's decisions about feeding should not be underestimated (McDougall, 2003). It has been demonstrated that earlier weaning tends to be based on informal advice from family or friends (SACN, 2008) and McDougall (2003) found that mothers who had weaned their baby at the recommended age reported pressure from family members and peers to wean earlier (McDougall, 2003). Tarrant et al. (2010) and Alder et al. (2004) also noted that if maternal grandmothers were the principal source of a mother's advice on the timing of weaning they tended to wean earlier (Tarrant et al., 2010).

Parents also access written advice about weaning. In a survey of Australian women Walker, Conn, Davies and Moore (2006) found that written information was the most

commonly used information source, and in the UK Arden (2010) found that mothers relied on books and leaflets to inform them about weaning. Synnott et al. (2007) found that information from baby food manufacturers, including leaflets and handouts, made it likely that mothers would wean earlier in Germany and Sweden. In the UK Alder et al. (2004) also reported that women who had received free samples of manufactured food were more likely to introduce solids earlier (Alder et al., 2004). However, Arden's (2010) relatively well educated UK mothers did not seem to be swayed by things like being in receipt of free baby weaning food or the labels on baby food.

The timing of advice about weaning may be important. Davies and O'Hare (2004) suggest that education about infant nutrition should start during the school years. Tarrant et al. (2010) found a significant association between mothers' antenatal reporting of when infants should be weaned and the time when they were actually weaned, and conclude that initiating weaning advice to parents during the antenatal period may result in parents weaning their infants later. In addition, it has been identified that a key determinant of the nature of an infant's diet is the quality of the mother's diet (Hart, Raynor, Jelalian, & Drotar, 2010; Robinson et al., 2007). Therefore, in order to promote a healthy diet in the infants, interventions to enhance healthy eating behaviour in the mothers should start early (Hart et al., 2010), certainly prior to the infant starting complementary feeding, and possibly antenatally. Some antenatal classes address weaning and infant nutrition, although the emphasis tends to be on milk feeding, particularly breastfeeding (Davies & O'Hare, 2004). Nevertheless, Moore et al. (2011) found an association between later weaning and attending antenatal classes, although this relationship may be confounded by socioeconomic group or education.

Postnatally, White (2009) found a significant association between the timing of advice about weaning (from health professionals) and when the baby was weaned, suggesting that there may be a risk in offering advice too early. This does not concur with the idea that mothers' thoughts about weaning antenatally will predict when they wean, but does suggest that the relationship between timing of advice about weaning and commencement of weaning requires further exploration (White, 2009). It has also been suggested that information about weaning needs to contain specific advice concerning healthy snacks, appropriate volumes of supplementary fluids and the home preparation of infant foods (Tarrant et al., 2010).

3.7 The introduction of complementary foods and the development of overweight

There is a variety of evidence concerning age at weaning and the development of overweight. A number of studies have concluded that the age of introduction of complementary food has no effect on the risk of obesity in infancy and childhood (Burdette, Whitaker, Hall, & Daniels, 2006; Kramer, 1981; Lanigan et al., 2001; Mehta, Specker, Bartholmey, Giddnes & Ho, 1998; Maffeis, Micciolo, Must, Zaffanello, & Pinelli, 1994; Morgan et al., 2004; Reilly et al., 2005). However, a Scottish study, which identified no relationship between the timing of the introduction of complementary foods and weight at age 2 years (Forsyth, Ogston, Clark, Florey, & Howie, 1993), found that children who had started complementary foods before 15 weeks had higher weight and body fat at 7 years than those starting complementary feeding later (Wilson et al., 1998). As the increased weight and body fat was not evident at 2 years of age this may have been a programming effect (EFSA, 2009), programming referring to the concept that an insult or stimulus applied at a critical or sensitive period may have long term effects on the structure or function of an organ, system or organism (EFSA, 2009). Seach, Dharmage, Lowe, and Dixon (2010) reported that the delayed introduction of solids was associated with reduced odds of childhood overweight in ten year old Australian children and Schack-Nielsen, Sørensen, Mortensen and Michaelsen (2010) found that although there was no association with overweight in childhood, the earlier introduction of solids was associated with a higher risk of overweight at aged 42 years. Conversely, in a six and a half year follow-up of infants who had been exclusively breast fed for six months, compared to those who had been exclusively breast fed until three months, the six month group had higher fatness indices (Kramer et al., 2009). The authors speculated that maybe faster growing children, who are likely to become fatter, were breast fed for longer because mothers were confident that their milk was providing sufficient nutrition, although there is evidence that faster growing infants are given solids earlier (Fewtrell, et al., 2011).

When the EFSA Panel examined the evidence about complementary feeding and the development of overweight, they concluded that, at that time (2009), there was insufficient evidence to show that the age of introduction of complementary foods had an impact on the development of obesity. There has been some new evidence, such as the studies by Schack-Neilsen et al. (2010) and Seach et al. (2010) detailed above. However, a subsequent systematic review of the association between age at introduction of solid foods and obesity in infancy and childhood found that there was

no clear association (Moorcroft, Marshall, & McCormick, 2011). The EFSA Panel pointed out, however, that when examining the evidence concerning the introduction of complementary feeding and overweight, it was necessary also to consider studies which have found a significant positive association between high growth rates in infancy and obesity. This is because an association between earlier weaning and higher growth rates has been suggested. Baker et al. (2004) found that infants weaned before 16 weeks gained significantly more weight during their first year. In addition, a study in Ireland reported that infants who were weaned before the age of four months were heavier at seven and 14 months than those weaned later and gained more weight between eight weeks and 14 months (Sloan, Gildea, Stewart, Sneddon, & Iwaniec, 2008).

However, conflicting findings have been reported. Two randomised intervention studies have demonstrated no significant improvement in growth from introducing complementary foods at four months compared to exclusive breastfeeding to six months (Cohen, Brown, Dewey, Canahuati, & Landa Rivera, 1994; Dewey, Cohen, Brown, & Landa Rivera, 1999), although Foote and Marriott (2003) state that the sample size in these studies was small. To explain these findings, there is evidence that infants between the ages of four and six months will decrease the amount of breast milk they drink if solids are introduced into their diet, therefore maintaining their energy intake before and after supplementation and resulting in there being no weight or length advantage of the introduction of solids before six months (Kramer & Kakuma, 2002).

In a study of 1,600 infants from five prospective randomised trials conducted in the UK between 1993 and 1997, Morgan et al. (2004) found that infants who received solids at or before 12 weeks of age were heavier at 12 weeks of age. This had been reported previously. However, they showed slower gain in weight, length and head circumference between 12 weeks and 18 months so that by 18 months of age there were no significant differences in size between the two groups. They concluded that: the effects of introducing solids before or after 12 weeks on growth and health outcomes during infancy were limited; larger infants are more likely to be given solids by 12 weeks; and the introduction of solids before 12 weeks does not result in accelerated growth, at least in infancy. Similarly, Wilson et al. (1998) reported increased body weight and body fatness in children who received solids before 15 weeks, although there was no apparent effect on weight in two year follow up and Mehta et al. (1998) found no differences in weight gain up to one year of age

according to the timing of the introduction of solid foods. However, Morgan et al. (2004) comment that such findings do not preclude the later emergence of programmed effects.

3.8 Parental feeding practices and the development of overweight

As childhood obesity initially occurs within the context of the family, parents may have a role in its increasing prevalence (Jackson, McDonald, Mannix, Faga & Firtko, 2005). Much research in this area has involved children after the period of weaning, but nevertheless this may be of relevance to the current study. Parenting practices in feeding can have long-term influences on an individual's dietary practices (Golan & Crow, 2004) and parental feeding strategies may thus play a role in the development of childhood overweight (Faith, Scanlon, Birch, Francis, & Sherry, 2004), which is partly what this study was designed to explore in relation to infants aged under one. The influence of parenting practices is for a number of reasons: parents usually control the amount and type of food available (Baughcum et al., 2000; Golan & Crow, 2004), and this is particularly so during the very early postnatal period; they help to shape the attitudes and behaviours children develop in relation to food (Gable & Lutz, 2000; Golan & Crow, 2004; Hodges, 2003; Jackson, Mannix, Faga, & McDonald, 2005; Savage et al., 2007); and they construct the family mealtime environment (Gable & Lutz, 2000; Hodges, 2003; Golan & Crow, 2004). Parental obesity is associated with childhood obesity (Reilly et al., 2005), which could indicate genetic factors, a shared environment, or both, as implicated in the development of overweight. Parental weight, knowledge of nutrition, and modelling of behaviours and attitudes may influence children's eating behaviours (Davison & Birch, 2001; Fisher & Birch, 1995). Perhaps unsurprisingly, an association has been found between the eating habits of children and those of their parents. For example, children choose to eat foods that are served most often and prefer what has been available and acceptable in the parental household. However, research has produced conflicting findings regarding whether children resemble their parents in food preferences and the role of modelling as an independent factor in children's eating behaviour is not clear (Golan & Crow, 2004).

Parenting styles are also thought to be important in the development of eating patterns, with both over-controlling and under-controlling parental attitudes associated with unfavourable child outcomes (Clark, Goyder, Bissell, Blank, & Peters, 2007; Gable & Lutz, 2000; Golan & Crow, 2004). It has been argued that highly controlling and restrictive feeding strategies interfere with children's ability to

self-regulate energy intake (Birch & Davison, 2001; Fisher & Birch, 1999), as do very laissez-faire attitudes (Gable & Lutz, 2000). Parents who think that their children are overweight, or at risk of becoming so, are likely to use restrictive feeding practices (Golan & Crow, 2004; Spruijt-Metz, Lindquist, Birch, Fisher & Goran, 2002). Controlling feeding practices may also be adopted by parents who are overweight themselves, or who have problems controlling their own food intake (Golan & Crow, 2004). Pressure in child feeding has been demonstrated to be negatively associated with fruit and vegetable intake, and parents with lower fruit and vegetable intake tend to put more pressure on their children to eat these foods (Golan & Crow, 2004), although the role of fruit and vegetable intake in the development of overweight in children is not clear (Reilly, 2007).

In the majority of western families it is women who hold the main responsibility for feeding children (Savage et al., 2007), and blame for increasing childhood overweight aimed at mothers has been evident in the media (Jackson et al., 2005). As women are increasingly employed outside the home children are frequently fed by someone other than a parent, for example grandparents or at nurseries (Savage et al., 2007). Children are also eating an increasing proportion of food that is prepared and consumed away from home in commercial food outlets (Savage et al., 2007), which increases the likelihood that they will be offered large portions, or can ask for or choose this if unsupervised. Families spend less time eating together than was the case in the past (Savage et al., 2007) and eating alone is more common (Golan & Crow, 2004). Research has suggested that when families eat together, with parents establishing a positive atmosphere and modelling appropriate food-related behaviour, the quality of children's diets is higher (Stanek, Abbott, & Cramer, 1990). In addition, parental presence at the evening meal and increased frequency of family meals have been positively associated with increased intake of fruits and vegetables by children (Golan & Crow, 2004).

3.9 Conclusions and implications for this study

It is evident that in the UK very few babies are breastfed exclusively for the recommended six months and that in many communities there is a strong bottle feeding culture. Bailey et al. (2004) suggest that as breastfeeding initiation rates are increasing, maybe 'failing at breastfeeding' has become a cultural norm whereas non-initiation was the norm in the past. There is a tendency to view decisions over milk feeding in a static way, rather than as an ongoing process which can be revised in relation to the changing circumstances of the mother and family. It is this

perception of feeding as a process which was central to the conceptualisation of weaning in this study, and it would seem to be applicable to milk feeding too.

It is also evident that there is a complex web of factors associated with the timing of weaning (Moore et al., 2011). Many mothers respond to perceived signs from their babies to help them decide to commence solid foods (Anderson et al., 2001; Arden, 2010; Savage et al., 1998; Synott et al., 2007; White, 2009; Wright et al., 2004). Consequently, a tension can exist between rigid feeding guidelines, with a prescribed age for weaning and a "one size fits all" approach (Foote & Marriott, 2003, p.488), and the notion that every baby is different (Arden, 2010). In order to offer effective support to parents, health professionals' weaning advice should be tailored to meet the needs of the individual mother and infant (McDougall, 2003). Synnott et al. (2007) argue that it is important that health professionals are aware of what may act as potential obstacles for parents in adopting particular feeding practices in order that weaning messages are realistic and acceptable (Allcutt & Sweeney, 2010). Where mothers choose to introduce solids before the recommended age of six months, SACN (2008) suggest that they should be encouraged by health professionals to follow the existing DH guidance (1994) on appropriate types and amounts of solid foods. From their Irish study of health professionals' practices in relation to supporting mothers through weaning, Allcutt and Sweeney (2010) concluded that, overall, advice needs to be consistent.

There are several themes running through the literature reviewed that have implications for this study. First, although it has been suggested that every baby needs to be treated as an individual, the nature of official advice and the tone of many commentators on weaning imply that babies are a homogenous group that can be treated in a standardised way to achieve the 'best' outcome, and that mothers make decisions in a rational way and follow them through. In reality, from the literature reviewed, it would appear that this is not the case. It is also apparent that parental feeding practices may have an influence on the development of overweight, so exploring these during weaning may be useful. Although much attention has been paid to issues such as when mothers wean or what weaning foods they use, there is a paucity of research exploring how and why they take the actions they do, which this study seeks to address. Second, much of the language used, in the guidelines, other official publications, and by researchers exploring weaning practices, seems to be about encouraging compliance amongst mothers, rather than empowering them to care for their baby. Finally, the backdrop of

changing weaning guidelines, and uncertainty about the applicability of the guidelines to all infants, has arguably led to some confusion and inconsistency in advice given by health professionals about weaning, therefore engendering confusion for mothers. All of these issues helped to inform the qualitative fieldwork in that they indicated avenues of possibly fruitful enquiry. They also provided a context in which to interpret the experience of mothers as they negotiated the weaning process, through which it was hoped that some light might be shed on the early development of overweight.

Chapter 4
Study design and methods

4.1 Introduction

In this chapter, the research strategy, study design and methods adopted in this research are described and explained. The process of carrying out the study, which used mixed methods and had two phases: a quantitative analysis of routinely collected infant weight data; and a longitudinal qualitative study of the process of weaning; is described in detail. The ethical issues inherent in the research and how these were managed throughout the study are also explored. The aim was to design a robust and ethically sound study.

4.2 Overall research strategy: philosophical foundations

The philosophical foundations of research have been argued about at length by researchers and theorists (Denscombe, 2009; Silverman, 2001), reflecting the importance of these foundations and how they manifest themselves (Denscombe, 2009). There has, however, been debate concerning the extent to which it is necessary for researchers actively to understand and engage with such discussions (Carter & Little, 2007; Cheater, 2003; Denscombe 2009; Robson, 2011). The philosophical arguments can be challenging, are often expressed in language which is difficult to understand with concepts defined differently by different researchers or theorists (Denscombe, 2009), and Robson (2011, p.41) has pointed out that many "real world researchers" have completed competent research with no explicit attention paid to its philosophical underpinnings. Nevertheless, there are compelling reasons for researchers to develop an understanding of the philosophical basis of their research.

Different philosophical perspectives can be used to think about the world and they have the potential to shape the nature of research, the questions asked, and methods used (Denscombe, 2009). In addition to being different, these perspectives have been perceived to be incompatible with each other (Denscombe 2009; Robson, 2011). Although many would now dispute the incompatibility argument (Bryman, 2008; Denscombe 2009; Robson, 2011), it can enhance research if researchers have an appreciation of why they do what they do. This can help to avoid the adoption of familiar practices without any thought being given to alternatives (Robson, 2011) and to sensitise researchers to the limitations of their

work resulting from their philosophical position (Denscombe, 2009). Carter and Little (2007, p.1324) argue that by understanding the philosophical basis for research practice, a researcher is likely to undertake that research in a "more nuanced and flexible way and to feel personally confident in her practice rather than blindly following a recipe". In this study, pragmatism (Denscombe, 2009; Robson, 2011) was used as an overall underpinning philosophical stance due to the nature of the enquiry being undertaken, which called for the use of both quantitative and qualitative research methods. Pragmatism will be introduced here, and the philosophical underpinnings of research will be revisited in Section 4.5 where phase two of the study is described, as they have been particularly vigorously debated in relation to social research.

Pragmatism is a philosophical stance which rejects the traditional dualisms between quantitative and qualitative research (for example, objectivity/subjectivity) and judges approaches to research according to the practical outcomes of their use (Denscombe, 2009). In terms of ontological assumptions, that is assumptions about the nature of reality, both social reality and physical reality (Carter & Little, 2007), pragmatism contends that social reality can be perceived as external to individuals and recognises the existence and importance of the natural or physical world (Burke Johnson & Onwuegbuzie, 2004). At the same time, the emergent social and psychological world which includes language, culture, human institutions and subjective thoughts is also acknowledged (Burke Johnson & Onwuegbuzie, 2004; Denscombe, 2009; Robson, 2011). From an epistemological point of view, that is questions about what can be considered acceptable knowledge and how that knowledge can be acquired (Denscombe, 2009; Henn, Weinstein, & Foard, 2006) pragmatism views knowledge as both constructed by human actors *and* based on the reality of the world, and all knowledge as fallible and provisional (Burke Johnson & Onwuegbuzie, 2004; Robson, 2011). A pragmatic approach embraces eclecticism: different or conflicting theories or perspectives can be seen as useful; and observation, experience and experiments are all perceived as helpful in understanding people and the world (Burke Johnson & Onwuegbuzie, 2004). Pragmatism is more concerned with how research addresses particular problems, than how consistent it is with particular ontological or epistemological positions (Denscombe, 2009). For these reasons, pragmatism often underpins mixed methods studies, such as this one. This mixed methods approach is explored below.

4.3 Overall study design: mixed methods research

Mixed methods research is research that integrates quantitative and qualitative research paradigms within a single project (Bryman, 2008; Robson, 2011). There has been an increase in the development and use of mixed methods research in recent years in a number of different disciplines such as educational research (Burke Johnson & Onwuegbuzie, 2004), health services research (O'Cathain, Murphy, & Nicholl, 2008), and the social sciences in general (Bryman, 2006; Creswell & Plano Clark, 2011; Denscombe, 2009; Robson, 2011). There are various ways in which quantitative and qualitative approaches can be combined (Punch, 2005) and a number of approaches to, or typologies of, mixed methods research have been developed (for example, Creswell, 2003; Creswell & Plano Clark, 2011). Although the development of these typologies has been criticised on the basis that they are largely theoretical rather than being informed by real examples of mixed methods research (Bryman, 2006), it has been argued that naming types of mixed methods research designs conveys a sense of rigour and gives a framework for understanding how a piece of research is to be carried out (Creswell, Plano Clark, Gutman, & Handson, in Bryman, 2006). Creswell and Plano Clark (2011) outline six major mixed methods research designs: convergent parallel design; explanatory sequential; exploratory sequential; embedded; transformative; and multiphase design. The explanatory sequential design is described as occurring in two phases, starting with the collection and analysis of quantitative data followed by a qualitative phase designed to help to explain, or at least shed light on, the quantitative results (Creswell & Plano Clark, 2011). This was broadly the design used for this study, as explained below.

There are many reasons for using mixed methods within a research study (Creswell & Plano Clark, 2011), although the ultimate aim is usually to draw from the strengths and minimise the weaknesses of both approaches (Burke Johnson & Onwuegbuzie, 2004). Bryman (2006) conducted research in which he searched the Social Sciences Citation Index over a ten year period (1994-2003) for published work that had used mixed methods and carried out an analysis of the reasons researchers gave for using quantitative and qualitative approaches. He identified 16 different reasons for combining the two strategies (Bryman, 2006, 2008). From this work Bryman (2006) concluded that researchers should be encouraged to make the grounds on which they used mixed methods research explicit. He also noted that many studies had multiple reasons for using mixed methods, and that new reasons for using them might emerge as a study progresses. Although they consider that

being responsive to emerging insights as a research study progresses is important, Creswell and Plano Clark (2011) argue that it is preferable that a researcher has at least one clear reason for using mixed methods at the commencement of a study. In terms of this study it was concluded that a mixed methods approach was appropriate for two reasons: quantitative and qualitative research answer different research questions; and qualitative work may contribute to illuminating or explaining quantitative findings. Specifically, the first phase of this study sought to investigate patterns of weight and overweight in young infants in Halton in an effort to establish if there was evidence of the very early development of overweight. Thus, using routinely collected quantitative data was an appropriate way to investigate this. The first phase of the study was descriptive and hypothesis generating. Subsequently, in phase two of the study, in order to explore possible ways of understanding the patterns of weight in infants revealed in the quantitative data, a qualitative approach was utilised to seek insight into the process of weaning from the perspective of mothers as they negotiated this transition, from which it was anticipated that a theoretical explanatory account could be generated. The following sections will describe these two phase of the study in detail.

4.4 Phase one - patterns of weight in Halton children

The first phase of the project was a descriptive epidemiological study involving the interrogation of a large routinely collected dataset of infant weights. From a philosophical point of view, it used standard scientific method. 'Weight' was viewed as a fact that could be validly and reliably measured and compared objectively to reference values. Descriptive epidemiological studies are primarily used for hypothesis generation and in this case patterns of weight in the data were described in order to establish if there was any evidence of the early development of overweight and obesity in young children in Halton. The full aim and objectives are detailed in Chapter 1 and the research design, procedure and methods are presented here.

4.4.1 Research design: a retrospective study

The study was retrospective, using data from a 13 year period for infants born between 1994 and 2006. There are many advantages in using this type of routinely collected data such as low cost and the size of the dataset, often covering whole populations (Bain, Chalmers, & Brewster, 1997) as was the case with these data. Birthweight, weight and length/height at eight weeks, eight months and 40 months of age were recorded on the Child Health System maintained at Western Cheshire

PCT for all births in Halton, since 1994. Birthweight data were obtained from birth notifications; subsequent measurements were carried out by health visitors during routine health surveillance and returned to the Child Health System manager for entry onto the database. All measurements were taken by trained NHS staff using standard procedures and instruments and data entry was undertaken by trained NHS clerical staff (K. Worthington, personal communication, January 12, 2007).

4.4.2 Research procedure and methods

Data were anonymised by the Child Health System manager and made available as a Notepad file. The data were transferred into an Excel database and data cleaning was undertaken to eliminate errors that would have occurred during the data collection and inputting processes (Singh, 2007). Data were available from 01/01/94 until 11/10/07: during this time 20,068 births were recorded in Halton. Initially, data for 2007 were excluded as this was an incomplete year, and all multiple births were excluded as they were likely to have lower birthweights than singleton births. These exclusions are shown in Table 4.4.2.1 below.

Table 4.4.2.1 Initial exclusions from the entire dataset

Excluded from the dataset	Number of births (total 20,068)
Births in 2007 (incomplete)	1,129
Twin births	477
Triplet births	21
No record of whether singleton/multiple birth	2,113
Births potentially included in study	**16,328**

At each measurement point (birth, eight weeks, eight months and 40 months) there were missing data which reduced the number of infants who could be included in the analysis at that stage. As infants and children were not all measured when they were aged exactly eight weeks, eight months or 40 months of age, a range of ages to be included in each age category was used. These are shown in Table 4.4.2.2 (overleaf). Age ranges used were similar to comparable epidemiological studies (for example Bundred et al., 2001; P. Bundred, personal communication, March 3, 2009). In any case, as each measurement taken was standardised for age (see description of data analysis below) the actual age at which every child was measured was taken into account. Nevertheless, it was decided to limit the range in order to strengthen the validity of the measurement point.

Table 4.4.2.2 Age category and age range

Age category	Age range included
8 weeks	4 weeks – 12 weeks
8 months	4 months – 12 months
40 months	2.5 years – 4.5 years

At the eight week measurement point, all measurements fell within the range of weeks specified. However, at the eight month and 40 month measurement points some infants were not measured within the age ranges specified and so were excluded for that measurement point. In addition, for the birthweight measurement, infants who had a gestational age of under 23 weeks or over 44 weeks were removed, as these were likely to be data inputting errors. These exclusions are displayed in Table 4.4.2.3 below.

Table 4.4.2.3 Exclusions at each measurement point

Excluded from the dataset	Number (%) of infants (out of 16,328 births)
Birth	
Missing data (birthweight or gestational age)	530
Gestational age below 23 weeks	4
Gestational age above 44 weeks	2
Total birthweight measurements available	**15,792 (97%)**
Eight weeks	
Missing data (weight or date of measurement)	3,719
Total eight week measurements available	**12,609 (77%)**
Eight months	
Missing data (weight or date of measurement)	5,354
Outside of age range	472
Total eight month measurements available	**10,502 (64%)**
40 months	
Missing data (weight/height or date of measurement)	5,378
Outside of age range	42
Total 40 month measurements available	**5,429 (50%)***

* Denominator 10,849 (births 1994-2002 for which 40 month measurement potentially undertaken)

4.4.3 Data analysis

For infants at birth, eight weeks and eight months of age weight measures were used in this analysis. For children at 40 months of age, body mass index (BMI) was utilised. There is widespread agreement on the use of the BMI to detect overweight and obesity in adults (SIGN, 2003). In children however, as detailed in Chapter 2, the BMI is not a static measurement, varying from birth until adulthood and between girls and boys. Nevertheless there is widespread international support for using BMI to define overweight and obesity in children once they have reached the age of 40 months (SIGN, 2003). Therefore, for this age group, BMI was calculated using the formula weight (kg)/height $(m)^2$. The height, weight and body mass index were standardised for age and sex with the British growth reference charts (Freeman et al., 1995; Cole, Freeman, & Preece, 1995) and the conversion programme obtained from the Child Growth Foundation (Child Growth Foundation, 1996). The resulting SD scores were used in calculations. A SD score of 0 represents the 50^{th} centile. An SD score ≥1.04 was above the 85^{th} centile for weight or BMI and ≥1.64 was above the 95^{th} centile. A BMI ≥85^{th} centile was defined as overweight and ≥95^{th} centile as obese (The NHS Information Centre, Lifestyle Statistics, 2009). Where weights or heights were more than 5 SDs from the mean they were excluded from the analysis as it was presumed that the data were likely to be erroneous, due to measurement or data entry error. The proportion of babies or children with SD scores equal to or above the 85^{th} or 95^{th} centile was compared to the expected values using the binomial test in the Statistical Package for the Social Sciences (SPSS), and the chi-squared test for trend (X^2_{trend}) was used to investigate trends in the proportions over the study period. Pearson correlations were used to look at birthweight over time, and also to investigate whether there was any relationship between SD scores at different measurement ages.

The purpose of these tests was to describe the patterns of weight in Halton infants and test out preliminary assumptions about the development of overweight and obesity in this population. Chapter 5 explores the findings in detail, but it is important to note at this juncture that the emerging findings from this phase of the study informed the development of the longitudinal qualitative study, which is described in detail in the next section. Specifically, patterns in the data indicated that, in some children, overweight was evident in early postnatal life. This finding formed a focal point for thinking about possible explanations for this phenomenon.

4.5 Phase two - longitudinal qualitative study of the process of weaning

The second phase of the study was a longitudinal qualitative study of the process of weaning from the perspective of mothers as they thought about and negotiated this transition. The full aim and objectives are detailed in Chapter 1. Weaning was conceptualised as a social process, and so this phase of the study was social research, that is research studying people, their social organisation or society. As indicated earlier, the philosophical underpinnings of social research have been much debated. Therefore, these philosophical discussions will be reviewed here in relation specifically to this phase of the study. Following this, quantitative and qualitative research paradigms, both of which can be utilised in social research, will be discussed. An issue which can be the basis for criticism of qualitative research and is salient to this study, that of the role of the researcher, is also looked at. Finally, the research design, methodology and methods for this phase of the study are outlined.

4.5.1 Ontological and epistemological considerations

Ontology and epistemology are central concepts in an understanding of the main philosophical positions in contemporary social research (Denscombe, 2009). Ontology is concerned with whether social entities are objective and have a reality external to social actors (an objectivist ontological position) or whether reality is a social construction (a constructionist[1] ontological position) (Bryman, 2008; Denscombe, 2009). An objectivist position implies that social phenomena are external and beyond the influence of the individual, that there is an objective reality that exists 'out there' (Denscombe, 2009). So for example, cultures would be perceived as the repositories of shared values and customs into which individuals are socialised. Constructionists would argue however that although culture may be a point of reference for individuals, it is in a continuous state of construction, as one set of cultural understandings cannot offer solutions to all of the problems that an individual might come across (Bryman, 2008). Using a constructionist approach, social reality is not viewed as inert, completely external to individuals, and acting as a constraint to them, but as something constantly being (re)formed (Bryman, 2008). That is, social reality is a subjective experience and people create and shape the social world, which is comprised of multiple realities (Denscombe, 2009). As weaning was conceptualised as a social process and the focus was on the experiences of mothers and how they understood this within the wider context of

[1] The term 'constructionist' is used throughout, although some writers (e.g. Charmaz) use the term 'constructivist' to refer to the same ontological leanings.

their lives, a constructionist ontological position was congruent with the aim of this phase of the study.

As far as epistemology is concerned, Carter and Little (2007, p.1319) describe it as “inescapable”, in that whether explicitly or implicitly, it is not possible to engage in knowledge creation without some assumptions about what knowledge is and how it is constructed. There has been considerable debate about whether the social world can and should be studied according to the same principles as the natural sciences (Bryman, 2008; Henn, Weinstein, & Foard, 2006; Robson, 2011), a debate which is therefore relevant to this study.

Positivism is an epistemological position which advocates the application of the natural science model of research to the study of social reality (Bryman, 2008). It is understandable how this position developed: “science” in the natural world was seen as a success, and in an attempt to replicate this success the research methods used by natural scientists were used in studies of the social world (Denscombe, 2009, p.120). Although positivism has been described as difficult to define (Bryman, 2008; Denscombe, 2009), it tends to place emphasis on knowledge that can be confirmed by the senses and on testing hypotheses (Bryman 2008; Dykes, 2004). Empirical observation is central, as to be credible theories need to be evidenced through the observation of events (Denscombe, 2009). Objectivity is also crucial from a positivist perspective (Bryman 2008; Dykes, 2004), with researchers maintaining a detached and impartial position (Denscombe, 2009). An alternative, and contrasting, epistemological stance, interpretivism, acknowledges the difference between people and the objects of the natural sciences, requiring researchers to look for the subjective meaning of social action (Bryman, 2008). The difference is that social reality has a meaning for human beings and humans act on the basis of the meanings that they attribute to their own acts and the acts of others (Bryman, 2008). From this stance, objective knowledge is not possible, as researchers are part of the world they study (Denscombe, 2009). The intellectual underpinnings of interpretivism include phenomenology, a philosophy concerned with how individuals make sense of the world, and symbolic interactionism, a theoretical perspective which views social interaction as taking place in terms of the meanings actors attach to actions and things (Bryman, 2008). Therefore, from an interpretivist perspective, interacting with people to explore how they make sense of and understand their social reality is a legitimate means of enquiry. As this phase of the study sought to

understand weaning from the perspective of mothers, an interpretivist epistemological position was appropriate.

4.5.2 Research paradigms: quantitative and qualitative approaches

Denscombe (2009) defines a research paradigm as a pattern or model of research. A research paradigm will include a philosophy of research, as explored above, and indeed specific research paradigms tend to be associated with particular ontological and epistemological perspectives, but paradigms also often encompass reference to the practices of research and the identification of particular research questions as most worthwhile (Denscombe, 2009). Additionally, the relationship between theory and research can have different emphases in alternative research paradigms (Bryman, 2008). Traditionally, in social research, it has been found helpful to distinguish between two paradigms: 'quantitative' and 'qualitative' research (Bryman, 2008). This distinction can be ambiguous, but nevertheless these terms have proved useful in conveying a general sense of the research approach (Bryman, 2008; Brannen, 2005; Denscombe, 2009) and so are used here in order to orientate this phase of the study.

Quantitative research is usually associated with objectivist ontological and positivist epistemological positions (Bryman, 2008; Brannen, 2005; Denscombe, 2009). As an approach to the study of the social world it emphasises quantification in the collection and analysis of data (Bryman, 2008). There is a focus on measurement, with precision, statistical analysis, repeatability, and comparison all being important (Bryman, 2008; Denscombe, 2010). Quantitative research is often concerned with causality and generalisation, and objectivity is key (Bryman, 2008; Denscombe, 2009). In essence, quantitative research on the social world is following the established pattern of research in the "so-called natural sciences" (Robson, 2011, p.17) such as physics, chemistry and biology, and it may be decontextualized and experimental, thus take place away from the field. Finally, quantitative research is usually deductive in terms of its relationship to theory, aiming to test hypotheses and theories (Bryman, 2008), although it can be descriptive too.

Qualitative research is generally associated with constructionist ontological and interpretivist epistemological positions (Bryman, 2008; Brannen, 2005; Denscombe, 2009), and was the approach used for this phase of the study. Reflecting these philosophical underpinnings, it emphasises words rather than quantification in the collection and analysis of data, and there is a particular emphasis on context,

process, and seeing through the eyes of those being studied (Bryman, 2008). It is concerned with human experiences and how people make sense of their social world (Gibbs, 2007), their socially constructed realities (Hallberg, 2006), and exploring the motivations that people have for doing what they do (Henn, Weinstein, & Foard, 2006). Qualitative research tends to be carried out in 'real life' settings in order to build up an understanding of how people experience the world around them (Henn et al., 2006), hence mothers were followed through the process of weaning. It is also often primarily inductive in nature, that is, the aim is to develop theory from the data, rather than to test pre-existing theories. However, qualitative research can be used to test theory (Silverman, 2001), and anyway much qualitative research requires some testing of theories as part of the research process, a feature particularly evident in the grounded theory approach (discussed below) (Bryman, 2008).

4.5.3 Role of the researcher

Objectivity and value neutrality have been seen as the hallmark of good 'scientific' research. In the quantitative research paradigm, the use of mathematical principles and standardised procedures for the collection and analysis of data were purported to minimise any influence of the researcher (Denscombe, 2009). "Quantitative purists" argued that not only the physical world, but the social world too, should and could be studied in an objective way (Burke Johnson & Onwuegbuzie, 2004). However, in reality, it is nearly impossible for social research to be objective, as such research will always be influenced by the values and predispositions of those undertaking it (Burke Johnson & Onwuegbuzie, 2004; Denscombe, 2009). The social researcher is studying a world of which they are a part, thus they cannot claim to be an objective, neutral observer (Denscombe, 2003; Gibbs, 2007). Even in quantitative research there are examples of subjectivity, for example in the choice of what to study, or the way in which collected data are interpreted and conclusions drawn from them (Burke Johnson & Onwuegbuzie, 2004). Data do not speak for themselves (Denscombe, 2009) but require intelligent interpretation. In addition, not only is complete objectivity in social research not possible, it is not necessarily desirable, as subjective awareness of situations may enable researchers to be alert to potentially important behaviours or emerging themes (Ahern, 1999).

Reflexivity is the recognition that the products of research reflect some of the background and predilections of the researcher (Gibbs, 2007), that is the researcher is part of the construction of knowledge (Bryman, 2008). Rather than claiming to be

objective, in order to view the world from the perspective of those being studied, a social researcher can make efforts to bracket off or suspend their own beliefs (Denscombe, 2003). They should also be aware of how their values may shape the nature of the research they are undertaking and acknowledge and make those values explicit to those who read their research findings (Denscombe, 2009). Some social researchers have argued that, rather than seeing objectivity and subjectivity dichotomously, it is more useful to think about degrees of detachment (Denscombe, 2009). The concept of involvement-detachment was developed by Elias (1987), who saw involvement-detachment in terms of an axis. Thus a researcher can be more or less involved in, or detached from, the entity that they are studying. Complete detachment is not achievable or desirable, and some involvement can lead to a deeper understanding, the important thing is to get an adequate blend of the two in order to generate valid data (Elias, 1987; Perry, Thurston, & Green, 2004).

It was this notion of involvement-detachment which was employed in this phase of the study. Although not feeding or weaning an infant at the time the study took place, I had breastfed my only child exclusively for four months and undertaken much reading about infant nutrition before weaning her onto a vegetarian diet, some 22 years previously. During preparation for the fieldwork I formed the view that this experience had shaped my ideas on how the infant feeding process should be conducted. Therefore, in order to maximise the validity of the study, the aim was to develop an approach based on an appropriate blend of involvement and detachment. Strategies used to do this included regular meetings with the supervisory team and debriefing after interviews in order to reflect upon and manage this involvement to 'maximise' the benefits and minimise the 'costs' (Perry, Thurston, & Green, 2004). Topics such as the development of the interview schedules, themes emerging from the data and alternative ways of categorising data were discussed recurrently at different stages of the study.

Another important aspect of the role of the researcher relates to the observation that in some situations humans react to the knowledge that they are being studied (Denscombe, 2009). There is the possibility that human research participants might alter or adjust their thinking or behaviour because of their involvement in the research: the process of data generation may actually alter what is being researched (Denscombe, 2009), a "reactive effect" (Bryman, 2008, p.468). In the qualitative phase of this study, there was evidence that participation had shaped women's thinking and behaviour in some small ways. For example, one participant

explained at her antenatal interview that she had been thinking about weaning as she knew that the interview was taking place, and that she did not think that she would have thought about it otherwise. Another participant stated that a telephone call received to arrange an interview had brought thoughts about weaning her son to the forefront of her mind, and that she had commenced weaning the next day. The possibility that research participants may feel that they are being judged may also lead to them not revealing aspects of their situation, or give what they perceive to be the 'correct' answer. In this study, effort was made to conduct the interviews in a non-judgemental way so that women were happy to talk about the reality of feeding their infant. For example, national weaning guidelines state that babies should be weaned at six months of age, and it was important that mothers were able to talk about weaning before this if they had done so.

4.5.4 Research design: a longitudinal study

As detailed in Chapter 1, much research into weaning has been retrospective and few have explored the relationship between antenatal weaning intentions and subsequent practice. Therefore, a longitudinal study design was used, with each participant being interviewed at more than one point in time (Bryman, 2008). In the social and behavioural sciences, longitudinal studies have an important role in enhancing understanding of 'natural' developmental processes and the analysis of change (Boys et al., 2003). By interviewing mothers on more than one occasion it was possible to elicit more accurately the timing and order of events (Bryman, 2008) as well as mothers' accounts of their actions. It was also possible to verify, clarify and check out issues raised at previous interviews, and so develop a deeper understanding of the women's perceptions and behaviour (Charmaz, 2004). The longitudinal nature of this study helped to maintain a sense of context and to guard against a loss of narrative flow (Coffey & Atkinson, 1996), as although the analytic coding process (described below) may have divided the data into discrete chunks, these were built back up by examining the experience of women over time in order to explore how the thoughts and perceptions of women developed during the experience of having and caring for their baby.

4.5.5 Research methodology: a grounded theory approach

A methodology can be defined as a strategy for approaching research (Carter & Little, 2007), and the grounded theory approach has become a popular choice of methodology among social researchers (Denscombe, 2010). It is, however, quite difficult to define, as grounded theory is both a strategy for doing research (Carter &

Little, 2007; Denscombe, 2010; Robson, 2011) and a particular style of analysing data (Bryman, 2008; Robson, 2011), each of which has a set of theories and techniques (Robson, 2011). In addition, since the development of the approach by Glaser and Strauss (1967), it has been taken forward in slightly different directions by various researchers (Charmaz, 2006; Corbin & Strauss, 2008; Strauss & Corbin, 1990), leading to a situation where there are different 'versions' of grounded theory (Charmaz, 2006). There has been a tendency for researchers to "adopt and adapt" grounded theory, using it selectively (Denscombe, 2010, p.107), and it has also been suggested that "grounded theory is honoured more in breach than in observance" (Bryman, 2008, p.541), with the term being used simply to indicate that the researcher has grounded their theory in the data, synonymous with an inductive approach (Bryman, 2008), characteristic of a qualitative research approach in general.

However, although within a grounded theory approach there is a commitment to generating theories from data, grounded theory is more than this (Robson, 2011). There are a number of basic ideas associated with the approach and Charmaz (2006, p.2) describes grounded theory methods as "systematic, yet flexible, guidelines for collecting and analysing qualitative data to construct theories grounded in the data themselves". Grounded theory is an approach well suited to qualitative research, exploratory research where little is known about a phenomenon, studies of human interaction and small-scale research (Denscombe, 2010). Although originally Glaser and Strauss (1967) claimed that the approach could be applied to quantitative data, and it is possible to incorporate such data into a grounded theory study (Robson, 2011), it has become firmly associated with qualitative work (Denscombe, 2010; Robson, 2011). Grounded theory has its roots in symbolic interactionism, which focuses on the interaction between people, assumes that society, reality and self are constructed through interaction (a constructionist approach) and so rely on language and communication, and explores how participants in social settings make sense of things through the use of symbolic actions. Therefore, it is also particularly appropriate for research where the aim is to explore practical activity and routine situations from the participants' point of view (Carter & Little, 2007; Charmaz, 2006; Denscombe, 2010; Dykes, 2004; Holloway & Wheeler, 2002). In addition grounded theory has its philosophical underpinnings in pragmatism in the sense that a good grounded theory should be practically useful, not just to social scientists but also to lay people (Denscombe, 2010).

Building on the work of Strauss and Corbin (1990), Charmaz (2000, 2006) has advocated a constructionist model of grounded theory, putting more emphasis on the researcher as interpreter (Denscombe, 2010). She contends that neither data nor theories are discovered, as alluded to in the original work of Glaser and Strauss (1967), but that researchers are part of the world they study and the data they generate, therefore grounded theories are constructed (Charmaz, 2006). Any theory offers an interpretation of the world, not an exact picture of it. Glaser has criticised this model of grounded theory, claiming that the concept 'constructionism' is used to legitimise 'forcing' of the data (Hallberg, 2006). Nevertheless, this version of grounded theory has been influential in the 2000s. Corbin has also developed her earlier work with Strauss to emphasise the existence of alternative perspectives and constructions of reality (Corbin & Strauss, 2008). It is this more constructionist approach which was adopted in this study. Grounded theory was employed because the study was small scale and exploratory; it aimed to focus on how mothers negotiated the process of weaning their infant, a practical and routine activity; and a constructionist model was adopted in order to try to capture the multiple perspectives of mothers on weaning their infants and to construct a theory to illuminate how mothers' approaches to weaning might be relevant to understanding weight gain in their children.

4.5.6 Research procedure and methods

In this section the process of the study will be detailed and the research method used, semi-structured in-depth interviews, will be explained. There are some fundamental characteristics that can be recognised in a grounded theory approach: the requirement to approach research with an open mind; theoretical sampling; simultaneous data collection and analysis; use of the constant comparative method; and, constructing codes, categories and theories from the data. These will be addressed as the study is outlined. Presenting the material in this way enables a clearer explanation of how the study was carried out.

4.5.6.1 Development of the proposal

In grounded theory research it is generally required that researchers approach their work with an open mind: that is they are not setting out to test a particular theory and should not be constrained by previous theories, although this does not mean that they should have a blank mind (Denscombe, 2010). Taken to the extreme, even a literature review prior to commencing the work may be prohibited, a stance taken by some early grounded theorists (Charmaz, 2006). However, most researchers

using a grounded theory approach accept that previous theories and personal experience will inevitably have an influence on the development of a research proposal, as well as throughout the research process (Denscombe, 2010). Henwood and Pidgeon (2003) argue that rather than ignore them, researchers should take a critical stance towards earlier theories. Previously held knowledge and extant concepts should be treated as problematic, provisional, and not necessarily 'right' (Charmaz, 2006; Denscombe, 2010). Background knowledge can be used as sensitising concepts, offering initial ideas to pursue and particular questions to ask, what Charmaz (2006, p.17) defines as "points of departure". This was the way in which the literature was used in the current study. A number of ideas that were considered potentially useful in pursuing the aim of this study were identified in the literature, as outlined in Chapter 1. These were used in the development of the research and when analysing the data in order to highlight issues that might be of interest. However, steps were taken, as outlined above, to try to ensure that they did not constrain the way in which the data were generated and analysed, in that other concepts generated from the data were actively pursued.

4.5.6.2 Recruitment of participants

In keeping with a grounded theory approach, sites for sampling women were chosen as they offered access to a wide range of mothers from across Halton, that is they were relevant sites (Denscombe, 2010). Sites were antenatal clinics at Widnes Health Centre, antenatal clinics at Halton Hospital, Runcorn, and parentcraft classes in Runcorn. Sampling in this study was purposive (Bowling, 2009), that is to say, deliberately non-random, in order to select individuals who, it was judged, were in the best position to act as key informants. Therefore women who were attending for NHS antenatal care were targeted. Generation and analysis of data is viewed as a simultaneous process in grounded theory. At first, purposive open sampling is used to maximise variations in experience amongst participants, then purposive theoretical sampling is undertaken to follow up theories from the data as analysis is carried out (Hallberg, 2006). Charmaz (2006, p.100) states "initial sampling in grounded theory is where you start, whereas theoretical sampling directs you where to go". It was intended to recruit a mixture of younger and older women, women having their first baby, women who had older children, and women who did and did not plan to work outside the home during their baby's first year. As recruitment progressed it was evident that this mix of participants was being gathered without any specific targeting or filtering of prospective participants, except for a lack of younger women. Therefore, a parentcraft class for younger mothers was

purposively targeted. Using a grounded theory approach means that initial sampling should continue until 'data saturation' is reached, hence new data do not add new information (Charmaz, 2006; Denscombe, 2010). Saturation is actually based on an informed judgement, as a researcher can never really know if further data collection would yield more information, so it is important not to start theoretical sampling too early (Hallberg, 2006). In this study, initial sampling was continued until it appeared data saturation had been reached, as additional interviews were not adding new ideas or insights, and early data analysis informed later interview questions. The discontinuation of sampling was also, in part, a pragmatic decision in terms of the time scale available for the research. In addition, in actual fact, data saturation in the antenatal interviews was reached before sampling was discontinued, but as it was anticipated that women would be lost to follow up, recruitment continued.

It was planned that as the study progressed and data saturation through purposive sampling was reached, theoretical sampling, a key facet of grounded theory (Bryman, 2008), would be utilised. In effect, when using theoretical sampling, a researcher is sampling concepts rather than people (Denscombe, 2010) and it is necessary to be flexible, that is to go where the data analysis indicates (Corbin & Strauss, 2008). Therefore, it cannot be stated at the beginning of a grounded theory study what the sample size will be. In this study, analysis of data commenced before recruitment was complete, but because of the way in which the antenatal clinic system was set up it proved to be impossible to identify women who may have been theoretically interesting, that is to say, to identify women who had specific previous experiences, in order to include them in the sample. For example, it may have been useful to recruit a woman who had a particularly difficult time weaning an older child. Instead, sampling on the basis of convenience actually occurred, that is any woman attending the sampling sites who agreed to participate was offered the opportunity to do so (Corbin & Strauss, 2008).

A problem often associated with longitudinal research is that of attrition, or loss of participants over the course of a study, for example through individuals moving house, becoming ill or dying, or deciding that they no longer want to take part in the research (Bryman, 2008). Attrition can present a threat to the integrity of a longitudinal study and to theory development resulting from the study (Marcellus, 2004). The focus of research into attrition has been in the context of quantitative studies (Marcellus, 2004), but nevertheless it needs to be considered within the context of qualitative work: Thomson, Plumridge and Holland (2003) identify the

importance of participant retention in longitudinal qualitative studies. Marcellus (2004) presents an ecological model of attrition in which factors concerning the participant, the study, the researcher and the environment combine to influence attrition, and recommends a "participant centred approach" (Marcellus, 2004, p.95). This model was used to consider attrition in the present study, as explored below.

As it was anticipated that not all participants would continue to contribute to the study until the end, that is participate in four interviews spanning the time from just before the birth of their infant until s/he was approximately nine months of age and therefore had commenced the process of weaning, it was decided to recruit more women than were judged adequate to address the research questions, as detailed above. Once women were recruited, attention was paid to developing a good rapport with them in order that they would feel comfortable, and be encouraged, to continue participating in the research. The researcher answered any questions that women had and gave them her contact details. A range of interview venues were offered (for example home, Children's Centre or other suitable community venue), but, initially, participants all opted to be interviewed in their own homes, which may have contributed to participation being as easy as possible for them. For later interviews, when some women had started working outside the home, a flexible approach was taken. Venues such as a convenient coffee shop during a woman's lunch hour, or a telephone interview, were suggested, if a home interview was no longer possible. One woman did elect to be interviewed in a coffee shop. Women were all offered a copy of the transcript of their interviews because it was considered that they might like a record of their thoughts and experiences, which many were interested to receive. It became evident over the course of the study that participants had an interest in the research as, for example, they asked questions about when they would be visited again, and offered advice about where to park or what was the best time of day to contact them to arrange appointments.

Whether individuals should be offered inducements to take part in research, or should be rewarded in some way, are controversial issues (Grant & Sugarman, 2004; Lavender & Briscoe, 2000; Manning, 2004). Manning (2004) argues that the majority view is that inducements should not be offered, although participants may be refunded travel or other expenses. Grant and Sugarman (2004) considered that inducements to participate were not a problem, with a number of exceptions: if the participant was in a dependency relationship with the researcher; where the risks of research were high; where research was degrading; where the participant would

only consent to the study if the incentive was relatively large because aversion to the study was great; and where aversion to the study was a principled one. No incentive to take part in this study was offered to potential participants. However, it was considered that it was appropriate to offer a token of thanks to participants at the end of their engagement with the work, so all mothers were given a high street shopping voucher. They did not know that they would receive this when they were recruited.

Between February and June 2011 a total of 11 antenatal clinics at Widnes Health Centre, 13 antenatal clinics at Halton Hospital, three parentcraft classes in Runcorn and one Runcorn parentcraft class specifically for younger mothers, were attended. At the clinics the receptionist informed women who were 30 weeks gestation or more that the research was taking place. The study was then explained face-to-face to each woman and an information sheet (Appendix 1) was provided. If a woman expressed an interest in the study, her name and contact details were taken, and it was explained that she would be contacted in approximately one week to ascertain if she was still interested in taking part in the study. At the parentcraft classes, where women were all approximately 35 weeks gestation, information sheets were distributed and contact details were collected the following week from anybody who was interested in participating. In this way, a total of 51 women agreed to consider participating in the study and provided contact details. At least three attempts were made to contact each of these women subsequently by telephone, and where successful, the purpose of the study was outlined again to ascertain whether the woman would be interested in participating. Ultimately, 21 women were recruited. The reasons for non-recruitment of the 30 women who initially provided contact details are displayed in Table 4.5.6.1 overleaf.

Table 4.5.6.1 Reasons for non-participation amongst women who originally provided their contact details

Number of women	Reason for non-participation
6	Telephone was not answered
5	Did not want to take part
4	Had already delivered baby when contacted
4	Stated that she would be too busy to take part
2	In process of moving house
2	Asked researcher to call back at a specific time but did not answer
2	Arranged appointments but cancelled
1	Hung up the telephone when researcher explained who she was
1	Arranged an appointment, but did not answer the door
1	Was in labour when the researcher telephoned
1	Was unwell when the researcher telephoned
1	Partner said that the woman would ring back, but no contact was made

Of the two women who arranged appointments but subsequently cancelled, one did so because family members were unwell and the other because she was being admitted to hospital for a caesarean section. Both said that they would still like to be involved in the study and that they would telephone the researcher when they were able, but neither made contact again.

4.5.6.3 Data generation: semi-structured interviews

The 21 women recruited were all interviewed in the antenatal period when they were between 31 and 39 weeks gestation. Interviews were arranged at a time suitable to the participant and all participants chose to be interviewed in their own home. At the beginning of the interview the purpose of the study was explained again, women were given the opportunity to ask any questions, and then asked to sign a consent form (Appendix 2). At the end of the first interview it was ascertained if the woman was willing to be contacted after her baby was born in order to conduct the second interview. All women agreed. At the appropriate time, the local midwifery services were contacted to check if each woman had delivered successfully, before

they were rung to arrange a second interview when their baby was aged approximately 3 months. At the end of the interview it was established if the woman was happy to be contacted for a third interview (when the baby was aged approximately 6 months) and subsequently these, and fourth interviews (when the baby was aged approximately 9 months) were carried out. Before contact was made to arrange the third and fourth interviews, the NHS ethical approval granted for the study (see section 4.7) stipulated that the local health visiting services were to be contacted to check that it was considered 'appropriate' to contact the families. It was not suggested that any mother should not be re-contacted. With the permission of the interviewee, all interviews were audiotaped using a digital recorder.

Semi-structured in-depth interviews were the method of data generation. Such interviews are generally considered to offer a good way to generate data regarding individuals' experiences and emotions (Denscombe, 2003), and given the emphasis in the study on accessing the perspective of mothers, the flexibility afforded by using semi-structured interviews was important in terms of achieving the research objectives. In keeping with a grounded theory approach, semi-structured interviews allowed the generation of relatively unstructured data (Denscombe 2010). Interviews do not reproduce prior realities, they provide accounts from particular points of view (Charmaz, 2006), and it was these accounts of the mothers' experiences of feeding and weaning their baby and their related actions that the interviews were designed to generate.

An interview schedule was developed to guide the interviews, consisting of open-ended questions that defined the area to be explored (Bryman, 2008), but allowed the interviewer or interviewee to diverge in order to follow up particular areas in more detail (Britten, 1995). Thus, although the interview topics and questions that lead into exploring these areas were defined initially, the semi-structured format allowed interviewees to express ideas that were important to them, and answers could be clarified and complex issues probed (Bowling, 2002; Bryman, 2008). The research aim and objectives and 'sensitising concepts' from the literature guided the original development of the interview schedule, as described above. As data generation progressed the schedule was revised to reflect other areas of interest that were suggested by preliminary data analysis. The nature of grounded theory interviewing entails learning from the data being generated from the beginning, which helps to correct pre-conceived ideas (Charmaz, 2006). For example, after the initial postnatal interviews, it was considered that more questions needed to be

asked about the conversation that mothers had with health professionals when they had their babies weighed. In initial interviews women were asked about their knowledge of infant feeding as well as their intentions in relation to their infant. In subsequent interviews mothers were encouraged to 'tell the story' of weaning their baby, and their accounts about actions undertaken regarding the timing, process and nature of weaning were explored. Information about the weight of the baby and general health and development was also elicited. The interview schedules that were used with the mothers at the antenatal interview and after their babies were born can be found in Appendix 3.

In terms of the process of the interview, attempts were made to reduce the traditional power relationship that can exist between interviewer and interviewee (Bryman, 2008) as it was considered that this would increase the likelihood of generating in depth and valid data. All but one interview took place in the participant's own home, thus the interviewer was a guest. If, during the course of an interview a woman needed to stop to attend to other things that were happening, for example a visitor arriving at the house or a baby or child needing attention, it was made clear that such things should take precedence over the interview and the offer to stop recording was made. Conventional advice to researchers is that they should adopt a passive and neutral stance in order to minimise the impact of the researcher's 'self' on the interview process (Denscombe, 2010). However, in this study, particularly due to its longitudinal nature, a relationship with each mother was built up which meant that, for example, they often asked questions of the interviewer regarding her own experiences. In keeping with the feminist approach described by Oakley (1981), such questions were answered as far as possible. If women had questions about feeding or weaning their baby it was suggested that they should seek advice from their health visitor or other health professional.

After each interview, field notes of thoughts or observations about that particular encounter, or anything that happened before or after the interview which seemed relevant to the study, were made. These unstructured data (Denscombe, 2010) were analysed along with the data generated in the interview session (see section 4.5.6.4).

4.5.6.4 Data analysis

It has been argued that there is no single right or most appropriate way to analyse qualitative data (Coffey & Atkinson, 1996) and in this study a number of guiding principles were used to inform this stage of the research process, particularly grounded theory methods (Charmaz, 2006). The idea of data analysis implies some kind of translation, from a collection of qualitative data through to a clear, understandable, trustworthy and perhaps original analysis (Gibbs, 2007). Analysis "calls on the researcher to discover the key components or general principles underlying a particular phenomenon so that these can be used to provide a clearer understanding of that thing" (Denscombe, 2010, p.114). There are two broad aspects to analysis: data handling, in which the procedures of data organisation and retrieval are paramount, and data interpretation, where analytical work is done (Coffey & Atkinson, 1996; Gibbs, 2007). Both of these aspects will be attended to here.

All of the interviewees permitted their interviews to be audiotaped. Interviews were transcribed verbatim by a professional transcriber, except for two instances where the interview was so disrupted by the presence of family members that the researcher transcribed it herself, making judgements about not transcribing some of the exchanges. The decision to outsource the transcribing was a pragmatic one relating to researcher time. Digital audio recordings were uploaded to a secure drop-box facility provided by the transcription service, and all transcribers signed a confidentiality agreement in line with the requirements of the University of Chester policy on ethical conduct. Transcribers were provided with copies of the interview schedule, in order that they could develop some familiarity with areas that may have been covered in an interview hence supporting the accuracy of the transcript, notwithstanding that the schedules were only used as a general guide. Although the act of transcription can be perceived as an early step in the analysis process and this is an argument for researchers to transcribe their own interviews (Gibbs, 2007), previous experience suggested that during transcribing, the attention given to reproducing each word verbatim rather precluded any thought about what was actually being said. Instead, as each transcript was received from the transcriber, it was printed out and checked against the audiotape in order to eliminate mistakes and attempt to fill in any gaps where the transcriber had difficulty in understanding what was said. Thus, this process formed part of early familiarisation with the material.

Subsequently, the transcripts were read again in their entirety, allowing familiarisation with the data in its textual format. The transcripts were annotated during this process to identify possible codes by which the data might be indexed (Pope, Ziebland, & Mays, 2000). As it can be argued that a prerequisite of effective qualitative analysis is efficient, consistent and systematic data management (Gibbs, 2007), a decision was made to use computer-assisted data analysis software (CAQDAS). This is not to argue that using such software would make data analysis itself any better, as "computer software cannot make good work that is sloppy, nor compensate for limited interpretive capacity" (Bazeley, 2007, p.3), but that CAQDAS can make data management easier. A number of concerns have been put forward about the use of CAQDAS and Coffey and Atkinson (1996, p.12) have argued that "the assumptions and limitations built into software applications can be incorporated unthinkingly into the process of analysis". Concerns have included: that computers can distance researchers from their data (Bazeley, 2007); that they encourage 'code and retrieve' techniques to the exclusion of other analytic activities, and the narrative flow of material can be lost (Bazeley, 2007; Bryman, 2008; Coffey & Atkinson, 1996); and that the ease with which coded text can be quantified may encourage researchers into this activity inappropriately (Bryman, 2008). Therefore, NVivo was utilised in the current study with these limitations in mind, for example steps were taken to ensure that narrative flow was attended to (see below). All of the interview transcripts were uploaded onto NVivo software, along with accompanying field notes.

Coding is the first "analytic step" (Charmaz, 2006, p.43) in the analysis of qualitative data and is a pivotal link between generating data and developing a theory to explain them (Charmaz, 2006). Codes form a focus for thinking about the data and their interpretation (Gibbs, 2007). Coding is not, however, an activity which is universally understood by qualitative researchers, the term encompasses a variety of approaches to organising data (Coffey & Atkinson, 1996). Basically, coding involves breaking down data and labelling (naming) different chunks which seem to be of potential theoretical significance and/or appear to be salient to the social worlds of those being studied (Bryman, 2008). Data which have something in common, perhaps they refer to the same issue, involve statements about the same emotion or share the use of a similar word or phrase in relation to a specific topic, can be labelled together (Denscombe, 2010). Qualitative coding of this type is more tentative than the coding of quantitative data, which is coded into pre-conceived, fixed codes. Qualitative codes may change and are open to refinement as the

research progresses (Denscombe, 2010), and data may be coded more than once (Bryman, 2008). Some qualitative researchers prefer the term 'indexing' to coding, as this reflects the sense in which codes refer to one or more passages in the text about the same topic or issue, in the way that entries in a book index refer to passages in the book (Ritchie, Spencer, & O'Connor, 2003).

In grounded theory, coding is one of the most central processes (Bryman, 2008) and can commence as soon as the first data have been generated (Holloway & Wheeler, 2002). In the current study coding of the antenatal interviews was commenced before they had all been completed, and data generation and analysis continued in tandem. Strauss and Corbin (1990) identify three levels of coding in grounded theory: open coding, where the text is read reflectively, yielding concepts which are later grouped into categories; axial coding, where categories are refined, developed and related or interconnected; and selective coding, where the core category or central category that ties all other categories together is identified and related to other categories. Not all grounded theorists use this three-fold distinction, and in particular it has been argued that axial coding can close off too quickly the exploratory power of coding (Bryman, 2008). For example, in her version of grounded theory, Charmaz (2006) discuses coding as a two stage process, presenting initial coding (akin to open coding) and focussed coding (akin to selective coding) as the main steps. As this study was aligned with the constructionist version of grounded theory advocated by Charmaz (2006), her coding process was utilised. It should however be noted that the different stages in coding are linked and overlapping (Charmaz, 2006; Robson, 2011), hence this description of what was carried out makes somewhat artificial barriers between them.

In open or initial coding the researcher should be open-minded and generate as many new ideas, and so codes, as possible in order to encapsulate the data (Bryman, 2008; Denscombe, 2010). Charmaz (2006) claims that speed and spontaneity help in initial coding, and initial codes tend to be provisional and are modified or transformed as the analysis develops (Holloway & Wheeler, 2002). Some codes will be very descriptive of the data, some will be topic based, and others will be more interpretative and reflective (Gibbs, 2007; Richards, 2009): open coding is about interpreting rather than summarising the data (Robson, 2011). In addition, codes may be *a priori* or theoretically derived codes, or *in vivo* or indigenous codes (Bazeley, 2007). Theoretically derived codes, which may be developed directly from the literature or from a researcher's own knowledge and

experience, can be applied to data, to see if there is a fit. For example, in this study data were labelled as reflecting embodied knowledge, an idea taken from the literature. A problem with this approach can be that the researcher remains blinkered whilst carrying out coding, looking only for the theoretically derived codes and missing things that are contained within the data (Bazeley, 2007). Indigenous codes are derived directly from the data and are more aligned with the grounded theory approach adopted for this study. Particularly, in vivo codes are often taken directly from participants' own words (Charmaz, 2006). For example, an initial code developed was 'taking advice selectively', which were the words used by a woman to describe how she worked with her health visitor.

One approach recommended by many grounded theorists (Gibbs, 2007), including Charmaz (2006), as a first step in open coding is line-by-line coding. This entails going through raw data, for example an interview transcript, and coding each line of text (Gibbs, 2007). Line-by-line coding means that very careful attention is paid to the data and using this method helps to reduce the likelihood of preconceived ideas being imposed, and increase the likelihood of seeing familiar things in a new light (Charmaz, 2006). In addition it can prevent becoming so immersed in a participant's worldview that the data are not looked at critically and analytically, instead encouraging critical and analytic reflection (Charmaz, 2006), whilst staying close to the data (Gibbs, 2007). Line-by-line coding was used initially in the current study, particularly because through the serial interviews there was a potential for familiarity with one woman's situation instilling preconceived ideas. Through line-by-line coding, insights can be gained about what it may be fruitful to look for in the data (Charmaz, 2006). If an idea that seems important is identified, then the researcher can return to earlier transcripts to pursue that idea or it may point to possible new participants to be approached (theoretical sampling) (Charmaz, 2006). The coding labels given to chunks of data are referred to as concepts (Bryman, 2008; Robson, 2011).

However initial open coding is carried out, constant comparative methods are central to a grounded theory approach (Charmaz, 2006; Glaser & Strauss, 1967), and should be used when analysing the data. This involves a commitment to comparing and contrasting new codes, concepts and categories as they are developed, comparing each coded instance with others similarly coded, that is all data are compared with all other data (Denscombe, 2010; Hallberg, 2006). Comparisons can be made within interviews, looking at different statements about

particular incidents, between interviews by comparing different participants' responses, or looking at responses from one interviewee over time in subsequent interviews (Charmaz, 2006). This comparison helps the researcher to refine codes, concepts and categories (Denscombe, 2010) and by constantly comparing data being coded in a certain way a theoretical elaboration of the concept or category can begin to emerge (Bryman, 2008). In addition, the technique is designed to ensure that the researcher never loses sight of the data, or moves the analysis away from what is actually happening "on the ground", which is important to the grounded theory approach (Denscombe, 2010, p.116).

Focused or selective coding is the second major phase in coding using a constructionist grounded theory approach (Charmaz, 2006). These codes and concepts should be more directed, selective and conceptual than those developed during open coding (Charmaz, 2006). Focussed coding entails using the most significant and/or frequent earlier codes and concepts to examine data again, and making decisions about which make the most analytic sense to take forward (Charmaz, 2006). This means that some initial concepts will be dropped, and the purpose is to start to build concepts up into categories (Bryman, 2008). Data are then re-explored in relation to these new categories. For example in this study, in trying to understand mothers' approaches to weaning, concepts about the behaviour, physical development and health of babies were put together to make a more overarching analytic category 'following the lead of the baby' and another category, 'just get on with it' subsumed concepts which were labelled 'common sense' and 'trial and error'. Focused coding is not an entirely linear process in that the researcher may develop understandings about the data and be prompted to return to study earlier data afresh. A strength of grounded theory lies in this active involvement in the data and process of analysis, the researcher acts upon the data rather than passively reading them, and returns to look at the data again (Charmaz, 2006). Through comparing data to data, focused codes, concepts and categories are developed, so the product of focused or selective coding are the core categories that are seen as being vital to understanding the phenomenon under study (Denscombe, 2010; Robson, 2011).

Finally, theoretical coding is a sophisticated level of coding that follows the concepts and categories generated during focused coding (Charmaz, 2006). Theoretical codes specify possible relationships between categories developed in focused

coding. These theoretical codes can form the basis for theories, and can sharpen and clarify analysis (Charmaz, 2006).

In this study, memo writing was engaged in from the outset in order to provide a record of how the study progressed and the decisions that were made. Memo writing is another fundamental characteristic of grounded theory (Birks & Mills, 2011). Detailed memo writing through the analysis process means writing down ideas, assumed associations and theoretical reflections as analysis is conducted; memo writing is seen as an intermediate step between data collection and writing drafts of the findings (Charmaz, 2006). Memos can aid in the generation of concepts and categories, helping to formulate ideas and reminding researchers of their train of thinking as they were exploring their data (Bryman, 2008). Some grounded theorists contend that memo writing should commence at the conceptualisation of a study and can be an important part of ensuring the quality of a piece of research. Memos may include feelings and assumptions about the research, potential issues, problems and concerns in relation to the study design, and reflections on the research process, as well notes about codes, categories and developing theories (Birks & Mills, 2011).

4.6 Theories, theory building and grounded theory research

The grounded theory approach has been described as a “reaction” (Denscombe, 2010, p.117) to the grand theories produced by the logico-deductive methods of science prominent in the 1950s and 1960s. Glaser and Strauss (1967) argued that theories generated through grounded theory would have advantages over those derived from more traditional scientific methods. First, as testing developing categories and theories against new data is part of the process of grounded theory, it is less likely that a grounded theory will be disproved. Testing theories out is integral to the development of the theory, it is not a separate process (Denscombe, 2010). Second, the theory has credibility as it is derived directly from the data and consequently there should be a good fit between the facts of the situation and the theory used to explain them (Denscombe, 2010). Therefore, there should be no concerns that researchers are forcing a fit between the data and the theory.

The aim of grounded theory is to generate a theory or theories to explain what is central in the data (Bryman, 2008; Robson, 2011). There are two kinds of theory that can be generated using a grounded theory approach: substantive theory and formal theory (Coffey & Atkinson, 1996; Denscombe, 2010). Substantive theory is

linked closely to the empirical situation in which it has been generated, it applies to that particular social context, and is the most common kind of theory associated with the approach. Formal theory is more conceptual, and has application to circumstances beyond particular settings (Coffey & Atkinson, 1996; Denscombe, 2010). Qualitative researchers will often start off with substantive theory and move towards formal theory (Coffey & Atkinson, 1996). As previously mentioned, the grounded theory approach has its roots in pragmatism, so there is an emphasis on the practical and theories generated should be useful and meaningful to those 'on the ground' (Denscombe, 2010). Most grounded theories are substantive theories as they address delimited problems in specific areas. However, by looking at these theories in other areas of experience it is possible to move towards more formal theories which cut across substantive areas (Charmaz, 2006).

4.7 Ethical considerations

All research engenders ethical issues when it involves collecting data from people and about people (Oliver, 2003; Punch, 1998). Ethical considerations relate directly to the integrity of a piece of research and are concerned with such issues as how research participants should be treated and whether there are activities in which researchers should not engage in their relations with participants (Bryman, 2008). Historically, ethical codes of practice governing research, such as the Nuremberg Code (Shuster, 1997) and the Declaration of Helsinki (World Medical Association Declaration of Helsinki, 2000), were developed largely in response to Nazi 'medical' experimentation during World War II and to the recognition that research was being conducted on people without their consent (Manning, 2004). There are now numerous ethical codes and guidelines published by organisations whose members carry out research, such as the British Sociological Association and the British Psychological Society (Bryman, 2008; Henn et al. 2006; Robson, 2011), and it is important that thought is given to ethical aspects of a research proposal from a very early stage (Robson, 2011).

Phase one of the study involved the interrogation of infant weight data held on the Child Health System maintained at Western Cheshire PCT. As the data belonged to the NHS, an enquiry was made to the local NHS Research Ethics Committee to ascertain whether the work came under the remit of the DH's Research Governance Framework for Health and Social Care (RGF) (DH, 2005), and so required NHS ethical approval. As the work was considered audit, NHS ethical approval was not required. Instead, ethical approval was sought from the School of Applied and

Health Sciences Research Ethics Committee, University of Chester, which was granted on 30/05/07 (Appendix 4). Permission to carry out the work was also granted by Halton & St Helens PCT Research and Development Department on 18/05/07 (Appendix 5) and from Halton & St Helens Data Manager on 28/06/07 (Appendix 6).

Phase two of the study entailed recruiting women who were attending NHS antenatal services, and so fell under the remit of the DH's RGF (DH, 2005). The RGF requires NHS organisations to ensure, among other things, that before any research involving human participants, their organs, tissue or data commences: there are adequate arrangements and resources to meet the standards set out in the RGF; an identified sponsor has taken on responsibility for the study; appropriate contractual arrangements are in place; a person authorised to do so has given written permission on behalf of the NHS organisation; and the study has received ethical approval where required (NHS Health Research Authority, 2012a). Any research that involves NHS patients, staff or premises has to gain NHS ethical approval before commencement. Consequently, for phase two of the study NHS ethical approval was required. The NHS National Research Ethics Service (NRES) has a dual mission: to protect the rights, safety, dignity and well-being of research participants; and to facilitate and promote ethical research that is of potential benefit to participants, science and society (NHS Health Research Authority, 2012b). Having followed the procedures outlined by the NHS Health Research Authority (2012b), ethical approval for phase two of the study was obtained from the NHS National Research Ethics Service North West 3 Research Ethics Committee – Liverpool East, on 16/11/10 (Appendix 7). Subsequently, slight amendments were proposed to the site of recruitment to the study (parentcraft classes as well as antenatal clinics) and to the timing of the postnatal interviews, both of which were approved by the Committee on 23/02/11 (Appendix 8). Permission to carry out the research was also gained from NHS Halton and St Helens on 30/11/10 (Appendix 9). As well as being a requirement of ethical approval, this was important as PCT staff, or more specifically the Head of Midwifery, was the gatekeeper of the research in terms of access to antenatal clinics and parentcraft classes.

The process of gaining approval from the School of Applied and Health Sciences Research Ethics Committee, University of Chester, and the NRES, led to the anticipation of ethical issues that might arise in the study, which needed to be kept in mind throughout the conduct of the work. As such, ethical approval was not

considered as a one-off event (Bryman, 2008). The British Sociological Association's Statement of Ethical Practice (2004) was used as an ethical framework within which to plan the study, which was also bound by the University of Chester's research governance framework (University of Chester, 2011). Bryman (2008) summarises the ethical issues that should generally be of concern to social researchers into four main areas, after Diener and Crandall (1978, in Bryman, 2008). These are: whether there is informed consent; whether there is harm to participants; whether there is an invasion of privacy; and whether deception is involved. These areas inevitably overlap, but each will be examined in turn in relation to both phases of the current study.

In order to give informed consent to participate in a research project, potential participants must be given as much information as necessary for them to make a decision about whether to take part, that is they should be fully informed about the research process, what their participation will mean, and be aware of any risks involved (Bryman, 2008). Voluntary informed consent to participate safeguards the freedom of the participant to choose to participate and also reduces the legal liability of the researcher (Bowling, 2009), although it does not absolve the researcher from an obligation to protect participants from harm (Henn et al., 2006). Ideally the study should be explained verbally to a potential participant, they should be given a participant information sheet, they should have at least 24 hours to decide whether they wish to take part, they should sign a consent form with a 'checklist' of what they have consented to, and the researcher should check that the participant fully understands (Boynton, 2005). Informed consent is an issue which has been hotly debated, particularly in relation to covert observation (Bryman, 2008): clearly, observing people as part of a research study without letting them know you are doing so is at odds with the principle of informed consent (Robson, 2011). However, even when procedures to elicit informed consent are carried out there is evidence that some research participants may only have limited knowledge of what their participation involves (Robson, 2011) and Walker, Hoggart and Hamilton (2008) state that the amount of information that can be conveyed and absorbed prior to consent is limited. In addition, potential participants are not always aware of their rights to refuse participation, particularly in longitudinal studies where participation continues over a period of time (Holloway & Wheeler, 2002).

In phase one of the study, consent to use the data was in effect given by the PCT which held the dataset. Data were anonymised, consequently individuals were not

identifiable and it would not have been possible to seek individual consent. In order to ensure that participants in phase two were able to give informed consent to participate in the research, women had the study explained to them verbally and in writing, were given the opportunity to ask questions, were given approximately one week to decide if they wished to take part, and were asked to sign a consent form, as outlined above. The possibility that, at initial contact in the antenatal clinic or parentcraft group, women may have found it difficult to refuse to give their contact details was considered. Sensitivity to the reactions of women was exercised. For example, if a woman appeared hesitant a phrase such as “You don’t look very sure so shall we leave it?” was used in order to give the woman the opportunity to decline. Women did say no at this stage, and others said that they had decided not to take part when contacted by telephone, suggesting that those who did agree to participate were doing so because they wanted to, and in an informed manner. It was explained to all participants that they were free to withdraw from the research at any time, without giving any reason, and on each interview occasion it was confirmed with the woman that she was still happy to participate in the study. It was also explained that taking part, not taking part, or withdrawing from the study had no bearing on the ante and postnatal care of the mother, baby and family.

In terms of causing harm, the concern that research can harm an individual physically, psychologically, legally and professionally was considered (Henn et al., 2006). As mothers in phase two of the study were being recruited antenatally, it was decided that a mechanism was required to ensure that no woman was contacted if she did not have a successful outcome to her pregnancy. Therefore, the names of participants were given to the Pre-school Services Manager, NHS Halton and St Helens, who confirmed that all babies had been born. A condition of ethical approval was that, in addition to checking that a baby had been successfully born, a check was made with the Health Visiting service that it was ‘appropriate’ to re-contact mothers before the third and fourth interviews. Therefore, the Pre-school Services Manager was contacted again on these occasions with the names of mothers and babies in order to check that contact could be made. This caused some delays in approaching mothers, and was arguably unnecessary as, at that point, each woman had been interviewed twice and given her permission to be contacted again. Contact was made with the Ethics Committee to discuss the issue. However, completion of a ‘major amendment’ form was required, and the time-scales would have resulted in the outcome to this being received too late. Therefore, the

procedure of checking was undertaken, although it was unclear what the definition of 'appropriate to contact' was.

Feeding a baby can be an emotional issue (Pagnini et al., 2007), and Ward Platt (2009) suggests that few issues in childcare are as emotionally charged as how and when to wean an infant. Therefore, during interviews, sensitivity to the reactions of research participants was maintained in order that lines of enquiry could be stopped if they were distressing the interviewee. It was planned that any participant who expressed worries or concerns relating to feeding her baby, or any other aspect of caring for her child, would be referred to her health visitor. During the interviews, mothers were actually very willing to share their experiences, sometimes about difficult circumstances to do with the health of their baby. For example, one mother talked about her baby's swallowing difficulties and another spoke about her older child, who had a life threatening condition, and how that affected their family life. There were no occasions on which an interview needed to be curtailed. Information about the local Children's Centre services was given to one mother who expressed an interest in these.

Another facet of avoiding harm to participants is maintaining confidentiality, and also anonymity, which is considered the norm when reporting research findings and is enshrined in some aspects of the UK's Data Protection Act (1988) (Robson, 2011). In phase one of the study, data were all anonymous and there was no way in which individuals could be recognised. The electronic database was stored on a password protected computer in a locked office and any hard copies of data were stored in a locked filing cabinet. Ensuring confidentiality and anonymity can be more difficult in qualitative than quantitative research (Bryman, 2008), particularly where qualitative researchers work with small samples (Holloway & Wheeler, 2002) and because of the rich and detailed data that can be generated through qualitative research (Mason, 1996). Therefore, a number of steps were taken to ensure confidentiality in phase two of the study. Names and contact details for research participants were kept in a locked filing cabinet. Each participant was given a participant number which was used on interview transcripts and other documents pertaining to participation, with the key being kept separately in a locked filing cabinet. All interview transcripts were anonymised, and as part of informed consent, participants were asked whether they would permit the use of anonymised quotations from their interviews to be used in the reporting of the research. Interview audiofiles were kept on a password protected computer at the University of Chester, as were interview

transcripts, paper copies of which were held in a locked filing cabinet. It was explained to participants that the only situation in which the researcher would have to break confidentiality would be if anything was revealed to her which indicated that a child was at risk, in which case NHS Halton and St. Helens child protection procedures would be activated. This situation did not arise.

Invasion of privacy is linked to the idea of informed consent, as if a participant has agreed to participate in a research study it is likely that, to a limited extent, they will have agreed to some invasion of privacy (Bryman, 2008). However, participants have not given up all rights to privacy (Robson, 2011) and may, for example, refuse to answer questions about particular areas of their lives if they perceive them to be too invasive (Henn et al., 2006). Participants in phase two of the study were informed that they could refuse to answer any question if they were not comfortable. Finally, deception occurs if researchers represent their work as something other than it is (Bryman, 2008). Phase two focused on weaning, although it was set against the background of increasing overweight amongst infants and young children. It was considered whether, to an extent, participants were being deceived as they were not informed about this background, but as the expressed aim of phase two was to explore the process of weaning and the way in which mothers negotiated this transition it was decided that this was not the case. The Ethics Committee were also anxious that a focus on overweight should not be presented to mothers as it was considered that this might unnecessarily worry them.

Discussions of ethical principles in research often stress the potential risk to participants. However, researchers themselves can also be at risk (Robson, 2011), and this is in itself an ethical issue. Several social researchers have provided guidance on risk assessment in research, for example Boynton (2005). In phase two of this study, initial contact with potential participants took place in a public area, in view of both health professionals and members of the public, so was not considered a risk to the researcher. The subject matter of the study was not considered to be problematic in terms of researcher safety. However, interviews took place in the homes of participants. Therefore, the Centre for Public Health Research (University of Chester) lone worker policy was adhered to, which involved details of destination, mobile telephone number and expected return time being left with a designated person, as well as vigilance in the field in terms of, for example, being prepared to terminate an interview if there appeared to be any threat and noting the quickest exit route from a property.

4.8 Conclusion

In this chapter, the two phases of the study have been described and explained, along with the steps that were taken to ensure that the work was rigorously carried out, generating valid and reliable data to address the aims and objectives stated in Chapter 1. The findings from the study are presented in the following two chapters.

Chapter 5
Results: patterns of weight in Halton infants

5.1 Introduction

In this chapter, a short profile of Halton, the area in which this work was carried out, is given, in order to provide some context to the study. The results from the analysis of the Halton Child Health System dataset are then presented, illustrating patterns of weight in Halton infants born between 1994 and 2006. This is followed by a discussion of these results. The way in which the results informed the second phase of the study is then explained.

5.2 The study setting: Halton

Halton is an area of Northwest England. It is made up of two major towns: Runcorn, situated on the southern bank of the River Mersey; and Widnes, situated on the northern bank of the river. Both of the towns have a strong history in the chemical industry. Runcorn is a new town, developed in the 1960s and 1970s to accommodate people being moved out of Liverpool. A broad population breakdown for Halton is shown in the table below.

Table 5.2.1 The population of Halton (2010)

	Age range (years)			Total
	0-15	**16-64**	**65+**	
Runcorn	12,700	40,000	8,300	**61,000**
Widnes	11,500	37,700	9,100	**58,300**
Halton	**24,200**	**77,700**	**17,400**	**119,300**

Source: www3.halton.gov.uk/councilanddemocracy/statisticsandcensusinformation/145135

In terms of ethnicity, Halton has a smaller percentage of black and minority ethnic residents (2.5%) than the Northwest of England (8.4%) or England as a whole (12.5%).

The Borough was ranked as the 27th most deprived local authority in England out of a total of 326 in 2010 (Halton Borough Council, 2010), and was in a similar position throughout the period of time that weight data for infants were collected (1994 – 2006). Employment levels are below the national average, and Halton is ranked joint 33rd highest for unemployment rate out of the 326 Local Authorities. Child

poverty levels are worse than the England average with 28% of children under the age of 16 years living in poverty, a total of 7,455 in 2011 (Halton Borough Council, 2011). Halton also has a high proportion of households with dependent children headed by a lone parent (29.5%, ranked 38th out of the 326 Local Authorities), 89.5% of which are lone parent mothers (Office for National Statistics, 2011). In addition, during 2010/11, 2.8% of women giving birth in Halton were aged under 18 years, higher than the national average of 1.5% (ChiMat, 2012).

The health of people in Halton is generally worse than in England as a whole: life expectancy for both men and women is lower than the England average (Department of Health, 2011). Children's health is generally worse than the England average too. However, infant mortality is very similar to that of England (4.7/4.6 per 1000 live births respectively). Figures collected from PCTs by the Department of Health showed that in 2011/12 Quarter 3 breastfeeding initiation in Halton PCT was 52.7%. At six-eight weeks the percentage of infants totally or partially breastfed was 23.8%, with 18.9% being totally breastfed (DH, 2012). Child mortality rates are slightly higher than the England average (20.8/16.5 per 100,000 children aged one – 17 years respectively).

With regards to overweight and obesity, 25.9% of adults in Halton are classified as obese (England 24.2%), with 12% of children in Reception and 24% of children in Year six also classified as obese, higher than the England average (ChiMat, 2012). For the school year 2009/10, the NCMP revealed that in Halton Reception year children 11.7% of boys and 11.3% of girls were obese (that is above the 95th centile of the UK90 data) while 29.5% of boys and 28.1% of girls were overweight (above the 85th centile) (Deacon, Perkins, & Bellis, 2011). Thus, there are small differences between females and males evident at these ages.

5.3 Data analysis results

Table 5.3.1 shows the total number of singleton births for each year of the study period, before any exclusions because of missing data (detailed in Chapter 4).

Table 5.3.1 Number of singleton births in Halton

Year	Number of female births	Number of male births	Total number of births
1994	604	645	1249
1995	560	645	1205
1996	578	580	1163
1997	591	600	1191
1998	634	664	1298
1999	575	635	1210
2000	565	607	1172
2001	599	590	1189
2002	564	608	1172
2003	609	638	1247
2004	631	699	1330
2005	707	727	1434
2006	718	755	1473
Total	**7935**	**8393**	**16328**

When the initial analysis was carried out, all children with a weight or BMI SD score of more than 5 SDs from the mean were excluded, as explained in Chapter 4. These exclusions are detailed in Table 5.3.2 below.

Table 5.3.2 Exclusions due to SD score > 5 SDs from the mean

Measurement point	Number with measurement available	Number excluded	Total number included in sample (% of 16,328 births)
Birth	15,792	4	**15,788 (97)**
8 weeks	12,609	121	**12,488 (77)**
8 months	10,502	140	**10,362 (66)**
40 months	5,429	46	**5,383 (50)***

* Denominator 10,849 (births 1994-2002 for which 40 month measurement potentially undertaken)

Tables 5.3.3 (below) and 5.3.4 (overleaf) summarise the whole dataset for females and males respectively for the 13 year period, 1994-2006. They describe age, weight and SD score for each of the four target measurement ages, as well as the proportions ≥85th and ≥95th centiles. The percentage of valid weight/BMI measurements that were available declined as children became older, with measurement at 40 months being least complete.

Males were heavier than females at every age. If Halton were similar to the UK90 reference population the mean weight SD score at any age and in either sex would be 0 and the standard deviation of these scores would be 1. It can be seen that with the exception of females at eight weeks all mean SD scores are greater than 0 with 95% confidence intervals not including 0. It can also be seen that with the exception of females at 8 weeks, there are higher proportions of infants ≥85th and ≥95th centiles than would be expected. Therefore, it can be concluded that these Halton children are different from the UK90 reference population.

Table 5.3.3 Summary of the dataset: weights of females, 1994-2006

		Measurement age			
		Birth	**8 weeks**	**8 months**	**40 months**
n (% out of total 7935)		7675 (96.7)	6136 (77.3)	5061 (63.8)	2609 (32.9)
Age (years)	Mean (SD)	-0.02 (0.04)	0.15 (0.03)	0.76 (0.08)	3.54 (0.22)
	Range	-0.33 to 0.06	0.08 to 0.25	0.35 to 1.01	2.51 to 4.50
Weight (kg)	Mean (SD)	3.33 (0.56)	4.89 (0.65)	8.78 (1.06)	16.02 (2.32)
SD score	Mean (SD)	0.19 (1.02)	-0.05 (1.03)	0.13 (1.12)	0.25 (1.14)*
	CI for mean	0.17 to 0.21	-0.07 to -0.02	0.10 to 0.16	0.21 to 0.29
≥85th centile	% (n)	19.2 (1476)	13 (797)	20.1 (1017)	22.6 (589)*
≥95th centile	% (n)	7.5 (573)	4.2 (259)	9 (453)	9.3 (242)*

*Based on BMI SD score, all other results based on weight SD scores

Table 5.3.4 Summary of the dataset: weights of males, 1994-2006

		Measurement age			
		Birth	**8 weeks**	**8 months**	**40 months**
n (% out of total 8393)		8113 (96.7)	6352 (75.7)	5301 (63.2)	2774 (33.1)
Age (years)	Mean (SD)	-0.02 (0.04)	0.15 (0.03)	0.76 (0.08)	3.54 (0.22)
	Range	-0.33 to 0.08	0.08 to 0.25	0.35 to 1.01	2.53 to 4.50
Weight (kg)	Mean (SD)	3.45 (0.59)	5.34 (0.74)	8.78 (1.06)	16.02 (2.32)
SD score	Mean (SD)	0.15 (1.00)	0.08 (1.05)	0.16 (1.07)	0.25 (1.12)*
	CI for mean	0.13 to 0.17	0.05 to 0.11	0.13 to 0.19	0.21 to 0.29
≥85th centile	% (n)	17.9 (1456)	16.2 (1028)	19.6 (1041)	21.9 (607)*
≥95th centile	% (n)	7 (566)	5.7 (359)	8.5 (448)	9.1 (252)*

*Based on BMI SD score, all other results based on weight SD scores

In Table 5.3.5 the number and percentage of valid weight/BMI measurements available by year of birth for females is shown and in Table 5.3.6 the same information is displayed for males. As mentioned above the percentage of valid measurements that were available declined as children became older. Measurement at 40 months was the least complete, and during the study period the percentage of children measured at this age was falling year on year. Data for 40 months were only available up to the 2002 birth cohort, as later birth cohorts had not reached the age of 40 months at the time that the data were obtained. There was no 'inwards migration' into the study, that is only children born in Halton during the study years have an eight week, eight month or 40 month measurement included in the study.

Table 5.3.5 Valid weight/BMI measurements available (females)

Birth year	No. (%) with valid birth weight	No. (%) with valid 8 week weight	No. (%) with valid 8 month weight	No. (%) with valid 40 month BMI
1994	597 (98.8)	111 (18.4)	275 (45.5)	389 (64.4)
1995	560 (100)	413 (73.8)	414 (73.9)	364 (65)
1996	577 (99.8)	454 (78.5)	386 (66.8)	319 (55.2)
1997	590 (99.8)	474 (80.2)	384 (65)	305 (51.6)
1998	634 (100)	520 (82)	454 (71.6)	341 (53.8)
1999	569 (99)	462 (80.3)	415 (72.2)	285 (50)
2000	514 (91)	472 (83.5)	401 (71)	235 (41.6)
2001	538 (89.8)	515 (86)	448 (74.8)	249 (41.6)
2002	490 (86.9)	489 (86.7)	422 (74.8)	122 (21.6)
2003	585 (96.1)	524 (86)	434 (71.3)	*
2004	601 (95.2)	530 (84)	449 (71.2)	*
2005	704 (99.6)	603 (85.3)	487 (68.9)	*
2006	716 (99.7)	569 (79.2)	92 (12.8)	*

***** Data not available

Table 5.3.6 Valid weight/BMI measurements available (males)

Birth year	No. (%) with valid birth weight	No. (%) with valid 8 week weight	No. (%) with valid 8 month weight	No. (%) with valid 40 month BMI
1994	640 (99.2)	114 (17.7)	308 (47.8)	436 (67.6)
1995	644 (99.8)	458 (71)	474 (73.5)	409 (63.4)
1996	578 (99.7)	431 (74.3)	360 (62.1)	287 (49.5)
1997	597 (99.5)	490 (81.7)	435 (72.5)	312 (52)
1998	661 (99.5)	527 (79.4)	458 (69)	372 (56)
1999	624 (98.3)	518 (81.6)	456 (71.8)	313 (49.3)
2000	564 (92.6)	512 (84.3)	406 (66.9)	272 (44.8)
2001	533 (89.7)	488 (82.7)	413 (70)	233 (39.5)
2002	527 (86.7)	519 (85.4)	443 (72.9)	140 (23)
2003	600 (94)	534 (83.7)	455 (71.3)	*
2004	666 (95.3)	578 (82.7)	494 (70.7)	*
2005	725 (99.7)	593 (81.6)	500 (68.8)	*
2006	754 (99.9)	590 (78.1)	99 (13.1)	*

*****Data not available

Table 5.3.7 displays the mean birthweight for females and males in each year cohort. Males were consistently heavier at birth than females. Male birthweights were relatively stable over the study period although female birthweight seemed to be falling (r =-0.6, p = 0.029).

Table 5.3.7 Mean birthweight (SD) for females and males (kilograms)

Year of birth	Mean birthweight (females)	Mean birthweight (males)
1994	3.36 (0.54)	3.43 (0.56)
1995	3.35 (0.56)	3.43 (0.59)
1996	3.32 (0.56)	3.50 (0.53)
1997	3.32 (0.55)	3.48 (0.58)
1998	3.33 (0.54)	3.46 (0.55)
1999	3.36 (0.54)	3.46 (0.58)
2000	3.35 (0.60)	3.44 (0.60)
2001	3.32 (0.55)	3.48 (0.59)
2002	3.34 (0.57)	3.42 (0.61)
2003	3.29 (0.58)	3.44 (0.64)
2004	3.35 (0.51)	3.41 (0.62)
2005	3.30 (0.57)	3.45 (0.61)
2006	3.27 (0.60)	3.45 (0.61)

The following tables and figures display the number and percentage of infants who were ≥85th and ≥95th centiles in each year birth cohort. The tables give details of the figures and also show the 95% CI and p values generated by the binomial test. The figures display the results graphically.

Tables 5.3.8 and 5.3.9, and Figures 5.3.1 and 5.3.2 show the proportion of infants with birthweights ≥85th and ≥95th centiles. This was consistently above the expected 15% and 5% respectively in comparison to the UK90 reference data, and was statistically significant in most cases. There is a slightly higher proportion of females ≥85th centile in many years. In males, the proportion above the 85th centile increased significantly over time (X^2_{trend} = 4.411, p = 0.036).

Tables 5.3.10 and 5.3.11, and Figures 5.3.3 and 5.3.4 show the proportion of infants with eight week weights ≥85th and ≥95th centiles. At eight weeks the proportions of

infants ≥85th and ≥95th centiles were generally much nearer the 15% and 5% that would be expected, and had fallen in comparison to birthweight scores**.** However, in both males and females there was a significant upward trend over time in the proportion ≥85th centile (X^2_{trend} = 11.030, p = 0.001/X^2_{trend} = 5.169, p = 0.023 respectively) and in males there was a significant upward trend in the proportion ≥95th centile (X^2_{trend} = 3.952, p = 0.047).

At eight months of age, the distribution of weights was similar to that of birthweights, with a higher proportion of male and female infants ≥85th and 95th centiles than would be expected. This is displayed in Tables 5.3.12 and 5.3.13, and Figures 5.3.5 and 5.3.6. For males, there were significant upward trends over time in the proportion ≥85th centile (X^2_{trend} = 5.377, p = 0.020) and the 95th centile (X^2_{trend} = 5.590, p = 0.018).

The proportion of children ≥85th and 95th centiles for BMI aged 40 months is presented in Tables 5.3.14 and 5.3.15, and Figures 5.3.7 and 5.3.8. In the majority of birth cohorts, more children than would be expected were ≥85th and 95th centiles, differences which were often statistically significant. The proportions ≥85th and 95th centiles had increased from the proportions in these groups at eight months. In addition, there were significant upward trends over time in the proportion ≥85th centile in both males and females (X^2_{trend} = 6.168, p = 0.013/X^2_{trend} = 4.175, p = 0.041).

Table 5.3.8 Female infants with birthweight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	123 (20.6)*	17.4-23.8	0.000	56 (9.4)*	7.1-11.7	0.000
1995	108 (19.3)*	16.0-22.6	0.003	39 (7.0)*	4.9-9.1	0.025
1996	112 (19.4)*	16.2-22.6	0.002	39 (6.8)*	4.7-8.9	0.037
1997	107 (18.1)*	15.0-21.2	0.021	41 (6.9)*	4.9-8.9	0.023
1998	112 (17.7)*	14.7-20.7	0.036	33 (5.2)	3.5-6.9	0.432
1999	100 (17.6)	14.5-20.7	0.051	45 (7.9)*	5.7-10.1	0.002
2000	123 (23.9)*	20.2-27.6	0.000	50 (9.7)*	7.1-12.3	0.000
2001	117 (21.7)*	18.2-25.2	0.000	42 (7.8)*	5.5-10.1	0.003
2002	102 (20.8)*	17.2-24.4	0.000	37 (7.6)*	5.3-9.9	0.009
2003	108 (18.5)*	15.4-21.6	0.013	44 (7.5)*	5.4-9.6	0.005
2004	113 (18.8)*	15.7-21.9	0.006	48 (8.0)*	5.8-10.2	0.001
2005	119 (16.9)*	14.1-19.7	0.088	46 (6.5)*	4.7-8.3	0.042
2006	132 (18.4)*	15.6-21.2	0.007	53 (7.4)*	5.5-9.3	0.003

*Statistically significantly different to 15%/5%

Table 5.3.9 Male infants with birthweight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	91 (14.2)	11.5-16.9	0.313	36 (5.6)	3.8-7.4	0.257
1995	106 (16.5)	13.6-19.4	0.163	38 (5.9)	4.1-7.7	0.168
1996	102 (17.6)*	14.5-20.7	0.045	38 (6.6)	4.1-7.9	0.055
1997	111 (18.6)*	15.5-21.7	0.010	53 (8.9)*	6.6-11.2	0.000
1998	107 (16.2)	13.4-19.0	0.210	36 (5.4)	3.7-7.1	0.323
1999	121 (19.4)*	16.3-22.5	0.002	52 (8.3)*	6.1-10.5	0.000
2000	105 (18.6)*	15.4-21.8	0.011	47 (8.3)*	6.0-10.6	0.001
2001	115 (21.6)*	18.1-25.1	0.000	45 (8.4)*	6.0-10.8	0.001
2002	93 (17.6)	14.3-20.9	0.053	27 (5.1)	3.2-7.0	0.476
2003	99 (16.5)	13.5-19.5	0.165	39 (6.5)	4.5-8.5	0.060
2004	135 (20.3)*	17.2-23.4	0.000	43 (6.5)	4.6-8.4	0.055
2005	136 (18.8)*	16.0-21.6	0.003	58(8.0)*	6.0-10.0	0.000
2006	135 (17.9)*	15.2-20.6	0.016	54 (7.2)*	5.4-9.0	0.006

*Statistically significantly different to 15%/5%

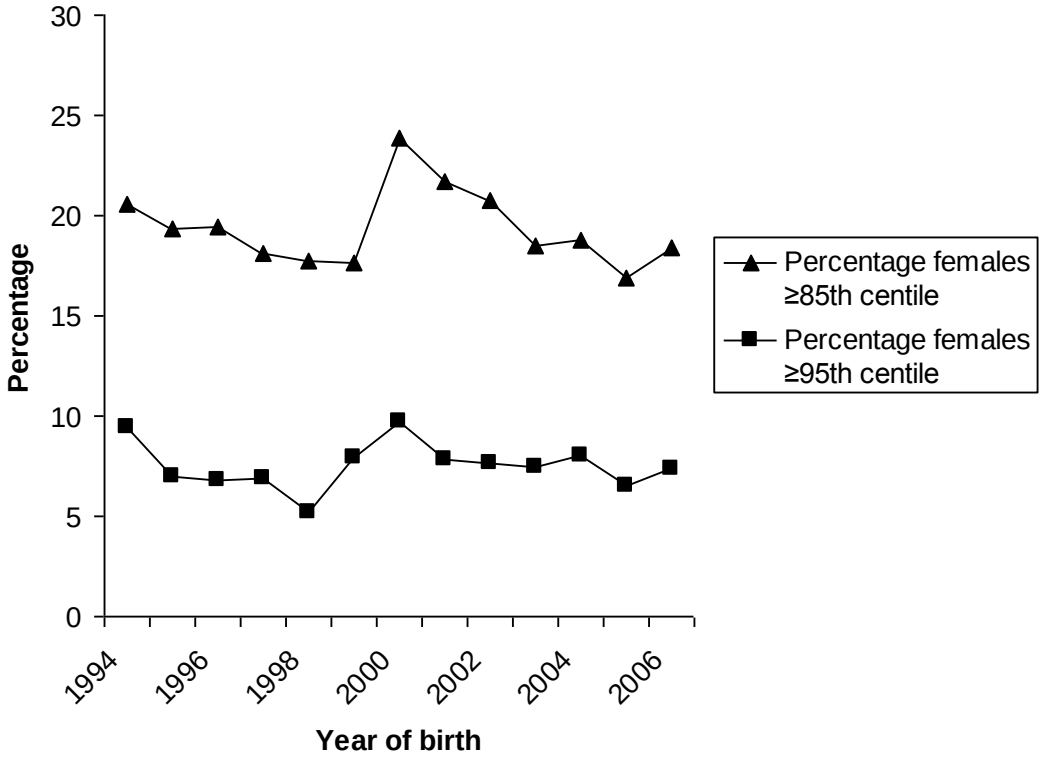

Figure 5.3.1 Percentage of females ≥85th and ≥95th centiles for weight at birth

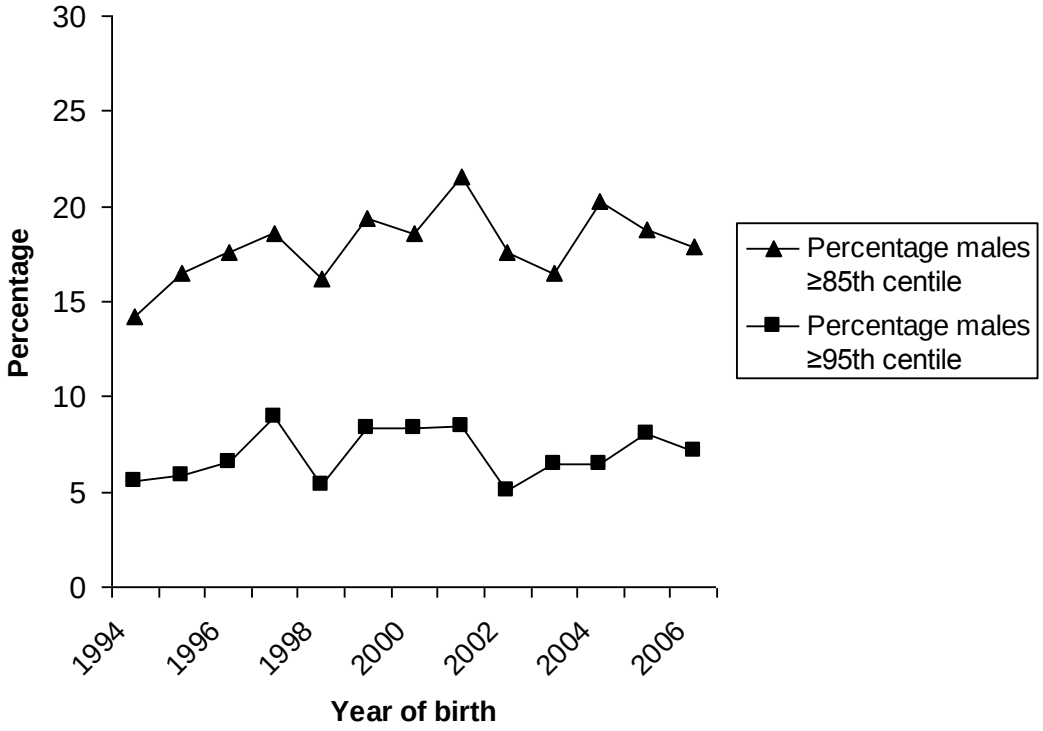

Figure 5.3.2 Percentage of males ≥85th and ≥95th centiles for weight at birth

Table 5.3.10 Female infants with 8 week weight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile in Halton by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	11 (9.9)	4.3-15.5	0.080	3 (2.7)	N/A	0.189
1995	59 (14.3)	10.9-17.7	0.373	21 (5.1)	3.0-7.2	0.500
1996	45 (9.9)*	7.2-12.6	0.001	13 (2.9)*	1.4-4.4	0.018
1997	53 (11.2)*	8.4-14.0	0.010	16 (3.4)	1.8-5.0	0.058
1998	62 (11.9)*	9.1-14.7	0.026	21 (4.0)	2.3-5.7	0.184
1999	60 (13.0)	9.9-16.1	0.125	15 (3.2)*	1.6-4.8	0.046
2000	66 (14.0)	10.9-17.1	0.293	22 (4.7)	2.8-6.6	0.420
2001	60 (11.7)*	8.9-14.5	0.017	14 (2.7)*	1.3-4.1	0.007
2002	72 (14.7)	11.6-17.8	0.463	28 (5.7)	3.6-7.8	0.257
2003	75 (14.3)	11.3-17.3	0.357	26 (5.0)	3.1-6.9	0.536
2004	60 (11.3)*	8.6-14.0	0.009	21 (4.0)	2.3-5.7	0.159
2005	79 (13.1)	10.4-15.8	0.104	29 (4.8)	3.1-6.5	0.463
2006	95 (16.7)	13.6-19.8	0.142	30 (5.3)	3.5-7.1	0.409

N/A If sample proportion x sample size <5, CI cannot be calculated

*****Statistically significantly different to 15%/5%

Table 5.3.11 Male infants with 8 week weight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile in Halton by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	6 (5.3)*	1.2-9.4	0.001	3 (2.6)	N/A	0.173
1995	73 (15.9)	12.6-19.2	0.305	23 (5.0)	3.0-7.0	0.521
1996	68 (15.8)	12.4-19.2	0.345	23 (5.3)	3.2-7.4	0.405
1997	76 (15.5)	12.3-18.7	0.395	25 (5.1)	3.2-7.0	0.488
1998	67 (12.7)	9.9-15.5	0.077	22 (4.2)	2.2-5.9	0.224
1999	75 (14.5)	11.5-17.5	0.398	27 (5.2)	3.3-7.1	0.440
2000	90 (17.6)	14.3-20.9	0.060	41 (8.0)*	5.7-10.3	0.002
2001	67 (13.7)	10.6-16.8	0.237	20 (4.1)	2.3-5.9	0.212
2002	91 (17.5)	14.2-20.8	0.062	34 (6.6)	4.5-8.7	0.069
2003	101 (18.9)*	15.6-22.2	0.008	30 (5.6)	3.6-7.6	0.282
2004	95 (16.4)	13.4-19.4	0.181	34 (5.9)	4.0-7.8	0.188
2005	116 (19.6)*	16.4-22.8	0.002	38 (6.4)	4.4-8.4	0.073
2006	104 (17.6)*	14.5-20.7	0.044	39 (6.6)*	4.6-8.6	0.049

N/A If sample proportion x sample size <5, CI cannot be calculated

*****Statistically significantly different to 15%/5%

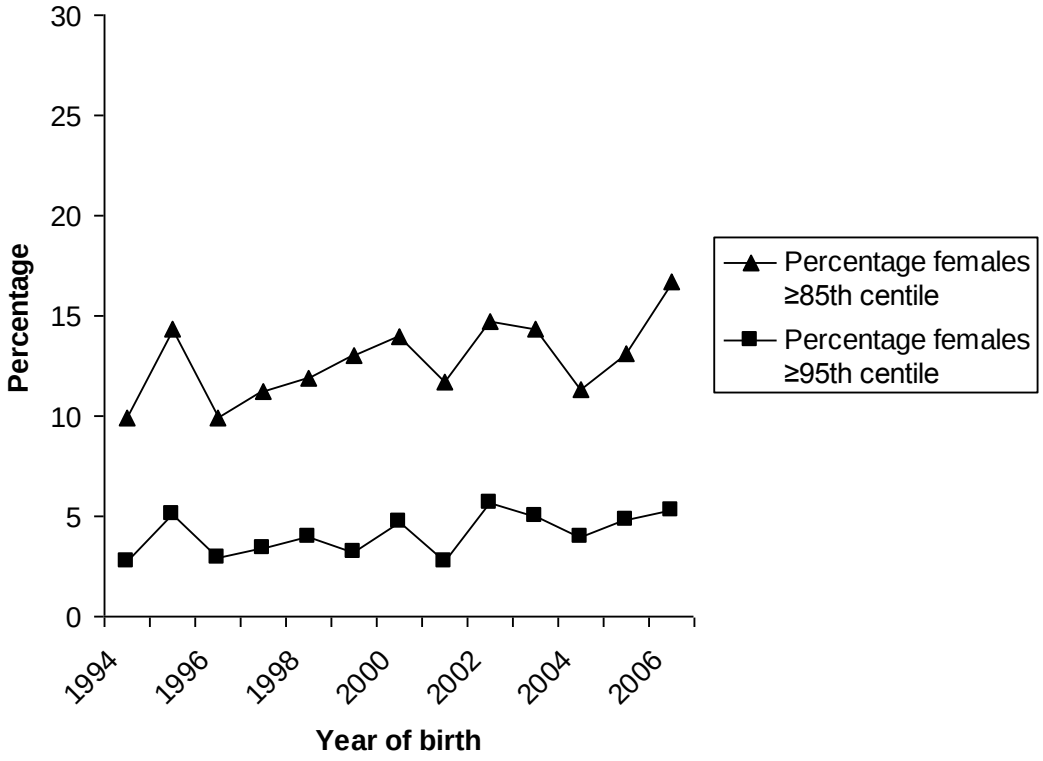

Figure 5.3.3 Percentage of females ≥85th and ≥95th centiles for weight at 8 weeks

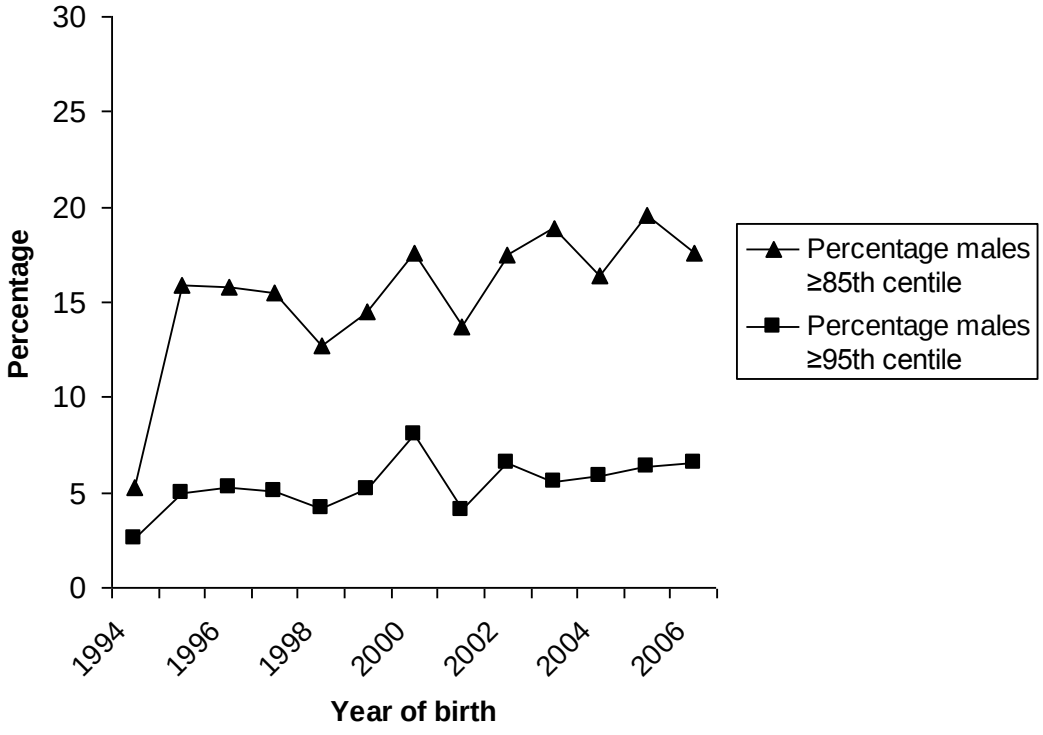

Figure 5.3.4 Percentage of males ≥85th and ≥95th centiles for weight at 8 weeks

Table 5.3.12 Female infants with 8 month weight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	67 (24.4)*	19.3-29.5	0.000	31 (11.3)*	7.6-15.0	0.000
1995	94 (22.7)*	18.7-26.7	0.000	41 (14.9)*	11.5-18.3	0.000
1996	58 (15.0)	11.4-18.6	0.516	24 (6.2)	3.8-8.6	0.163
1997	54 (14.1)	10.6-17.6	0.334	20 (5.2)	3.0-7.4	0.458
1998	85 (18.7)*	15.1-22.3	0.018	44 (9.7)*	7.0-12.4	0.000
1999	69 (16.6)	13.0-20.2	0.194	34 (8.2)*	5.6-10.8	0.004
2000	96 (23.9)*	19.7-28.1	0.000	41 (10.2)*	7.2-13.2	0.000
2001	92 (20.5)*	16.8-24.2	0.001	35 (7.8)*	5.3-10.3	0.007
2002	103 (24.2)*	20.3-28.5	0.000	42 (10.0)*	7.1-12.9	0.000
2003	83 (19.1)*	15.4-22.8	0.011	39 (9.0)*	6.3-11.7	0.000
2004	92 (20.5)*	16.8-24.2	0.001	46 (10.2)*	7.4-13.0	0.000
2005	101 (20.7)*	17.1-24.3	0.000	45 (9.2)*	6.6-11.8	0.000
2006	23 (25.0)*	16.2-33.8	0.008	11 (12.0)*	5.4-18.6	0.006

*Statistically significantly different to 15%/5%

Table 5.3.13 Male infants with 8 month weight SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	47 (15.3)	11.3-19.3	0.474	20 (6.5)	3.7-9.3	0.143
1995	83 (17.5)	14.1-20.9	0.073	38 (8.0)*	5.6-10.4	0.003
1996	68 (18.9)*	14.9-22.9	0.026	24 (6.7)	4.1-9.3	0.096
1997	91 (20.9)*	17.1-24.7	0.001	33 (7.6)*	5.1-10.1	0.012
1998	87 (19.0)*	15.4-22.6	0.012	43 (9.4)*	6.7-12.2	0.000
1999	89 (19.5)*	15.9-23.1	0.005	34 (7.5)*	5.1-9.9	0.014
2000	89 (21.9)*	17.9-25.9	0.000	37 (9.1)*	6.3-11.9	0.000
2001	71 (17.2)	13.6-20.8	0.120	24 (5.8)	3.5-8.1	0.254
2002	88 (19.9)*	16.2-23.6	0.003	42 (9.5)*	6.8-12.2	0.000
2003	97 (21.3)*	17.5-25.1	0.000	49 (10.8)*	7.9-13.7	0.000
2004	96 (19.4)*	15.9-22.9	0.004	40 (6.6)*	4.4-8.8	0.002
2005	110 (22.0)*	18.4-25.6	0.000	57 (11.4)*	8.6-14.2	0.000
2006	25 (25.3)*	16.7-33.9	0.005	7 (7.1)	2.0-12.2	0.227

*Statistically significantly different to 15%/5%

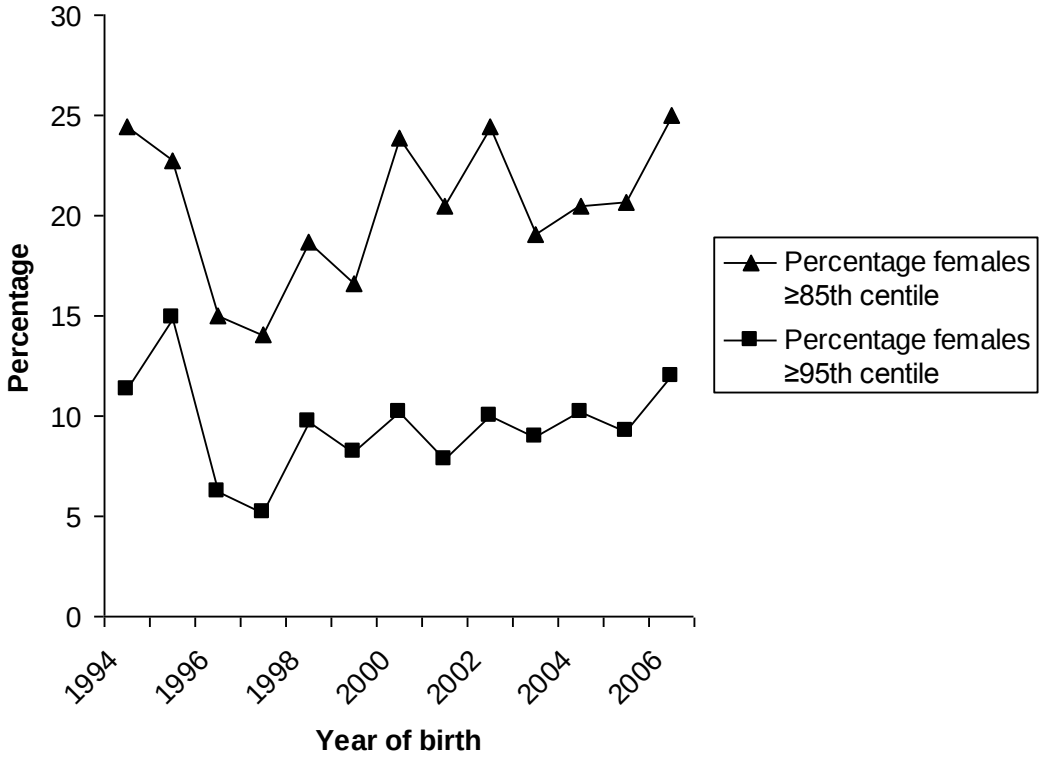

Figure 5.3.5 Percentage of females ≥85th and ≥95th centiles for weight at 8 months

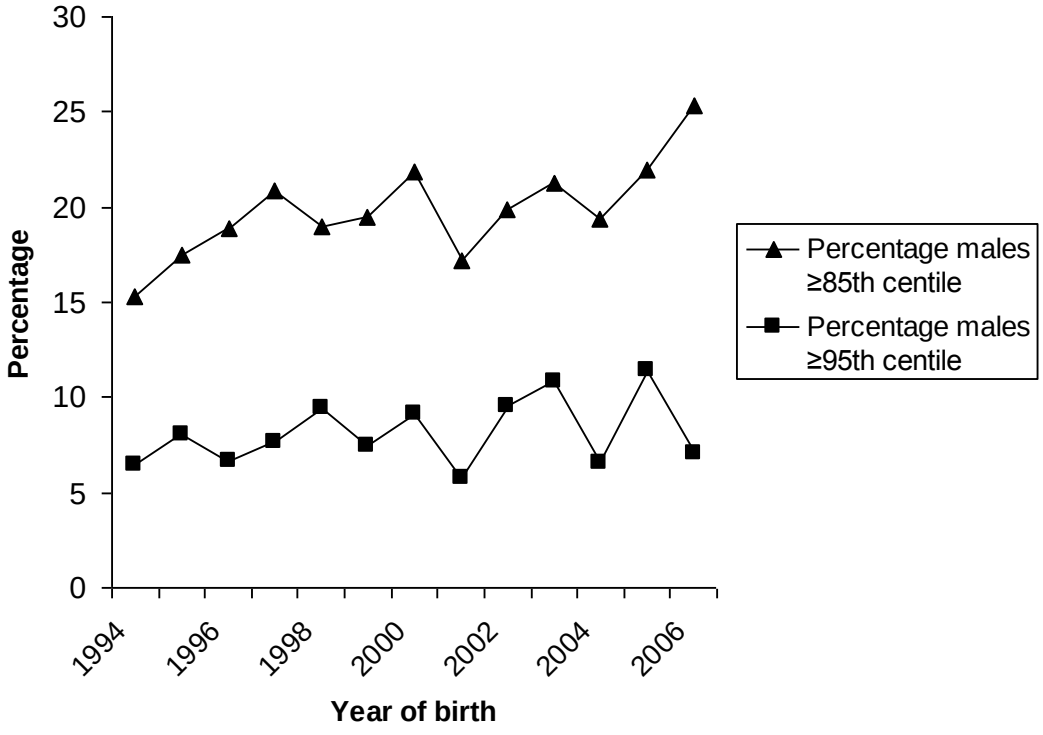

Figure 5.3.6 Percentage of males ≥85th and ≥95th centiles for weight at 8 months

Table 5.3.14 Female infants with 40 month BMI SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	66 (17.0)	13.3-20.7	0.155	24 (6.2)	3.8-8.6	0.172
1995	83 (22.8)*	18.5-27.1	0.000	36 (9.9)*	6.8-13.0	0.000
1996	79 (24.8)*	20.1-29.5	0.000	30 (9.4)*	6.2-12.6	0.001
1997	72 (23.6)*	18.8-28.4	0.000	23 (7.5)*	4.5-10.5	0.034
1998	78 (22.9)*	18.4-27.4	0.000	41 (12.0)*	8.6-15.4	0.000
1999	64 (22.5)*	17.7-27.3	0.001	29 (10.2)*	6.7-13.7	0.000
2000	49 (20.9)*	15.7-26.1	0.010	21 (8.9)*	5.3-12.5	0.008
2001	66 (26.5)*	21.0-32.0	0.000	25 (10.0)*	6.3-13.7	0.001
2002	32 (26.2)*	18.4-34.0	0.001	13 (10.7)*	5.2-16.2	0.008

*Statistically significantly different to 15%/5%

Table 5.3.15 Male infants with 40 month BMI SD score ≥1.04; ≥85th centile and ≥1.64; ≥95th centile in Halton by year of birth

Birth year	No. (%) > 85th centile	95% CI	P value	No. (%) > 95th centile	95% CI	P value
1994	89 (20.4)*	16.6-24.2	0.001	39 (8.9)*	6.2-11.6	0.000
1995	87 (21.3)*	17.3-25.3	0.000	28 (6.8)	4.4-9.2	0.060
1996	55 (19.2)*	14.6-23.8	0.032	28 (9.8)*	6.4-13.2	0.001
1997	56 (17.9)	13.6-22.2	0.086	25 (8.0)*	5.0-11.0	0.015
1998	86 (23.1)*	18.8-27.4	0.000	39 (10.5)*	7.4-13.6	0.000
1999	65 (20.8)*	16.3-25.3	0.004	23 (7.3)*	4.4-10.2	0.044
2000	71 (26.1)*	20.9-31.3	0.000	35 (12.9)*	8.9-16.9	0.000
2001	64 (27.5)*	21.8-33.2	0.000	17 (7.3)	4.0-10.6	0.078
2002	34 (24.3)*	17.2-31.4	0.003	18 (12.9)*	7.3-18.5	0.000

*Statistically significantly different to 15%/5%

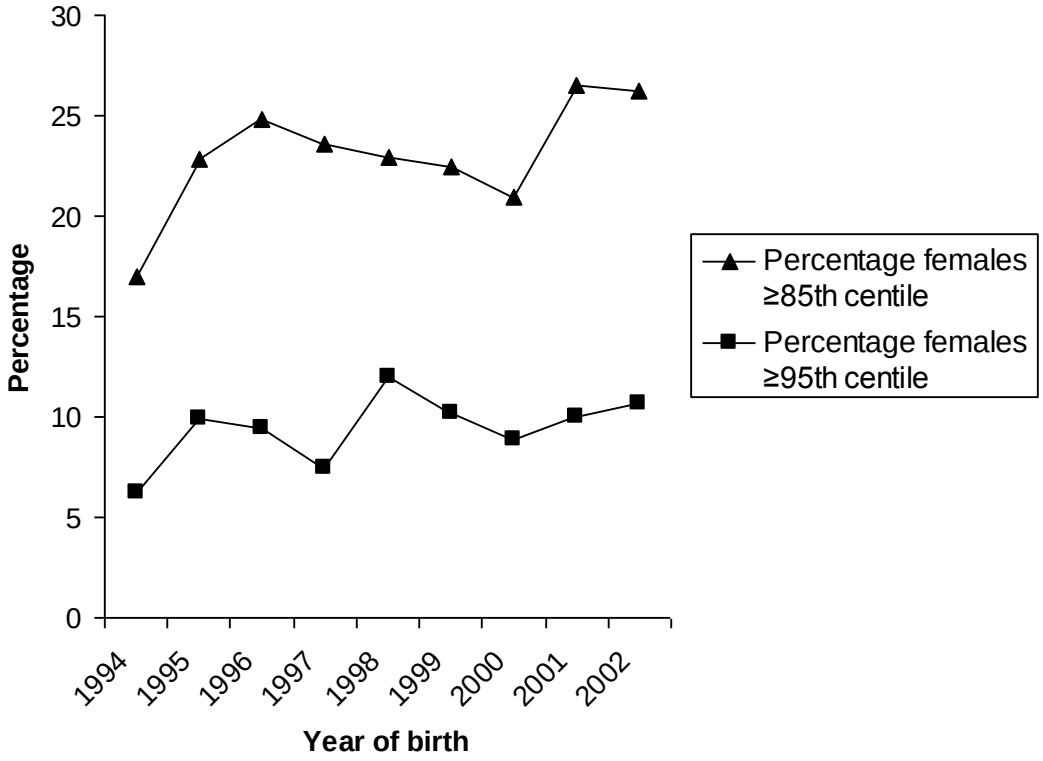

Figure 5.3.7 Percentage of females ≥85th and ≥95th centiles for BMI at 40 months

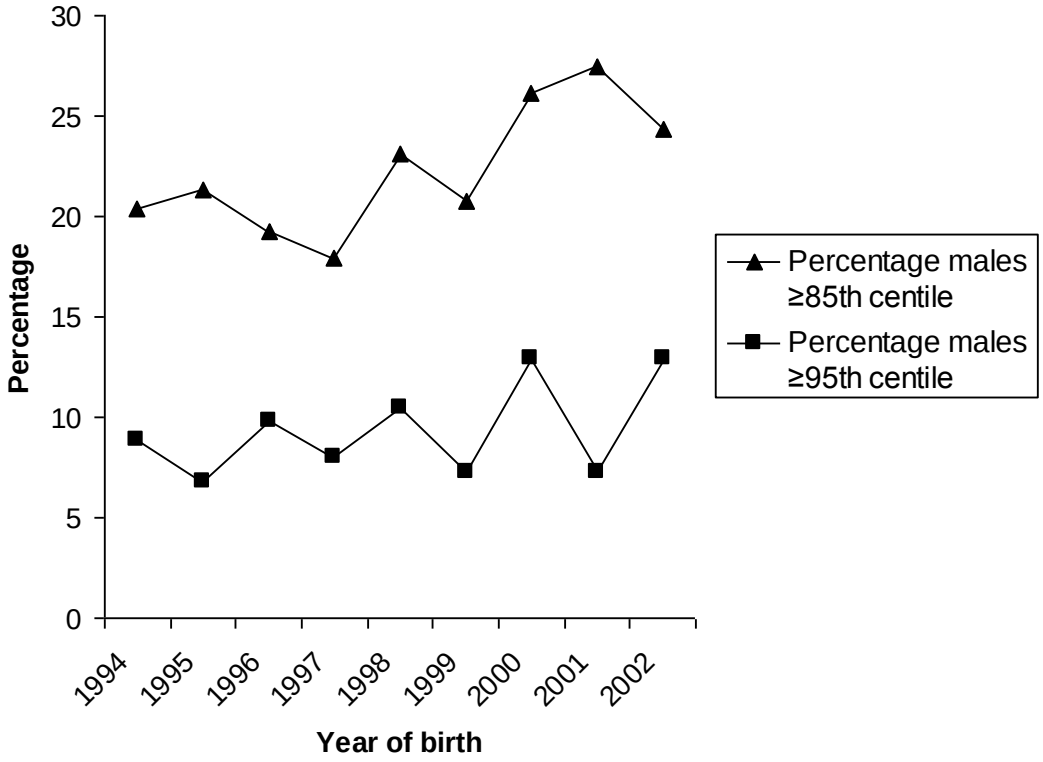

Figure 5.3.8 Percentage of males ≥85th and ≥95th centiles for BMI at 40 months

In order to explore whether there was any relationship between early weight and weight/BMI later on, Table 5.3.16 displays Pearson correlations between SD scores at different measurement ages. It can be seen that there are no strong correlations. There are moderate correlations, however, between the SD score for males at 8 weeks and 8 months, and eight months and 40 months. In addition there is a moderate correlation between the SD scores for females at 8 weeks and 8 months.

Table 5.3.16 Pearson's correlation between SD scores at different measurement ages

	Females			Males		
	8 weeks	**8 months**	**40 months (BMI)**	**8 weeks**	**8 months**	**40 months (BMI)**
Birth	0.52	0.36	0.20	0.49	0.35	0.19
8 weeks	-	0.63	0.26	-	0.61	0.29
8 months	-	-	0.48	-	-	0.63

5.4 Strengths and limitations of phase one of the study

In this study, routinely collected data were utilised to explore patterns of overweight in Halton infants and children over a 13 year period. The main strength of the study lay in the size of the dataset: 16,328 singleton births. Inevitably, valid weight data were not available for each individual at every data collection point, but the proportion of valid measurements was high: at birth nearly 100%; at eight weeks and eight months data were available for more than two thirds of births for the majority of year cohorts; and at 40 months around 50% of each birth cohort had a measurement recorded. Thus, patterns in the data were likely to reflect the totality of singleton births in Halton.

There are a number of limitations to the study that need to be considered, however, some of which are considerations in all studies utilising routinely collected data and others specific to this study. First, as in all studies using routinely collected data, it is difficult to assess the accuracy with which the weight measurements were taken. Data were collected by health professionals using standard procedures and equipment. However, measurements will have been taken by a number of different individuals and there is no way of checking for inter observer differences. Data entry

was carried out by trained NHS clerical staff, but there is no direct way of checking the accuracy of data entry either. Missing data are often an issue with routinely collected data and as has been outlined above, in this study measurements were not available for every individual at every measurement point. For this study specifically, there are other data which could have been collected which would have been useful, such as whether mothers breastfed or formula fed, the weight/BMI status of mothers, and whether they smoked, but these were not routinely collected, or at least not in a format in which it was possible to amalgamate them with the weight data.

5.5 Discussion of the data

The data revealed interesting patterns, with some differences noted between females and males. Whilst average male birthweight remained stable over the study period, average female birthweight was falling slightly, a decline which was statistically significant. Despite this, the percentage of males and females with a birthweight ≥85th and 95th centiles was consistently above the 15% and 5% that would be expected in comparison with the 1990 reference data throughout the 13 year period, and this percentage was increasing over time in males, although not in females. Thus, heavier birthweights are an entrenched position. At eight weeks, the proportion of infants ≥85th and 95th centiles had fallen in comparison to birthweights, but was increasing in successive birth cohorts in both males and females. By eight months of age, the proportion of infants ≥85th and 95th centiles was much higher than expected, and was increasing in males over time, although not in females. Finally, by 40 months, in every year cohort there was a higher proportion of children above the 85th and 95th centiles for BMI than would be expected in comparison to the UK90 reference data, and this was increasing over time. Therefore, these data support the hypothesis that the development of overweight in children has its roots in very early life. How do they concur with other evidence?

As has been widely reported, there is increasing overweight and obesity amongst the adult population in the United Kingdom, and hence women are likely to be heavier when they become pregnant than in previous years. It has been demonstrated that high maternal BMI before pregnancy is a strong predictor of childhood obesity (Catalano et al., 2009) and work on the Wirral has demonstrated an association between the weight of a mother at her first antenatal visit and the weight of her baby (Bundred, 2008). This may possibly be an important contribution

to the trend towards an increasing proportion of babies born with SD scores for birthweight above the 85th and 95th centiles, as demonstrated in this study.

There is some published evidence of increasing weight in young children, before the age of school entry (Bundred et al., 2001; Gardener et al., 2009; Reilly et al., 1999; Stenhouse et al., 2004). The current study supports the findings in Wirral children of Bundred et al. (2001) as in Halton preschool children aged 40 months, between 1994 and 2002, there was an excess of individuals above the 85th and 95th centiles for BMI. The Halton proportions were increasing over time, and were generally as high, if not higher, than those identified in the latter years of the Wirral study. In addition, for infants aged eight weeks in Halton, comparable to the age of the infants in the Bundred et al. (2001) study, the increased proportions above the 85th and 95th centiles were not evident to the same extent as in the preschool children. However, in the present study weights at eight months of age were also presented (these were not available in the Bundred et al. (2001) study, and it is evident that by the age of eight months there was an excess of individuals above the 85th and 95th centiles. As the increase in the proportion of children above the 85th and 95th centiles for weight was not present in infants aged eight weeks, it could be concluded that excessive weight gain occurred, at least for some children, long before early childhood as hypothesised in other studies (Bundred et al., 2001; Gardner et al., 2009), instead occurring between eight weeks and eight months.

This picture is slightly complicated, however, when birthweights are examined. At birth, since 1994, there was a consistently higher proportion of infants above the 85th and 95th centiles for weight than would be expected using the 1990 reference data as standard. The proportion was fairly steady over the 13 years, representing a consistent and entrenched position, which was similar in females and males. That this excess disappeared at eight weeks, only to re-establish itself at eight months, is puzzling. If real, it implies that there is something present before birth, and then between eight weeks and eight months, but not between birth and eight weeks, that encourages excessive weight gain. It could be hypothesised that before birth this factor is the mother, perhaps related to her own weight, weight gain, diet or metabolism. Between eight weeks and eight months it could be the fact that an infant will be weaned. Between birth and eight weeks babies will be receiving only milk, either breast or formula, and so might possibly be less susceptible to excess weight gain than during these other periods.

Alternatively, the reason for the fall in the percentages of infants above the 85th and 95th centiles at eight weeks compared to birth could be that at birth, the gestational age of the infant was used in the calculation of the SD score but at eight weeks the actual age of the baby, determined by using birth date and measurement date, was used. Infants born before 40 weeks gestation and likely to be lighter may not have had time to 'catch up' with their weight, and hence this may have lowered the proportions above the thresholds. If this is the case, it is interesting to note that the percentages above the 85th and 95th centiles have increased again to above what would be expected in comparison with the UK90 reference data by the age of eight months.

In this study, differences were noted between male and female infants in relation to patterns of weight and overweight, and there is evidence that males are increasingly more affected by overweight and obesity than females. The prevalence of obesity has been noted to be higher in boys than girls in Reception and Year 6 in the National Child Measurement Programme (The NHS Information Centre, Lifestyle Statistics, 2011) so the data presented here indicate that this difference is evident earlier. This may reflect differences in the metabolism of males and females, or may reflect differences in the way in which parents respond to males and females, or both. Differences between males and females in relation to childhood overweight have been reported previously, for example, provisional findings from a study of 233 British children indicated that overweight in females is associated with overweight in mothers but not fathers, and overweight in males is associated with overweight in fathers but not mothers (Wilkin, 2009). Difference between males and females is therefore an area that may warrant further investigation.

The Pearsons correlations revealed no clear cut relationship between earlier and later overweight. There was some relationship between higher SD scores for weight at 8 weeks and 8 months in girls and boys, and between 8 months and 40 months in boys. However, the relationship between early overweight and overweight at an older age in individuals needs further exploration, as will be discussed below.

5.6 Possible future work

There is much work that could usefully be done with the dataset to extend the analysis presented here. Although Halton is a relatively deprived area as a whole, an exploration of whether there are any patterns associated with deprivation in the data could be carried out, which would be possible as postcode data for the mothers

at the time of the birth of their babies were available. In addition, it would be useful to look at patterns of underweight, as overweight and underweight can co-exist in the same population, given their association with deprivation. There was some suggestion of differences between females and males in this study, which could be explored further. It would be informative to examine mean SD scores at each age in the birth cohorts, in order to explore whether there is evidence of infants and young children, who would not be classified as overweight, getting heavier. There are also 3064 children who were measured at all four measurement points, so some longitudinal analysis of this could help to answer questions about what happens to heavier babies in terms of their weight trajectories. Finally, it would be useful to update the database, to get the later measurements for the existing infants, and to explore whether the patterns evident over the 13 year period to 2006 have continued or changed since then, particularly in the light of evidence, presented in Chapter 2, that increases in the prevalence of obesity may be levelling off among some groups of children.

5.7 Conclusion

This study has provided further evidence that the development of overweight and obesity could have roots in very early life, and has highlighted patterns of infant overweight and obesity not previously reported at eight months of age. The excess of infants above the 85th and 95th centiles at eight months, as compared to the UK90 reference data, underlines the potential importance of very early life in the development of overweight. Given this finding, and the fact that many of the factors that have been suggested to play a role in the development of childhood overweight are unlikely to exert a lot of influence at such a very young age, some consideration was given to what else could potentially have an influence on the early development of overweight. It is for this reason that the second phase of the study focussed upon weaning. This is a transition that takes place in early life which has not been extensively researched in terms of the way in which mothers manage the process. Therefore, this study sought to explore whether the way in which mothers wean their babies could shed any light on patterns of weight in infancy.

Chapter 6
Infant feeding and weaning
Findings from the longitudinal qualitative study

6.1 Introduction

In this chapter, the findings from the analysis of the interview data generated with Halton mothers during the qualitative phase of the study are reported. First, details about the study participants are outlined, followed by an explanation of the way in which the material is organised. Finally, the findings themselves are presented.

6.2 The participants

In total, 21 women agreed to participate in this phase of the study and took part in at least two interviews, generating 67 interviews in total. They took place between March 2011 and April 2012, each lasting between 25 and 90 minutes. A woman's partner was present at the interview, for at least some of the time, on six occasions, a female friend was present at one interview, and a participant's mother was present at another interview. Table 6.2.1 displays the number of interviews undertaken at each stage of the study. The attrition towards the end of the study was due mainly to two factors: difficulties in arranging a convenient time to interview some mothers who had returned to work outside the home; and a pragmatic need to draw the fieldwork to a close.

Table 6.2.1 Interviews undertaken

Time point	Number of interviews
During pregnancy (30-39 weeks gestation)	**21**
Baby aged 3.5 – 5 months	**21**
Baby aged 6.5 – 8.5 months	**16**
Baby aged 9.5-11 months	**9**
Total number of interviews	67

Demographic characteristics of the mothers are displayed in Table 6.2.2, below.

Table 6.2.2 Demographic characteristics of participants

	Widnes	Runcorn	Total
Age (years)			
21-25	4	2	**6**
26-30	3	2	**5**
31-35	4	1	**5**
36-40	0	5	**5**
Total	**11**	**10**	**21**
Parity			
0	5	5	**10**
≥ 1	6	5	**11**
Deprivation score (%)			
10-30	7	4	**11**
40-60	0	1	**1**
70+	4	5	**9**
Sex of baby			
Female	5	5	**10**
Male	7	5	**12**

Women were recruited from Widnes and Runcorn. One participant lived in Liverpool: her partner worked at one of the sampling sites. He asked for an information sheet and gave it to her; she subsequently expressed an interest in participating, and so was included in the sample. There was a mix of first time mothers and those who had older children, with the youngest participant being 21 years of age at the time of her first interview and the oldest 40 years. There were therefore no very young mothers recruited to the study. All of the women were living with the father of the baby that they were expecting when recruited and this was the case throughout their participation in the study. The deprivation score was determined using the calculator provided by the Office for National Statistics (Office for National Statistics, undated), based on the postcode of each participant. Each of the 32,482 neighbourhoods in England has been ranked on a range of factors

(including income, employment, health, education, barriers to housing and services, crime and living environment) and a total deprivation score awarded. The lower the score, the higher the level of deprivation. Percentage scores are displayed in the table: a score of 10% indicates that the neighbourhood is amongst the 10% most deprived in England, with higher percentage scores indicating less deprivation. A range of deprivation scores are evident. One woman from Widnes had a twin birth, thus the number of babies detailed on the table is one more than the number of women, and there are a similar number of females and males.

6.3 Organisation of material

The findings are organised into sections under a succession of descriptive headings related to the objectives of this phase of the study: accounting for milk feeding intentions; experiences of milk feeding; moving on to weaning; interaction with health professionals; and growth and development. Through the coding procedure described in Chapter 4, a series of 'categories of meaning' were developed in order to understand the experience of this sample of mothers as they negotiated milk feeding and the weaning process. The final coding framework can be seen in Appendix 10. These categories of meaning have been used within each section to structure the material and provide a valid analytical account of mothers' experiences. Direct quotations from the interviews are utilised in order to illustrate the categories and their different dimensions. These are anonymised and identified by a code which consists of a participant number followed by a number indicating whether it was the first, second, third or fourth interview with that particular woman. For example, 020/2 was the second interview with participant number 20. No differences were discerned between the narratives of the mothers of females and males.

6.4 Accounting for milk feeding intentions

As previously mentioned, it was evident during early data generation and analysis that it would be difficult to understand mothers' experiences of weaning without developing an understanding of their milk feeding experiences. When interviewed during the antenatal period, all of the participants said that they had considered whether they would breast or formula feed their baby, and reported that they had been asked about this during routine antenatal care. Among this group of women there was a diversity of feeding intentions. Some women were clear that they wanted to breastfeed, some were sure that they would formula feed, and others were less decided, saying that they might try breastfeeding but they would see how

it worked out. These intentions, and feeding outcomes (explored in Section 6.5), are displayed in Table 6.4.1. Sixteen out of the 21 participants reported either that they were intending to breastfeed or that they would try it. For feeding outcome, breastfeeding is defined as feeding in this manner for at least one week, which nine women did.

Table 6.4.1 Milk feeding intentions and outcomes

		Feeding outcome		
		Breast	Formula	Total
Feeding intention	Breastfeeding	6	3	9
	Try breastfeeding	3	4	7
	Formula	0	5	5
	Total	9	12	21

A number of different ways of understanding women's milk feeding intentions were developed through the analysis of the interview material. Women articulated an understanding that: there was pressure to breastfeed; breastfeeding was natural; breastfeeding was difficult; they would do what was 'normal' for them; fathers should be involved with the care of their baby; and they wanted to regain their own life. Interestingly, these were issues about which mothers tended to agree, whether they were planning to breastfeed or formula feed their baby. What was different among the mothers was how they acted on these thoughts. Mothers held the same view, but this spurred them on to different milk feeding intentions. Each of these ways of accounting for milk feeding intentions will be explored in turn.

6.4.1 Feeling pressure to breastfeed

Women expressed the view that they felt pressure to breastfeed from the health professionals with whom they had come into contact during their antenatal care. This pressure was often direct in terms of what health professionals said, or it could be experienced in a more indirect way. One woman, a second time mother who had formula fed her first baby because he had a tongue tie and could not latch on to the breast adequately, was intending to try breastfeeding. She spoke about her experience at the antenatal clinic, saying: *'They want you to breastfeed, but I do feel quite pressured … it's like press-ganging you into it'* (014/1). Another mother who had formula fed her first child and intended to do this again, spoke of parentcraft

classes: *'They'll mention it there and stuff like that but sometimes they sort of like try to push you into breastfeeding'* (015/1). A first time mother, who was very clear that she wanted to formula feed her baby, explained that the fear of having pressure put on her to breastfeed was worrying her more than thinking about labour and birth. She said:

> *'Yeah, because you'd heard so many stories, people in work had said "Oh when you go in the hospital they'll really push you into breastfeeding" and I was thinking, "They're not going to push me, no way in this world", I just didn't want to do it … So when I got to [hospital] I was thinking, "Oh, I'm going to really have to stand my ground here."'* (009/2).

Despite the pressure to breastfeed, women said that when they voiced an intention to formula feed, health professionals appeared supportive. For example, one woman said: *'When I went to the second antenatal, she just said whatever choice you make you'd be supported by the midwife'* (005/1). However, women reported that there was a lack of information about formula feeding from health professionals. They said that formula feeding was not really spoken about at antenatal clinics or parentcraft classes, which some would have appreciated. One woman said: *'If you can't breastfeed, they can't suggest which one [formula milk], they've got to wait for you to say which one you want'* (007/1). In a sense this can be understood in terms of being indirect pressure to breastfeed, as whilst there was plenty of information available about breastfeeding, there was very little about the alternative.

Finally in terms of feeling pressure to breastfeed, the opinion that rather than encouraging them, health professionals' promotion of breastfeeding was putting them off the idea was voiced by women. They described feeling fed up with being asked about their feeding intentions. A woman who was the only one in a group of about 20 in a parentcraft class who was intending to breastfeed said that even she was getting *'sick'* (020/1) of breastfeeding information. She continued:

> *'And then they're not listening to your answer, they're literally going into the hard sell about why you should breastfeed and as I said, other women that I was talking to in my parentcraft class were saying the same thing. But they were of the mindset that they were just not even going to think about it anymore … all the information and all of the hard sell is having the adverse effect.'* (020/1).

Thus this woman was expressing the view that the promotion of breastfeeding may have been generating resistance to the idea in some women, an unintended consequence.

6.4.2 What mother nature intended

Breastfeeding was described as natural by both women intending to breastfeed and women intending to formula feed. For women intending to breastfeed, the implication was that as breastfeeding was natural, that is what they would do. One said: *It was what mother nature intended'* (020/1) and another: '*It seems a natural way to do things'* (003/1). For women who were intending to formula feed however, the perception of breastfeeding as natural did not lead them to conclude that they would breastfeed themselves. Instead they explained that breastfeeding was not something which they personally wished to do, or that appealed to them in spite of it being natural. This view was articulated by a first-time mother who said:

> *'Breastfeeding, however I admire people doing it, it just does not appeal to me at all. I know it's the most natural thing in the world but I just couldn't bring myself to do it, so no, it's going straight on the bottle.'* (009/1).

Linked to the idea that it was natural, women intending to breastfeed described breast milk as being the best thing for their baby. One mother who was keen to breastfeed said that it was important to give the baby *'the best shot possible'* (020/1). Another woman who intended to breastfeed stated:

> *If, for any reason it [breastfeeding] doesn't happen then I believe obviously substitute milk is more than adequate but I think you should try your best, why would you go for a second hand car, you know, [when you could have a] brand new car, I just don't understand why you go out with the second best first.'* (019/1).

When asked why breastfeeding was the best thing for the baby, various factors were mentioned. Women reported that there were health benefits in terms of protection against diseases such as diabetes, that breast milk conferred immunity against other diseases, and that it made children *'really bright'* (008/1). Nobody mentioned other generally recognised benefits of breastfeeding for the baby such as it protecting the baby against overweight or that breast milk is nutritionally tailored to the baby. Thus breastfeeding was not linked with patterns of growth by this group of mothers. Similarly, no mention was made of possible benefits to the mother such as bonding with the baby or losing weight more quickly.

6.4.3 Breastfeeding as being difficult

Mothers who intended to breastfeed, those who were not sure, and those intending to formula feed all spoke about breastfeeding as being difficult. Even mothers who said that breastfeeding was 'natural' doubted whether they could do it in practice, thus they were articulating doubt about being able to do just what they knew their

body was designed for. There was a sense that, although breastfeeding was natural, this did not mean that everyone could accomplish it easily. Comments such as: *'I'll give it a go, whether it'll work is another matter'* (007/1) and: *I'm going to try anyway, whether it's successful or not I'm certainly going to try it'* (016/1) were made. Previous experience of successful breastfeeding did not necessarily make women confident either, for example a woman expecting her third baby said: *'I'd love to try it again and hopefully it works third time, some babies don't always attach do they?'* (011/1). Conversely, the importance of a negative experience was particularly emphasised by one woman who had attempted breastfeeding with her first child and described this as *'the worst week of my life ever. But you know, it was the first week she was born, I don't want that to happen again'* (002/1). She was intending to formula feed her second baby.

This doubt about whether they would be able to breastfeed, was expressed in terms of whether a woman *could* do it physically, and also in terms of whether she was *prepared* to do it given that it might make her life more difficult. So women, particularly those who had no experience of breast feeding, spoke about needing help in order to feed their baby themselves, and were concerned that they would not receive this. Stories were told about friends who had their baby at night, or when hospital staff were particularly busy, which meant that they had received no help in initiating breastfeeding. One woman said: '*There's a big part of me is very determined to start breastfeeding but it's that element of, how do you start going about it?'* (004/1). Other mothers who had decided to breastfeed and seemed very keen to do so, talked about limits on the lengths to which they were prepared to go in order to achieve this. For example, one woman said that she did not intend to *'kill myself*' (006/1) in her attempt to breastfeed, in that if it made her life too difficult she would not do it. Some women talked about this in terms of all of the things that women have to do besides feed their baby, with the inference being that this made committing themselves to breastfeeding difficult. One woman, who had voiced an intention to try to breastfeed, said:

> *'Unfortunately we're in a convenience society where women, you know, need to be able to multitask, do full-time jobs, have children, do everything else, and the idea of being tied to the breast with a baby for 12 months is not everybody's cup of tea.'* (020/1).

6.4.4 Being or doing what is normal

Women also spoke about milk feeding in relation to what was 'normal' for them at an individual level, as well as in relation to perceived wider social norms. At an

individual level, women related their milk feeding intention to how they had been fed themselves: a woman intending to breastfeed said this was partly because *'both [partner] and I were breastfed'* (004/1) and a woman who intended to formula feed explained that this was because she had been formula fed, consequently *'it's normal for me really'* (015/1). Similarly, women's previous experience of feeding a child was relevant to their feeding intentions. So, mothers who had successfully breastfed expressed their intention to do it again, and those who had successfully used formula milk described their intention to feed in this way. Therefore, depending on their experience, women could understand either breastfeeding or formula feeding as 'normal'. In terms of wider social norms, there was a belief that breastfeeding was not a common practice and one woman said: *'It doesn't seem to be such an open thing anymore to breastfeed'* (004/1). This view was expressed by women who were and were not intending to breastfeed. Many women said that they had rarely, if ever, seen another woman breastfeed, and that it was not easy to breastfeed in public. The portrayal of breastfeeding in the media was also described as being negative, and possibly to have discouraged women from feeding their babies in this way. Some, therefore, found it difficult to see any advantage in breastfeeding against this background. One woman, who was intending to breastfeed, stated:

> *'I think that people have such a kind of "you can't do that, you can't be seen to breastfeed in public" and I think that a lot of people, especially now there's a younger element of people having babies, they don't want to breastfeed, it's kind of like "why on earth would I do that?"'* (004/1).

This woman, although she was intending to breastfeed herself, could empathise with other women and understand why they might come to a different conclusion about milk feeding.

6.4.5 Involving fathers

All of the mothers reported that the father of her baby was happy to support her in whatever mode of milk feeding she chose. Involving fathers was talked about at length by mothers, in terms of the relationship between the baby and the father, the role that the father could or should play in caring for his baby, and how the mode of milk feeding the baby shaped this. One woman explained: *'I want my husband to be part of it as well… I want him to bond as much as I am with the baby, so I've taken the decision to bottle feed straight off'* (009/1). Mothers who were thinking about or intending to breastfeed also voiced concern about the relationship between the

baby and the father. For example, some said that they would express milk in order that the father could feed the baby. A first time mother spoke about this in theory, saying: *'They say you should express some anyway so that [father] can feed them and bond with them'* (005/1), whilst another mother spoke about this in relation to her previous experience. She said: *'So this time again, if I do breastfeed, then I will express 'cos it's nice for [father] as well because he feels more involved'* (014/1). One mother, whose partner had two children from a previous relationship who were formula fed, spoke of her experience of breastfeeding their first child. She thought that her partner missed the involvement that he had previously had in feeding. She said:

> *'I think he found it difficult because with his other two children, with his first marriage, they were both bottle-fed and he was very much involved with that, I think he found it quite strange because he'd never encountered breastfeeding and the bond you get.'* (018/1).

Other women thought about the role of the father in a different way and did not conceptualise breastfeeding to mean that the father would have less of a role in caring for his baby. One mother described how, although some of her friends thought that breastfeeding just made her partner's life easier, she anticipated a role for her partner in caring for the baby in ways other than feeding. The woman explained:

> *'The first thing they always say is "Oh you're letting him get away with it then aren't you?" And I think, that's what I am saying? "Tell you what [partner] you carry the baby for half of the pregnancy because, you know, we've done it." It's just one of them things, you're the woman, you've got the milk, it's just nature, it's just he can't help, I mean he can help do other things.'* (019/1).

So, although this mother wanted the father of her baby to be involved in caring for the baby, she came to a different solution to women who encouraged a father's involvement through milk feeding.

6.4.6 Regaining life

When talking about how to milk feed their baby, women also alluded to themselves as individuals, and that they wanted to regain some independence after pregnancy and get their life back. Thus women spoke about how their intended mode of milk feeding could make their own life easier. Those intending to breastfeed talked about not having to sterilise and make up bottles, whilst those intending to formula feed explained that this was easier because it meant that people other than themselves could do the feeding, particularly if they had other children to care for. Breastfeeding

was seen as possibly limiting life as an individual, which was articulated in various ways, by both women who were considering breastfeeding and women who were not. Some talked about the necessity of being careful about what they ate and drank themselves if they were breastfeeding. One woman, who was considering breastfeeding commented:

> *'I just, although it sounds selfish, I would like some sort of life back and I know that you've still got to restrict what you eat and what you drink and obviously, I'd like to be able to stay in bed when it cries sometimes and send my partner to do a bottle instead of me having to do it every time'.* (005/1).

In the quotation above another issue that women thought important is alluded to, that of not wanting to have to be constantly available. Women wanted a life which was, to some extent at least, separate from their baby. For example, one mother said: '*I'm not intending to be tied down like a cow to be honest, frankly'* (006/1). Also, women referred to the wider family resources on which they may be able to draw in order to give themselves a little more independence. The woman who was worried about what she could eat explained further:

> *'Mum said if we wanted her to have it overnight then breastfeeding wouldn't be the best option because then we can't, if we're tired or struggling then people can't help as much 'cos it's dependent on me being there to feed him.'* (005/1).

6.5 Experiences of milk feeding

Women were all asked about their experience of milk feeding their baby, whether this had gone according to their intentions, and how they felt about how it had gone. As detailed in Table 6.4.1 a total of 16 women wanted to breastfeed or were inclined to try it and nine women established breastfeeding and fed in this manner for between one week and nine months. Table 6.5.1 (overleaf) displays the milk feeding intentions of the mothers, their previous experience of milk feeding children, and how infants were actually fed. Feeding intention and outcome were defined in the same way as for Table 6.4.1. All of the mothers who during the antenatal period had voiced an intention to formula feed their baby did so. Some women who intended to breastfeed did so, whilst others went on to formula feed their baby, although nobody who intended to formula feed subsequently breastfed. This indicates that the antenatal period is the period during which an intention to breastfeed usually crystallises. Whilst a woman can start off breastfeeding and then change to formula feeding, she cannot easily commence formula feeding and then establish breastfeeding, unless she is actively expressing breast milk in order to keep her milk

supply going. Therefore, unless a decision to breastfeed is made before birth, or very soon afterwards, the opportunity to do so is lost.

Table 6.5.1 Milk feeding experience

Feeding intention (number of women)	Previous feeding experience (number of women)	Feeding outcome
Breastfeeding (9)	Previously breastfed (3) First time mothers (3)	• All 6 women breastfed (for between 4 weeks and 9 months)
	First time mothers (2)	• Both women were ill and hospitalised after birth, so were unable to establish breastfeeding (although one woman tried for 5 days)
	First time mother (1)	• Baby had a tongue tie and it was not possible to establish breastfeeding
Try breastfeeding (7)	Previously formula fed (2) First time mother (1)	• 3 women breastfed (for between 1 week and 8 weeks)
	First time mother (1)	• Woman experienced a long labour and did not want to breastfeed once baby was born
	Previously formula fed (1) First time mother (1)	• Both women breastfed for a couple of feeds but then stopped, 1 because of pain following a caesarean and the other because she did not like it
	Previously formula fed (1)	• Woman breast fed for 2 days but then stopped due to mastitis
Formula (5)	Previously formula fed (4) First time mother (1)	• All 5 women formula fed

Both women who had breastfed and women who had formula fed their baby expressed pleasure in the experience. One mother, who had breastfed for four weeks and had to discontinue because her baby's physical condition made breastfeeding difficult for him, commented: *'I enjoyed breastfeeding him I really did. And I almost said to [partner] "I'd have another baby just so [I could breastfeed]" 'cos I really did enjoy it'* (019/2). Another woman, who mainly formula fed her infant, said: *'I mean, it's always, it's always nice to feed him 'cos as I said you get that one-to-one time don't you'* (020/2). However, not all women thought in this way, one mother described formula feeding her baby as *'monotonous'* (006/2). When speaking about milk feeding their infants, women's stories could be understood in two different ways: adapting to changing circumstances; and fulfilling the maternal role.

6.5.1 Adapting to changing circumstances

In relation to their milk feeding plans, all mothers who intended to formula feed did so, and were quite happy with this decision. However, some women who were intending to breastfeed, or at least to give it a try, were not able to do so and they had to adapt their plans to fit their changing circumstances. Women who had stated an intention to breastfeed but then had only done so for a short while were, on the whole, happy with their decision to switch to formula feeding. These women all had very specific reasons for their decision not, ultimately, to breastfeed, or to switch to formula feeding after a very short time, which reflected the changing circumstances in which they found themselves and how they adapted to them. For some, the decision was to do with their own health. One woman had a caesarean and was in a lot of pain, so found it difficult to hold the baby correctly to breastfeed, as well as being unable to take painkillers because she was feeding. A midwife asked her why she wanted to stop breastfeeding and she said that she replied: *'I can't because I'm in too much pain and I'm tired, and if I'm not comfortable with it he's not going to be comfortable with it'* (007/2). She reported that, looking back, she thought it was the best decision as it took her at least three weeks to feel better after her caesarean, her partner had been able to help her with feeds, and her baby had thrived on formula milk. Another woman described how, although she was initially disappointed with herself for discontinuing breastfeeding because she was ill after the birth of her baby, with hindsight she thought it was the right decision. She said:

> *'When I think back to how I felt I couldn't do anything, I couldn't even get in the shower so I think, when I think back I actually did quite well to stick it out for five days, I was that bad, I've never been so ill in my whole life.'* (016/2).

Other women talked about pressure from other responsibilities making breastfeeding difficult. A woman who breastfed for one week and then stopped explained: *'I just found it a bit too difficult, especially when I had to deal with [older child] as well so it was a bit unfair on [older child] I felt so we went on to formula'* (003/2). This illustrates how the decisions and actions of mothers in relation to feeding are contingent on other things that are happening in their lives, and how they take steps to adapt to these circumstances.

6.5.2 Fulfilling the maternal role

Mothers who established breastfeeding and continued for more than a week, but did not feed in this manner for the recommended six months, expressed feelings of guilt in relation to their decision to introduce formula milk. One mother, who had successfully breastfed her baby for about five weeks, spoke of her angst when she formed the impression that he was no longer satisfied with breast milk alone and needed something extra. This decision was taken because although the baby would stop breastfeeding, apparently having finished his feed, he did not settle down afterwards and when offered it drank a substantial amount of formula milk. The woman explained: *'I think there was a time when I felt quite, sort of, almost guilty about the fact that, you know, I wasn't filling his hunger, if you like' (004/2).* Another mother, who breastfed for six weeks and then switched to formula feeding because she was exhausted as her baby was feeding three hourly throughout the day and night, taking about an hour over each feed, said: *'I do think I wish I'd have just give her the milk for a bit longer, you know, couple of months longer than I did, just because I know it's so good for them' (008/2).* Finally, a mother whose baby was unwell and who had been exclusively breastfeeding for four weeks expressed distress when advised that it would be better for her baby if he was formula fed. She said:

> '*But she just said it, "For his benefit and for him to have a more smoother feed, you're better putting him on formula". So that's what we, well you have to take your doctor's advice don't you, but I was a bit gutted though, but we just got there, we just were getting there like into a routine and it was fun.' (019/2).*

The experience of these mothers can be conceptualised as not fulfilling their maternal role in feeding their baby, as they had to discontinue breastfeeding. This can be contrasted with the experience of those mothers who breastfed for a number of months. They appeared satisfied that they had done what they needed to fulfil their role. For example, a mother who had breastfed her baby for nine months and

was considering finishing feeding him said: *'I mean, he's coming up to nine months now and I've done my bit'* (010/3). Another mother, who had also breastfed for nine months explained that she was happy to give up an evening feed. She said:

> *'And it's quite nice, actually, to stop the evening one, well it's not nice but it's just, it was always sort of in my mind one more thing to do, so, you know, bath, bed, read and then breastfeed.'* (013/3).

This analysis suggests that breastfeeding for a short while generated feelings of guilt about discontinuing that women who either formula fed from the start, breastfed their baby very briefly, or breastfed their baby for a number of months, did not experience. One mother articulated this view explicitly. She breastfed exclusively for six weeks and then decided that her baby was not satisfied with breast milk, because she would not settle after feeds, and changed to formula feeding. Looking back, she expressed guilt at this decision, and said that she did not think that she would have felt guilty if she had never breastfed. She said:

> *'Yeah, there is an awful lot of pressure but that said, as I say, if I'd have just formula fed from day one I don't think the pressure would have been as ... And I don't think I'd have felt as guilty as when I'd started and then given up.'* (006/2).

This experience is reflected in the story recounted by one woman about her first pregnancy. Her baby was born with a tongue tie, and because of that she eventually had to give up her attempt to breastfeed him as he could not latch on to the breast properly. She had felt so upset and guilty about her, as she perceived it, inability to feed her baby, that she was considering not even attempting to breastfeed her second baby in case something similar happened. By going straight for bottle feeding, she thought that she could avoid this distress.

6.6 Moving on to weaning

The title of this section reflects the way in which mothers understood weaning to be about their baby developing and 'moving on' to the next stage. When asked at their antenatal interview, all mothers knew what weaning was, describing it basically as the process of moving a baby from milk feeds on to solid food. During the antenatal period, some thought that it was too soon to be thinking about and considering weaning, as they had more imminent concerns. One mother simply said: *'I ain't got past thinking about the baby now'* (011/1) and another: *'I'm waiting for the baby to be born first, see how it takes the milk, obviously, another four months I might have more of an idea'* (007/1). Although she had not thought about weaning, this mother was explicitly making a link between milk feeding and weaning by suggesting that

how the baby reacted to milk feeding may influence her weaning practices. Other women, both first-time mothers and those with older children, had considered how they might approach weaning before their baby was born. One mother mentioned reading about weaning in the press, and said this had made her think about it. Other mothers said that they had researched it on the internet, in order to source up-to-date information. These examples reflect mothers' reports that weaning was not spoken about during antenatal care by health professionals, but some mothers considered that it was helpful to *'be prepared'* (009/1) for weaning, even if it was in the future.

As mothers began to wean their infants they were asked to describe and explain the actions they took. It was generally agreed that there was less guidance available regarding weaning than there was about milk feeding, with a particular lack of guidance for mothers who weaned their baby before the age of six months, the officially recommended age. One mother said: *'I mean, there was not an awful lot in the books I'll be honest'* (020/1), although books with recipe and menu ideas for babies were mentioned as available and useful. The internet was an often used source of information and a range of different websites were mentioned, including the NHS website, various baby milk and/or food producer's websites, and websites for parents such as Mumsnet or Netmums. A number of categories of meaning were developed to understand the experience of this group of mothers: just get on with it; what other mothers do; working with the guidelines; following the lead of the baby; providing adequate nutrition; weaning healthily; harming the baby; fitting in with family life; and handing over the reins. The category following the lead of the baby emerged as a core category around which the others pivot, that is they can best be understood against the background of 'following the lead of the baby'. Despite this, the categories are presented in the order that they are because this helps to 'tell the story' of weaning logically.

6.6.1 Just get on with it

There was a strong sense in the narratives of the women that weaning was something they just 'got on with'. They talked about it in terms of doing what had worked for them before, common sense, and trial and error. Women who had older children referred to their previous experience of weaning, expressing the view that they would just do what they had done with their other children unless they were *'proved different'* (001/1). Generally mothers suggested that whilst weaning a baby: *'You just go with your common sense and what you think is best really instead of*

listening to the midwives and stuff' (012/1). Both first time mothers and those with older children shared this belief in common sense. One first time mother, when asked whether she had any previous experience of weaning on which she based the views that she held just said: *'No, not particularly, I just think it's common sense'* (006/1) and an experienced mother of four said *'If they spit their food out then they don't like it or they're not hungry, so common sense really I guess'* (018/1). Similarly, trial and error was seen as integral to weaning, one woman who was expecting her second baby commented: *'So it's just trial and error, basically you try it, if it doesn't work you just wait for a bit'* (015/1).

6.6.2 What other mothers do

When they were speaking about their approach to weaning, it was apparent that this group of women very much valued the help and advice of other mothers. Sometimes this was their own mother, or it could be another family member who was a mother. For example, one woman described how she relied quite heavily on her niece, who had a slightly older baby, for help and advice if she was unsure. She commented:

> *'I'd say to [name of niece] "What do you think about this?" So she's like a sounding board and she'd say either "No" or "Oh yeah, that sounds really good". So we did take a lot more advice off her as well. Because I thought if she's been there, done that, recently, then it can't have changed that drastically in 12 months, but yeah, she's been really good.'* (009/2).

This woman's faith in other mothers was also revealed when she spoke about receiving conflicting advice from health professionals. She described how she decided to take the advice of one particular health visitor because she knew that she was a mother herself. Another woman spoke about a group of friends who were all mothers as a good source of advice. They had met when they were pregnant and had stayed in touch, meeting each other regularly with their babies. She said:

> *'Like I say, there's five girls, you know, we meet up every Tuesday, it's brilliant. And 'cos all the babies are the same age as well so, you know, give or take a couple of weeks so we're all at the same stages really and we've all got the same concerns.'* (016/2).

A third woman spoke about how she used the internet to get advice about feeding and weaning. She found internet forums where mothers could 'talk' to each other useful, and preferred this to what she saw as more 'official' information. So although these were women she did not know personally, the fact that they were mothers meant that she valued their opinions. She said:

> *'So that was really where I got my information from [other mums on Netmums].The other websites I find are too much like as if the government has a say in what's on them. Like you go on the Cow & Gate website because that's supposed to have advice and it's all "We definitely recommend you should breastfeed" and you don't feel like you get true information because you feel like they're saying what they have to say if you know what I mean.'* (005/2).

6.6.3 Working with the guidelines

There was a high level of awareness of current weaning guidelines amongst this group of women (in terms of timing and the advice to breast feed exclusively for six months), and some mothers expressed their desire to follow these wherever possible. One mother commented before her baby was born: *'That's what I am planning on doing, 6 months, if everything's well and there's nothing wrong with the baby'* (019/1). Other participants, both those breastfeeding and formula feeding, were clear that they would, in all likelihood, wean their baby before the age of six months. One mother commented: *'Well health visitors actually recommend six months before you wean them but I'm just impatient, is the only word for it'* (015/1). This mother perceived weaning as a sign that her baby was developing well. Some mothers were concerned that leaving weaning until six months might miss a critical window of opportunity when the baby was interested in food and lead to eating problems in the future. One woman said that she worried she could *'almost go past the point where it's interested so that when you are trying to introduce new food it's thinking "I was bothered five weeks ago and now I'm a bit like, well no"'* (004/1). It was also frequently articulated that waiting until six months was a difficult thing to do, because babies exhibited signs of hunger before then, and that not many babies would 'last' that long. This view was often based on previous experience, or having seen friends or family members weaning babies. One woman said:

> *'Sounds awful, but I'm going to completely ignore the guidelines of 6 months, because I tried with him [older child], even though I wasn't 100% convinced that was the right age to wait till, but I'm not even going to try because it was just too difficult, you know he was 9lb 2oz born.'* (018/1).

There was an awareness amongst participants that the weaning guidelines had been changed relatively recently. Women also talked about the debate concerning whether between four and six months was a more sensible recommendation, particularly for bottle fed babies. Other mothers talked about the guidelines changing since they had older children, and suggested that this actually made them *'unhelpful'* (018/1), made it difficult to know what was best advice, and contributed to

women ignoring them. In general there was a perception that the whole situation was very confusing. One woman commented:

> *'And this business recently, of going from 6 months to 3 months and then going to 6 months again, that's just confusing people. The advice was 6 months for weaning and then recently they said, as early as 3 months and then all the midwives have gone up in arms and said not before 6 months.'* (006/1).

Finally, women were aware too that the weaning guidelines were couched in terms of breastfed babies. Mothers who were not breastfeeding, or were partially breastfeeding, questioned how relevant the guidelines were, therefore, to them. For example, one woman said that she knew that bottle fed mothers were advised to give their babies water to drink but that this was not advised for breastfed babies, so she wondered if there were any other differences. A mother commented: *'I've got a baby guide… and it talks about when you're breastfeeding your baby and when you're doing this and it's like, I'm not!'* (002/2). Therefore, the breastfeeding 'default' position of official guidelines and publications may not be adequately meeting the needs of formula feeding mothers.

6.6.4 Following the lead of the baby

So, if women were doubtful about the wisdom of the guidelines in terms of the timing for commencing weaning, how did they cope with this uncertainty and decide what to do? Following the lead of the baby was one way of understanding this. Women expressed the view that every baby was an individual and could not be expected to behave *'like a text book'* (006/1), so a decision about when to wean had to take into account individual factors, by following the baby's lead. During the course of this study all of the participants started to wean their infants, and weaning occurred when babies were aged between 12 weeks and 6 months, demonstrating quite a range of experience. One way to explain this was that mothers were taking their cue from their baby and following his or her lead. For example, one mother commented:

> *'I think it's very individual. I think babies let you know when they're hungry and if the milk's not enough then it's not enough. Whether they're three months, six months or anything else.'* (006/1).

Mothers talked about following the lead of their baby by interpreting aspects of the behaviour of their baby, the physical development of the baby, and the health and well-being of the baby as signs that weaning should commence. In terms of the behaviour of the baby, mothers explained that they decided to commence weaning

because they thought that their baby was hungry and that he or she could no longer be satisfied with milk feeds. When asked why they thought that their baby was hungry, mothers explained that he or she was crying for milk more often than their established routine, so rather than offer milk more frequently they had decided to commence solid food. In other cases, the baby was finishing the entire contents of all of their milk bottles, which was taken as a sign that they were hungry. For example, one mother commented:

> *'Well she'd, at that point at that moment, she was drinking the full seven ounce bottles, all of them, and I thought maybe she's a little bit hungry because normally she'd be leaving little bits of feed and stuff and so I thought if she's that hungry, whether it was a growth spurt I don't know, and that's when I give it a try.'* (011/2).

Women were quite clear about why they thought that they should commence solids rather than offer their baby more milk. They explained that their baby could not physically drink any more milk, as illustrated by the woman who said: *'It's just too much in like volume so his tummy was sloshing about, he started positing, he was being sick, which he's never done before'* (014/2). Some babies became disinterested in milk and would just refuse it. A mother described how, despite crying because she was apparently hungry, her daughter would simply not take any more formula milk when she was offered it. She said: *'She clamps her jaw shut and that's it'* (006/2).

Another behaviour which prompted mothers to think about commencing weaning was their infant showing an increasing interest in food. One woman said *'If he's interested then surely that's a good time to start looking at things'* (004/2). When asked how they gauged that their babies were interested in food, one factor mothers reported was that they were watching other people eat. A mother said: *'He's sort of sat and you're having tea, he'll sort of watch your fork'* (004/2). Some women described other behaviour in combination with watching people eat which they thought indicated that weaning should take place. One woman said that her baby started to open her mouth when those eating did, saying: *'Well she's been doing that for a long time, watching us eat, but then over the last few weeks, the mouth's open and every bite you take her mouth's open'* (006/2). Women said that their baby had tried to take food from them while they were eating, or to take food from other people's plates. Mothers also spoke about their babies appearing to be interested in the smell of food. These mothers said that their sleeping babies would wake up when food was served. For example, one mother said:

> *'If we ever go out to eat he'll be fine then as soon as the food comes he's always like [makes sniffing noise], he'll either wake up, believe it or not if he's asleep, or he'll just, he's just interested in it.'* (005/2).

Readiness to wean was also considered to be indicated if a baby was constantly putting things in his/her mouth. One mother simply said that her daughter was *'putting everything in her mouth so I knew that it was time'* (018/2). Finally, if a baby who had previously been sleeping well through the night starting to wake up more frequently, mothers identified this as a sign of hunger and that weaning should be commenced. For example, one woman said: *'I want to wait until six months but both me and my mum are starting to think she's actually ready for food because she's, she's stopped sleeping as much'* (015/2).

The physical development of the baby was also cited as a reason to commence weaning. This was spoken about in relation to age, so mothers spoke about commencing weaning because their baby had reached the prescribed age of six months. They also spoke about delaying weaning because babies had not attained particular physical skills, for example one mother commented: *'I wouldn't want to introduce kind of solids to him until he had more control of, certainly, his head'* (004/2) and another: *'She's not ready yet, she (to the baby) you can't sit up, you can't sit up yet and you've still got your tongue reflex haven't you?'* (002/2).

Finally, the general health and well-being of the baby was also used to help in the decision to commence weaning. If a baby had a particular medical condition then this could be seen as necessitating weaning at a particular time. For example, mothers referred to the fact that their baby had been diagnosed as having reflux, and that weaning earlier could help this condition, and so trying to alleviate their infant's discomfort had prompted them to do so. A mother of six described how all of her children had suffered with reflux and commented: *'That is why I've tended to have to wean early with them because of that'* (001/2), another mother explaining: *'The food stays in the stomach better than what the milk does'* (015/2). Mothers reported that their baby's reflux did seem to settle down after the introduction of some solid food and so felt this justified weaning, in some cases, earlier than recommended. The other health and well-being issue which mothers referred to in relation to the commencement of weaning was their baby's weight. On the one hand there was a perception that a heavier baby needed food at a younger age. On the other, mothers talked about starting their baby on solid food in an effort to increase the speed of her/his weight gain. One mother said: *'I want to start her on it just*

because of her weight really, because I just think if she has something else it might make her weight go up a bit faster' (008/2). Faster weight gain was seen in positive terms. Similarly, another woman explained that when her baby reached five months old, he had stopped putting on weight, was becoming more active, and that as he was exclusively breastfed she thought that he needed something else. She said:

> *'I took him to the clinic, so over the course of two weeks he'd not put any weight on, he just stayed the same. So that's when I sort of made the decision to sort of think about weaning him, really. So he's burning it off, he's quite active, he obviously needs more than just milk from me.'* (010/3).

That following the lead of their baby was very important to mothers in the decision to commence weaning was illustrated very clearly by the experience of a mother with twins. She explained how she had started to wean her son before her daughter, saying: *'He wanted more, she didn't, so he was on the baby rice. She was happy on the milk so that's where they were different then'* (017/2).

The idea of following the lead of the baby could also be seen in the way that mothers interpreted their infant's first experience with solid food. It was evident that for some mothers their baby's reaction to solid food reinforced their belief that it was time to start weaning. Some spoke about this in relation to their baby appearing to enjoy the experience, for example, one mother commented: *'I thought she was ready for it. I think I knew she was ready for it because she does enjoy it'* (021/2). Others spoke of their baby's physical reaction to being fed as an indication that they were ready to be weaned. A mother reported: *'You can see him when he takes it off the spoon he sort of goes, like a chewing motion, so I think he is, I think he definitely is ready'* (007/2). However, some mothers spoke about their baby not wanting solid foods when they were first offered, and related how they had reconsidered their decision to wean, another example of following the lead of the baby. One mother said: *'I have tried him before but he didn't like it so I didn't give him any more, about three weeks ago'* (005/2). Another mother described how she gave her daughter a rusk, partly because she was chewing her fist and partly because she was the age that her elder daughter had been when she had successfully commenced weaning her, but that it had made her baby sick. She explained how she had decided to wait a little longer before introducing solids again as she interpreted this as a sign from her baby that she was not ready to wean. She commented:

> *'I think she's going to be 17 weeks on Friday, so I thought well she's nearly there, she's about a week off and she's chewing her fist all the time. So I thought we'll just try and see how she goes and she was*

> *absolutely loving it, gnawing on it [a rusk] and dribbling, but like later on it just all came up and I thought oh my baby, you know, her little tummy mustn't be ready for it so I think we're going to hold off because she's happy on her milk.'* (002/2).

As they continued with weaning, mothers recounted how they constantly looked to their baby for leads about how to move on, making comments such as: *'I've just gone along with him*' (014/3) and: *'I have my grand plans but she was like no! Just following what [baby] wants'* (002/3). One mother described how she intended to increase the amount of baby rice she was giving her son because he had, unusually for him, woken up in the middle of the night and she thought he might be hungry. She said:

> *'I'm actually thinking of increasing it [amount of baby rice given] because last night he woke up at four, and he'd never done this before, and wanted a bottle. So I'm thinking should I increase it and give him something in an afternoon as well as the morning, because I'm thinking maybe that the milk's not satisfying him really now.'* (007/2).

In terms of the baby's hunger, mothers were, on the whole, clear that their baby let them know if they were hungry and described various communication strategies which their babies employed to this end. One mother explained that her son cried, saying: *'He just gets really grumpy. He cries and he's just unhappy and, he's like a baby bird, he opens his mouth when he cries, it's weird'* (014/3). Another woman explained that her daughter appeared to look for food. She commented: *'She starts looking; I can tell she's looking round for food. Like before you get her to the highchair she's looking at the bowls, you know, and she starts clapping on her tray'* (006/4). A third mother described a particular noise that her baby made when he was hungry. She said:

> *'"Ah ah ah". Yeah I understand what he's saying to me, he's got his own little communication style and we understand what he's saying. So yeah, I do know when he wants more, he makes a particular noise.'* (016/3).

Mothers also described various ways in which babies let them know that they did not want anything else to eat, and reported that they trusted their baby to do this. A mother said: *'I kind of go by her in the sense that quantity wise, she's very, as I say, she's very good at policing that herself'* (006/4). Some said that the infant would just refuse to open his or her mouth when they had eaten enough. One mother said:

> *'She just clamps her mouth shut. No, you can't force feed her, once she's had enough she'll turn her head away, she closes her mouth and gives you a look as if to say "Don't bring that spoon near me." Normally*

> *when she does that I will put the spoon towards her, just to be sure, but she'll either take it or she won't.'* (006/3).

The baby becoming disinterested in feeding or being distracted from it was another sign that they did not want any more food. A mother said: *He'll just sort of lose interest, he does look away actually. He sort of turns in his highchair and he sort of gets a bit ratty'* (010/3). Other mothers described their baby spitting food out or pushing a spoon away.

6.6.5 Providing adequate nutrition

Although, as explored in section 6.6.4 above, mothers stated that they were confident that their baby could communicate when s/he was hungry and also when s\he had eaten enough, they nevertheless voiced concern about whether their infant was 'getting enough'. This was expressed in a number of ways. First, mothers spoke about trying to make sure that their baby continued to have enough milk once they had started to introduce solid food into their diet. They were conscious that milk was still necessary for vitamins and iron, but as their infants were taking more food they wanted less milk. A mother described how she had worried about this with her second baby:

> *'But I know there is pressure from health visitors about the milk, about how much they should still be having, and I did get a bit hung up on that with [baby] because [older child] carried on having his afternoon feeds but [baby] stopped it, and I was thinking he's not getting enough milk, he should be having this, but you can't force him, you can't make him drink his milk if he doesn't want it.'* (014/3).

Second, women worried about whether their infant was getting enough food. One mother commented: *'I think it's a constant worry, isn't it, of, you know, are they getting enough to eat?'* (004/3). Mothers reported that judging the amount of food to offer their baby could be difficult, and alluded to the idea that there is generally much more advice and guidance available on milk feeding than there is on weaning. One woman commented:

> *'It's very hard because they don't say, they're only allowed four ounces or eight ounces of this, they only tell you in milk terms, they don't tell you what food to give them.'* (009/3).

Some mothers used pragmatic means to decide how much to offer their baby. So, for example, a woman explained that she judged amounts by looking at the size of the appropriately aged commercial baby food jars. She said: *'I just tend to do, I try and give him the amounts that they would do in the jars, I'm assuming that they are*

a guideline, about right, as to what to give a child' (009/3). Another mother said she would look for advice on the amount of food to offer in books or on the internet, saying: *'I just tend to refer to them [books] or look it up online, like if I look up a recipe then it'll have advice with the recipe of when, how much to feed and things'* (008/3). Other women explained that they just learned to judge how much their baby would eat at a meal. One mother described it as: *'Just sort of instinct really'* (016/3) and another said: *'You can gauge how much she's going to eat after a while, like if I look at it I can see how she's going to eat and I know that she's going to end up leaving some of that'* (008/3).

Another way in which mothers expressed concern about their baby taking enough food was in terms of a fear of their baby becoming a fussy eater. For example, one mother just said: *'I don't want a fussy baby, I want them to eat everything'* (006/1) and another commented: *'The worse thing I want for a child is for it to be a fussy eater, I can't abide by fussy eating children'* (009/1). Second time mothers referred to their existing children in relation to their concerns about fussy eaters. One mother said: *'Hopefully this baby will be less fussy'* (002/1), and another mother, when asked if she would take the same approach to weaning as she had with her older child, said: *'Yeah, pretty much so, I mean I've been quite lucky really 'cos [child] is not a fussy eater'* (010/1). Here, it is not quite clear whether the mother means that the way in which the child was weaned meant that s/he was not fussy, or that because s/he was not fussy it had been possible to wean in a particular way. Nevertheless, it is clear that having an unfussy baby was perceived as a desirable thing.

Conversely, one mother of a baby whose birthweight was 12lbs said that because of her size she was aware that it would be easy to give her baby a lot of food. She commented:

> *'But I am very conscious of overfeeding her because she is so big. She's not, you know, fat or overweight, but she's certainly at the top level, but she's also at the top level on her length, so she's in proportion.'* (018/2).

6.6.6 Weaning healthily

During the antenatal interviews when asked about weaning, mothers said that the food they weaned their baby on to should be healthy. When asked what they understood by healthy food, one mother commented: *'So low salt, low sugar, no convenience foods, that sort of thing, you know, introduce fruits and vegetable …*

not swamped with flavourings' (020/1). Also mentioned was the idea that sweets or chocolate should not be introduced when the baby was young, for example one mother said: *'I'm not doing any chocolate in the first year, no chocolate in the first year!'* (006/1). However, mothers were also keen not to be *'an extremely strict parent'* (020/1) in that they said that the occasional treat should be allowed. The belief was expressed that by starting babies off on a healthy diet they would learn that this was normal, and continue to eat healthily as they grew up. One woman said:

> *'I think if you give them a healthy start they tend to not question it when you put vegetables on the plate when they get older. If you give them chicken nuggets and chips from day one they're not going to want vegetables are they?'* (019/1).

Whilst talking about their intentions in relation to healthy weaning women did inject some reality into their accounts, in that they often laughed at themselves and suggested that it was all well and good having particular ideals but the reality of their situation may make them behave differently. Interestingly, it was first time mothers who thought about this. So, one mother who during her first interview voiced very strong opinions about not using pre-prepared commercial baby food went on to say:

> *'It's all well and good saying what the plans are, reality might be a completely different thing, come back and ask me in six months and I might be going "forget all that, I'm on jars, we haven't got time"'.* (020/1).

On the whole, women thought that making their own food for their baby was the ideal, as this was considered to be a healthier option than giving commercially prepared baby foods. Women expressed worries about what commercial baby food contained. Before she had her baby, one woman commented:

> *'[I do not] have any intention of using any of those disgusting jarred foods if we can help it, I'd rather, you know, know that it's all proper healthy ingredients and no additives and stuff so I'd rather we make our own foods.'* (020/1).

This view persisted after babies were born and mothers were in the process of weaning them. One mother spoke about her impression that all commercial baby food was orange, saying: *'How can they all be orange? And none of my foods that I make seem to stain her clothes. So there must be something in them, which makes you worry a bit'* (006/3). Another mother, who had used commercial baby food, said that looking back at her experience of feeding her baby the only thing that she would change was that she would have liked to have made her own food. Mothers spoke about making 'batches' of food and freezing it to use when it was needed, for

example freezing portions of different vegetables in cubes to *'randomly mix and match'* (006/3). Various pieces of equipment were mentioned as being very useful in this respect, including hand blenders, freezers, microwaves, and *'a combination steamer blender thing'* (006/3). However, it was universally agreed that making weaning food for their baby was a very time consuming activity and some mothers described the lengths they went to in order to achieve it. For example, one woman commented:

> *'Even though, and it'll be even worse when I go back to work, but even now with him I have to sometimes ask my mum and dad to come up here and sit with him while I blend loads of stuff down … So a bit time consuming really, but it's good if you can.'* (007/3).

This mother was articulating the view that the pressure on her time when she went back to paid employment would mean that continuing to make her baby's food was difficult, thus she may need to use pre-prepared commercial food. Another reason cited for using commercial food was convenience. A woman said:

> *'It's convenience to be truthful with me. When we do, like I was saying, a dinner tonight they'll have their dinner but if we're in town, no, you know, you go somewhere, and it's jars. Or if we've not like, we do freeze when we make a big pan we will freeze so if we've got none of that they will have jars.'* (017/2).

Another mother said that she could understand that if your baby did not eat well, it would be very tempting to offer prepared foods, indicating that it would not be worth the effort preparing food from scratch. She said:

> *"[Baby] likes my food. I think the more he likes it the more keen you are to do things for him. I think if he was struggling, I can see how you would just go straight for the jars and things just because it would be so much easier. If, you know, he's not going to eat it anyway, why bother spending the hours cooking things if you know he's just going to go, "No.""* (004/3).

Although on the whole home prepared food was seen as the healthiest option, some participants described commercial baby foods as healthy, and trusted that because they were made for babies they would contain all of the nutrients that they needed for healthy development. The partner of a first time mother said:

> *'The other thing is that you know, with those jars you know it's all like it's well balanced for him and, you know, you know it's not going to be a load, all the rubbish in it. And not that what we eat is a load of rubbish but you just don't know if it's going to agree with him so much.'* (005/3).

A similar view was expressed by a mother who explained that she had been worried about what foods she could give her daughter safely and what she should avoid. She explained: *I've been sticking to buying the jars because obviously they know best about it because they've made the food'* (021/3). This mother went on to explain that she had started to make her own food for her daughter by looking at the meals that were available in the commercial baby foods and making similar combinations from scratch.

6.6.7 Harming the baby

Mothers talked about worrying that their baby might choke when they were introduced to solid or lumpy foods. It was evident that they knew this was actually unlikely, for example some mothers explained that babies have a strong 'gagging' reflex and so would not choke if they were sitting up and supported. However, it remained a source of anxiety. One mother stated that she had delayed introducing finger foods because of her fear that her son might choke. Another woman described how she got her partner to give their daughter a piece of toast because she was too nervous to do it herself. She said:

> *'I think when she first had toast, I made [name of partner] do it because I chickened out, that was the only bit that I was actually worried about, first giving her something she could choke on.'* (006/3).

Mothers also talked about harming their babies through giving them food which could provoke an allergic reaction. As with the fear of choking, it was not lack of knowledge that underpinned this fear as women were generally well informed about the foods that are considered suitable for infants and the foods that it is considered care needs to be exercised over. Nevertheless, the fear that a baby might suffer an allergic reaction to food introduced was expressed. A mother said:

> *'That's another thing that scared me. I didn't want her to eat because I didn't want her to have a reaction and then don't know what to do when she has one, it's quite scary actually.'* (021/3).

6.6.8 Fitting in with family life

Women talked about how they managed the weaning process in order to fit feeding their infant in with other aspects of family life in a variety of ways. On occasion there was a 'trade-off', as mothers described doing something that they did not consider ideal, but that fitted in with her other commitments. For example, a mother explained how, when she commenced weaning her son, she fed him in the late afternoon even though she thought that it might have been better to do it earlier in the day when he was less likely to be tired. She explained:

> *'I've just been giving it [food] once a day and to be honest with you, it's probably not the right thing to do but it's just convenient in that I give it usually when [older child] has his evening meal, so about half past five because I sort of, I don't know it just seems to work out better that time.'* (013/2).

Mothers also talked about special occasions and how they were managing weaning in order not to upset plans for these. One woman said that she did not want to change her son's initial weaning pattern because it was coming up to Christmas, saying: *'I think we'll get Christmas out of the way because I don't want to upset him before Christmas, and then I think we'll start on the stage two'* (005/2). Another mother explained that when she was arranging her son's christening she had worried that if she progressed too far with weaning before the event it would make things difficult. Therefore, she had delayed things in order to manage the occasion more easily. She said:

> *'Yeah because the only reason I kept him on the bottles and tried to keep him off as much as possible, it was his Christening in January and when we worked it out, I thought if he was on full, proper feeds, I'd have literally been feeding him as he was at the font.'* (009/3).

As they progressed with weaning, mothers spoke about fitting in with the family in terms of establishing family mealtimes, which was articulated as important by participants. One woman said: *'We try to eat all together when we can'* (003/3) and another: *'And once he's finished his tea and we're having ours we sort of pull his highchair up to the table so he's sort of not left out of it, because in a way he's sort of joining in.'* (010/3). First time parents also thought that this was good practice, with the partner of one of the interviewees commenting *'I think it would be a benefit to eat meals together and eat the same stuff when he's old enough to appreciate and understand that we're eating as a family'* (005/1). There was also a concern that mealtimes should be pleasant. One woman said that she wanted to have *'a bit of a relaxed sort of approach'* (020/1) and another stated: *'I think I'm not going to make an issue of meal time. When we have our tea the baby can sit down with us and eat and if he doesn't want to eat he can wait until next meal time'* (019/1). A third woman said:

> *'But you can't force a child to eat something they don't want to eat and I don't want to force him either because I don't want him to get to the point where mealtimes become a fight that he's almost sort of, not frightened of but, you know, it's not something he enjoys because then it's more likely he'll have more of an issue with food and that's not the intention.'* (004/4).

Women also spoke about fitting in with family life in another way, suggesting that the family should change to fit in with the baby. For example, some women saw weaning as an opportunity to improve their whole family's diet. One woman said: *'You never know, I might get my husband to eat better as well. Work on him at the same time'* (006/1). Another woman explained that she and her partner had a sweet tooth which she did not want to pass on to her baby, saying: *'I think we have to kind of, you know, change the way we eat maybe, to then encourage the child to follow us rather than us be eating something completely different to it'* (004/1). There was not a lot of evidence that this did actually happen. A mother said that, in fact, she and her partner had stopped eating wholemeal bread because her baby did not like it, suggesting that her own diet was getting less healthy. However, one of the mothers who had suggested that the family diet may become healthier remained optimistic that it might happen as weaning progressed, saying:

> *'I think it will happen [whole family will eat more healthily] because when we start eating at the same time it will happen. Because you're not going to add as much salt and things and you're more likely to steam everything.'* (006/4).

6.6.9 Handing over the reins

A number of mothers returned to paid employment outside the home during the course of the study. Some mothers were sharing childcare with their partners, so the baby continued to be cared for in the home. These mothers reported that their returning to work had no impact on the process of weaning, as their partner just carried on with the pattern of eating that they had established. Some mothers had relatives (grandparents) caring for their infant while they worked, whilst others were being cared for either by a childminder or at a nursery. Mothers whose children were being cared for outside of the home talked about handing over the reins of weaning and feeding to others. This did not seem to concern mothers who in fact seemed pleased that this was the case. One mother, whose parents and parents-in-law cared for her son while she worked, explained that she was happy for them to look after him and care for him, including feeding him, in whatever way they saw fit. She said:

> *'They have him in the day and I don't want to lecture them. I'm quite happy for them to sort of deal with him how they want to deal with him and look after him. So I'm quite happy for them to do it the way that they've always done it and it seems, it doesn't seem to do him any harm. I have said no to cow's milk just because of the problem that he's had seems to have been linked with milk.'* (005/2).

Similarly, a mother whose son was going to have all of his food during the working week at his nursery was quite content for the nursery to take this role, saying: *'He's doing really well [with his feeding]. I mean, nursery have took over now'* (014/4). Other women described how they had prepared their baby for nursery by making sure that the feeding pattern that they had established, in terms of the timing of meals, fitted in with the pattern of the nursery. They also spoke about the food that their babies would be eating and were happy with what was to be offered. One mother explained that nursery staff had suggested that if she was worried about whether her son would eat properly, she could send his own food in initially while he became used to being at the nursery. However, she preferred to leave things to the nursery, saying:

> *'The lady at the nursery said, you know, for the first couple of weeks, if you're particularly concerned, you can kind of take your own food so that you know they're going to eat. So I said, "Well, I think I'd like to start him off on just whatever it is that you're having and let's just see how we get on." I'm hoping that when he sees other children eating things, because he tends to be, like if we eat with him, he tends to be better at trying new things.'* (004/4).

In general, mothers were impressed with the variety of food, as they saw it, that their child was offered at nursery. One mother said: *'I mean, they're absolutely fantastic at nursery with him, he has roast chicken dinners, lemon sponge and custard, jacket potatoes with like beans and cheese'* (009/3). Another mother commented that her daughter had food at nursery that she would not have had at home but she was happy about that as it was all prepared freshly on the premises. She said:

> *'Yeah they [nursery] feed her, they give us a little sheet of what she eats and things. But some of the stuff I wouldn't have given [to baby] but you had chilli the other day didn't you! Chilli! And then you had chicken curry one day.'* (003/3).

Mothers reported that they hoped that eating at nursery with other children would encourage their baby to eat, try different things, and to feed him/herself. This did seem to happen in some cases. One mother reported:

> *'He's started to show more interest in feeding himself, definitely. Whereas before he started nursery he was quite happy for you to feed him, whereas now he wants, he prefers finger foods, and he will, he likes to feed himself and if you feed him with a spoon he wants a spoon, so he's shown more of an interest.'* (014/4).

6.7 Interaction with health professionals

All of the participants had been in contact with health professionals during their pregnancy and after the birth of their baby, mainly midwifes and health visitors. During their antenatal care and the birth of their babies, women had been in contact with both community and hospital midwives. Most women reported that after the birth of their baby they had a visit from their health visitor who talked about services available at local Children's Centres and gave them a telephone number to contact the health visiting service should they need to do so. For some women, particularly those who already had children and felt quite comfortable about caring for them, this was perfectly adequate. A mother of six said: *'They just leave me to it, their attitude is, "You've had six kids, you know what to do, if you need me you know where I am". Which suits me a lot'* (001/2). Another woman, having had her second baby, said that she knew she could always telephone the health visitors if necessary.

Health visitors were talked about specifically as sources of advice regarding weaning. Mothers reported being given leaflets on the subject by health visitors, and some women had found their health visitor to be a good source of information. One mother commented: *'But yeah she did make me feel a lot better, gave me some good advice* (016/3) when explaining that she had needed help with how to combine milk feeding and solid food and another said that her health visitor had been *'very useful, very helpful'* (010/3) in giving her advice regarding how to increase the calcium in her baby's diet. All of the women had heard about the 'weaning parties' or classes run across Halton by health visitors. They were generally very well received and considered useful. One first time mother said:

> *'I'm really pleased that I went [to a weaning class]. It was aimed very well. It was kind of assumed that you had some sense, and it was more a practical, you know, these are the things, you know, to try.'* (004/3).

However, some reservations about the support available were also expressed. In order to understand what women wanted from health professionals during this time and how they experienced their interactions, three categories of meaning were developed: mode of support; towing the party line; and conflicting messages.

6.7.1 Mode of support

Some women, whilst acknowledging that support from both midwives and health visitors was available if they sought it out, would have appreciated more proactive and/or directive support. They would, for example, have liked health visitors to

contact them to see how they were getting on, and on occasion they would have liked to have been told more categorically what they should do. A first time mother, who said that her experience while she was pregnant had been that unless she asked questions of the midwives she was not given a lot of information, spoke about her contact with her health visitor. She commented: *'It's the same with the health visitors I find, once you've had the baby sort of in a sense, you're not on your own, but yet they won't come out unless you phone them'* (007/2). This woman said that she would have appreciated more than one visit from her health visitor when her baby was very young and she was learning how to feed and care for him. Another first time mother was not impressed with the help that she had received from her health visitor. She had contacted the service as her baby was crying all the time, she did not know if it was because he was hungry, and she was at a loss over what to do. It was suggested that she let her mother take the baby for a while, which the woman did not find particularly helpful advice. She said:

> *'I think it's terrible that the last time she [health visitor] saw me I was in a mess and I've not heard from them since. I've not even done my postnatal depression questionnaire; I've not even had my six weeks check.'* (005/2).

It was not only first time mothers who would have appreciated more support from health visitors. A mother who had just had a second daughter explained that her health visitor had *'signed her off'* and she commented: *'Maybe it's because she's my second, they think I know everything. I don't'* (002/2).

Mothers also spoke about sometimes wanting more directive support, reporting that at times they just wanted to be told what to do for the best in a particular situation. Although they appreciated that it was their baby, and their responsibility to make decisions about his or her care, they did not always feel able to. One mother commented: *'I think it's the culture we've created to be honest, they probably won't want to say anything because someone, some silly person, would sue them'* (005/2). Another mother explained:

> *'I think health visitors are very reluctant to say "This is what you should do". They give you like the ideas or suggestions of what to do but then it ultimately is your decision whether you do it, which can be a bit frustrating at times because sometimes you just want someone to say "Right do this and then it'll be alright".'* (010/2).

One mother had become very frustrated because after her son had been referred to a dietician because of his slow weight gain, the local health visitors were reluctant to offer any more advice to her, suggesting instead that she should contact the

dietician. The mother explained that this was not necessarily an easy thing to do, and the situation had left her feeling unsupported. She said:

> *'[I] wanted to ask someone about how he's not taking 20 ounces of milk at the moment because we just can't get it in him because he's refusing and they're very much like well now you're with the dietician we really won't talk to you, you know, you need to speak to your dietician and that's a bit, it's more frustrating because you sort of think, well, if I wasn't with the dietician what would you be saying?'* (004/4).

6.7.2 Towing the party line

It was evident that women believed that health professionals often gave particular advice because they had to, as it was NHS or government policy. The mothers' words indicated that they understood this as health professionals having to tow the party line, that is, because of their position there were things health professionals had to say or do irrespective of what they really thought. This was particularly so in two areas: in relation to the decision about whether to breastfeed or formula feed; and with reference to the age at which a baby should be weaned. Mothers thought that the national guidelines were repeated by health professionals regardless of individual situations. That women felt considerable pressure to breastfeed has already been discussed; they also considered that midwives had no choice but to promote and encourage breastfeeding. For example, one woman said: *'Well obviously breastfeeding, they sort of push breastfeeding more than [formula feeding], I think they basically have to in their job* (007/1). Another mother's experience in a maternity ward reflected this. She explained that some midwives appeared to ignore formula feeding mothers, whom she thought they saw as a *'lost cause'* (006/2). Instead, they concentrated all of their efforts, which were not always entirely welcome, on those who breastfed. The mother explained:

> *'But there was one of them, she was like the Nazis storming down the bloody ward and she was like, because there were two of us breastfeeding and the rest weren't and like we were targets, it was just like, "Why haven't you got that baby on the breast yet? Get that baby on the breast." And we were like, "Oh God, I've only just put her down.'"* (006/2).

Similarly, a mother breastfeeding in the maternity ward explained how she started to keep written notes of every time that she breastfed her baby because the midwives kept asking her about it and she could not always remember how long he had fed for. The implication of these experiences was that health professionals, in these examples midwives, were driven to 'support' breastfeeding mothers to such an extent that the support could feel like pressure.

When speaking about weaning and health visitors, another mother expressed the opinion that, no matter what she said about her baby, how she was behaving, and why she thought that she should start to wean her, the health visitors would say that weaning should not be commenced until the baby was 6 months of age. Her belief was that her individual situation would not be taken into account and the official guideline would just be repeated regardless. She said:

> *'Because, ultimately, I know if I go to the health visitor and say, "She's not sleeping and she's drinking loads" they would still recommend that I don't wean her till six months.'* (018/2).

To some extent this point of view was borne out by mothers who reported receiving information about the health visitor led weaning parties after they had actually started weaning. This was often because they had started weaning before the recommended age of six months, and the invitations had been timed to coincide with this. Some of these mothers would have appreciated the opportunity to attend the event. One mother recounted her experience with her older child:

> *'Because they don't recommend till six months, you've got no help then off anyone till they get to six months and that's when they'll start saying, oh well, come to like weaning parties…. I got a letter saying they're doing a weaning party….. but at which point I'd already weaned her.'* (015/1).

What effect did the understanding that health professionals had to promote particular ideas have on this group of mothers as they negotiated feeding and weaning their babies? Some women largely dismissed health professional's advice, on the basis that it was academic rather than practical. One mother said: *'I'm not being funny but half of these people that show the guidelines haven't got kids. They're just going off the books'* (017/2). This also reflects the idea discussed earlier about the importance attached to the advice of other mothers. Other women explained that if they were not following what they knew to be the advice of health professionals they would just not talk to them about it, for example one mother said that she would not mention that she had started weaning her son before six months in case she '*got shot'* (007/2). It was also suggested that if a parent did start weaning before six months then health professionals would not help at all even if asked, and that there was *'no-one to turn round and go to'* (015/1). Thus, some mothers did to an extent feel that they were on their own. One mother said:

> *'So they're not going to give you help and advice, are they, because really I'm going against the guidelines now, even though it wasn't the guidelines when I had my other two children.'* (018/2).

6.7.3 Conflicting messages

Finally, conflicting messages were spoken about. Women talked about being given conflicting messages in a number of different ways. They spoke about different health professionals giving conflicting advice, and about individual health professionals contradicting themselves. Mothers also spoke about information being given that conflicted with their own lived experience, which made it difficult to incorporate the advice into their lives. First then, mothers recounted experiences of being given directly conflicting advice about various issues by different health professionals. A number of examples were given involving midwives at parentcraft classes and in hospital, and health visitors after the baby was born. Mothers explained how this really made them feel at a loss as to how to go forward. For example, talking about her parentcraft class, one woman said:

> *So there was another question the week after and we had a different midwife [done this one], she said, "Oh no, the other midwife is talking a load of rubbish, don't give them any water".'* (009/2).

To cope with this situation, this woman explained that she decided to choose one health professional and just ask that one person and follow her advice. Another woman described her experience of seeking advice from the health visitors when her son would not stop crying, describing how two different health professionals contradicted each other. She explained:

> *'I just said, "Look, what can I do"? "Oh he's hungry, go and get him some hungry baby milk". So I went and got him some hungry baby milk and he was even worse so I rang them again on the Monday. "Oh what did you put him on hungry baby milk for? That's the worst thing you could have done". And you're sort of like the right arm doesn't know what the left arm's doing.'* (005/2).

One woman explained how she thought that her health visitor was, in a sense, giving her conflicting advice over time in terms of the weaning her son. She described that up until the baby was six months of age, the health visitor had always been adamant that weaning should not commence until that age, and although she did commence weaning before this, the mother did not mention it to the health visitor. However, the mother commented that it seemed that as soon as a baby reached six months of age, it was assumed by health professionals that he or she was fully weaned, which she thought was odd, describing it as *'mixed messages really'* (007/3). To be fully weaned at six months of age would mean, as this woman understood the situation, commencing weaning considerably before that, which she had been told she should not do. She said:

> *'Really strange, I was asking about the follow on milk and she went "Oh right, so whereabouts is he in his weaning?" Now he'd only just turned six months, so it's like they say to new mums don't wean until they're six months, you can't do this, you know national guidelines state. When I went it was like she already knew or was expecting me to have [weaned baby].'* (007/3).

Another mother reported being slightly perplexed when a health visitor, in effect, contradicted her own advice. She recalled that the health visitor had advised her to start to wean her baby before the age of six months in order to help him gain weight, but had also indicated that she should not be issuing such advice. The woman commented:

> *'It was funny, really, because the health visitor said something, you know, if anyone asks, I haven't told you this, but baby porridge. I can't be seen to be saying to you because we're saying you should be weaning at six months, so I can't be seen to be saying, you know, this is a good idea, she said, but in my experience, do it.'* (004/3).

Conflicting advice was also spoken about in terms of the advice proffered contradicting in some way a mother's own experience, knowledge, or lifestyle, thus either making it difficult to follow or leading to the woman deciding not to take the advice. Thus, women described taking advice selectively. In relation to advice conflicting with her own experience, one mother explained that a health visitor advised that she should give her baby more milk in order to increase her weight gain. However, her daughter would not take any more milk, and as the woman could see that her baby was growing and appeared happy she decided not to increase her milk feeds. Another woman spoke about her experience of seeking advice from her health visitor regarding weaning her baby, whom she thought was getting hungrier. She was advised to give more milk rather than to wean her daughter, but explains that she decided she could not follow this advice:

> *'After the six [ounces of milk per feed] she went up to seven and that's when I decided, you know, you can't really always listen to professional advice because if you did then you know it would mess up the routine that you've got and you know I think she's ready for it.'* (012/2).

Occasions when health professionals had given advice that was considered to be wrong or out-of-date, and so was conflicting with the mother's own knowledge, were also recounted. One woman expressed surprise that she had heard a health visitor advising a mother not to give her baby fruit. As she thought that fruit should be an important part of her daughter's weaning diet, she stated that she would not be following that advice. She reported:

> *'I overheard one of the health visitors say, "Don't give your baby pureed fruit, they'll get a taste for it….. it's like you don't want them getting a sweet tooth". It's like with fruit. You're advising someone not to give their baby fruit!'* (006/2).

Another mother talked about advice that she received about storing formula milk feeds in the fridge and considered that the health visitor was talking about a type of bottle which was no longer available, intimating that the health professional was out-of-date with her knowledge. Finally, in terms of advice given conflicting, or not fitting in, with a woman's lifestyle, one mother, who had experienced a very busy period in her home life, reported a conversation that she had with her health visitor regarding suitable weaning foods for her son. She commented: *'She did say, "Try and make your own [baby food]". I said, "Don't even go there, it's just been absolutely hectic, I've not had a minute at all the last couple of months"'* (009/3).

6.8 Growth and development

Mothers were clearly concerned to know that their babies were growing and developing normally and they were all asked about how they judged that their infant was healthy. Three ways of understanding this were developed: valuing weight and weight gain; the tyranny of weighing; and just look at the baby.

6.8.1 Valuing weight and weight gain

It was evident that the weight of their baby was important to women. At the first interview after the birth of their baby, mothers were asked about their baby's birthweight, which all could recall, and reported using imperial measures (pounds and ounces). Monitoring the weight of their baby was one way in which they judged his or her well-being and progress and how the weight of her baby may encourage a mother to commence weaning has been mentioned previously. Women enjoyed having their babies weighed, and during the interviews displayed the growth charts in their 'red book', where the weight of their baby was plotted, often with great pride. The importance they attached to their baby gaining weight was discernable. For example, one woman described the problems her baby had experienced with lactose intolerance and was evidently pleased that, despite this, her son was gaining weight. She said:

> *'But he's put weight on really, really well even when he was having a lot of pain with his stomach and being sick all the time, he still put weight on fine, like he stayed right on the curve [percentile line] didn't he?'* (005/2).

Another woman explained that, as she was breast feeding and did not know what quantity of milk her baby was taking, having him weighed reassured her that he was growing adequately. When asked if she liked to know the weight of her baby she explained:

> *'Yeah, definitely, not obsessed by it but it's just nice to know that he's…. especially 'cos I'm breastfeeding, you don't really know how much they're getting and you just want that reassurance really that they are getting enough.'* (010/2).

Different responses were evoked when a baby was deemed to be either under or overweight. In general, being small, losing weight, or not putting on enough weight generated more concern and anxiety than being heavier or gaining weight. One woman, who was formula feeding her baby, described how she understood her baby to be underweight because he had fallen below a percentile line which his weight had been following. It is likely that the health professional in this consultation was saying that the baby was under the percentile line on which he had previously been, rather than he was actually underweight, but the mother thought her baby was underweight, which generated much concern and made her question her ability to care for her child. She explained:

> *'She weighed him and she said "Oh, he's a bit underweight" and I was like "What do you mean, he's a bit underweight?", so I started panicking then thinking "Oh, maybe I'm not feeding him enough, maybe I'm not doing this, maybe I'm not doing that" you think all kinds, don't you, you're thinking "Oh my God, I'm a terrible mother now".'* (009/2).

Three babies had been referred by health visitors to other health professionals (one to a GP and two to a dietician) because of low weight. One mother, who had breastfed for six weeks and had moved to formula feeding by the time of the referral, was reassured by this, describing the response of her GP. She said:

> *'She got weighed and she's put on three ounces, which isn't a lot, so then the health visitor said speak to the doctor, but the doctor said it's fine, it's just her way kind of thing, as long as she's drinking her bottles there's nothing else really, and as long as she's putting on and not losing.'* (008/2).

However, the two mothers who had been referred to a dietician felt that they were being blamed for their baby's lack of weight gain, or that their ability to care for their child was being questioned. One mother, who had breastfed for four weeks but had been advised to formula feed because of her baby's throat problem by the time of her referral, said that she was asked if she could *'make'* (019/3) her baby drink more milk, the implication being that she should be able to. Another mother, who mainly

breastfed her baby but also gave him supplementary formula feeds, reported that she had felt *'very defensive'* (004/4) about her baby's referral to a dietician. She said:

> *'It's just a bit kind of frustrating really because you feel that you're going to have to try and explain yourself to the dietician and she's lovely, it's not like she's kind of going "God you're doing it all wrong", but you kind of feel like she's thinking, "Well, you obviously aren't doing it right though, are you?".'* (004/4).

At her subsequent interview this woman also said that she felt there was pressure to make sure that your baby ate enough, saying: '*You do feel it's your kind of failing if your child doesn't take a bottle well or isn't eating what they should be eating or whatever*' (004/4).

Having a bigger baby or a baby putting weight on quickly did not provoke the same level of anxiety. One woman, who was formula feeding, described how her baby had crossed percentile lines in an upward direction and was pleased with this. She said: *'I know that I had him weighed, it's in here anyway, he was on the 75th percentile, and then the last time I had him weighed he was on the 91st, so he's doing alright'* (005/2). Women tended to laugh about bigger babies and weight gain. For example, a mother whose daughter was between the 50th and 75th percentile for weight laughed about her rapid weight gain, saying: *'She just rocketed after that, and she carried on rocketing, she's a monster'* (006/2). Another mother, whose baby was on the 95th percentile for weight and height, commented:

> *'I used to take him to the massage class and he's about twice the height of the little ones of four months old. It's quite shocking actually how big he is (laughs). He's a big bruiser!'* (020/2).

One woman expressed concern about her baby being heavier, saying that her grandfather had commented that the baby was big. She had taken him to be weighed in order to gain reassurance that he was not overweight. The health visitor had told her: *'He's fine, from the centile chart, he's just following his birth [percentile]* (014/2). This had reassured her, and when she was interviewed when her baby was 11 months old she did not know what he weighed. She commented:

> *'I don't know how much he weighs, I was going to take him tomorrow. He's big but he's not fat, he's just tall and solid. He hasn't got a fat face and he hasn't, he just seems like a big boy.'* (014/4).

6.8.2 The tyranny of weighing

Despite the fact that mothers liked to have their babies weighed, there was also a sense in which the process of monitoring weight was one fraught with worries and concerns. Hence, weighing became a tyranny in that mothers worried if they did not have their baby weighed, but also if they did and weight gain was not as expected, either by themselves or health professionals. When interviewed, if they had not had their baby weighed recently, some mothers clearly thought that they should do so. Implicit in their words was the idea that they should have prioritised the weighing of the baby. For example, when asked if she knew the weight of her daughter, one mother replied: *'I don't, no, I need to, I'm going to get round to going to the clinic'* (011/2). Another commented: *'I haven't had time to go to the health visitors, I feel really bad actually because I haven't had her weighed for months, absolutely months'* (006/4). Even mothers who did not need to know the weight of their baby for their own reassurance expressed the belief that they should be weighed. One mother said: *'I know I should do it more often but there's nothing, I don't like feel I need to do it [have baby weighed] every week'* (012/2). Women were almost apologetic about not having their baby weighed.

Mothers who had taken their baby to be weighed, however, were worried if their baby had not put on weight, or if they had not put on what was considered enough weight by either themselves or health professionals. Their words suggested that they felt pressure from health professionals to ensure that their baby had gained weight at each clinic visit. A mother with a small baby described how slow his weight gain had been and said: *'Because I think there was a time when I was thinking I'll never get him [baby's weight] to double figures'* (004/2). This woman described how she would behave differently were she to have another baby. She explained that she thought it was too easy to become very focused on weight and that she did not think this was *'particularly healthy, certainly for mums!'* (004/4). She said:

> *'I think if we have another child I wouldn't weigh them as frequently as I had [name of baby] weighed. Because I think you get so focused on, he's only put on two ounces, he's only done this, he's only done that and actually, he doesn't need to be weighed that often because babies don't, especially after a couple of months, they don't put on weight that fast.'* (004/4).

Other mothers spoke of their worry if their baby lost weight. For example, one mother commented: *'I think in the first couple of weeks when we were struggling with the breastfeeding it [baby's weight] dropped a bit and I was a bit concerned'* (006/2). Women were also anxious that their baby should follow percentile lines

steadily and not drop to a lower percentile (which can happen despite the baby actually gaining weight). Following the percentile line was viewed as the pattern of weight gain to be aimed for, an understanding often developed through encounters with health professionals. One woman said: *'She's between the 50th and the 75th centile and she's kind of stayed there constantly… she's following it quite nicely and the health visitors think she's wonderful'* (006/2). Another mother described her concern that her baby had dropped to a lower percentile line, saying:

> *'Because of my concerns that he's dropped the percentile, if he'd stayed in the, you know, in sort of the perfect arc, if he'd stayed in that I wouldn't be concerned at all, but the fact that he's dropped makes me think I wish he'd drink a little bit more so he could stay on the perfect curve.'* (016/2).

6.8.3 Just look at the baby

Despite the anxiety which was frequently expressed about weighing babies and adequate weight gain, some mothers did not feel the need to weigh their babies so often, relying on the fact that they could see that their baby was growing, thus the idea of 'just look at the baby' was articulated. This was particularly the case for mothers who had older children, who were more confident in their ability to judge that their baby was progressing. One mother said: *'With [older child] I had him weighed, I think because it's your first, I had him weighed quite a lot but with [name of baby] I can see he's doing well'* (014/3). When women were asked how then, apart from weight, they judged that their baby was growing and developing, two factors were mentioned: that the baby was growing out of his/her clothes; and that they judged the baby to be healthy and happy. A number of mothers mentioned that they monitored their baby's growth through their clothes. One woman said:

> *'I had noticed he was putting on weight because of his clothes and the nappies so I know that he's not, if he was losing then obviously I wouldn't be so stubborn [about not having the baby weighed] but I can tell that he's putting weight on and he's growing, going through his clothes isn't he?'* (005/2).

This same mother commented at a subsequent interview: *'We just haven't weighed him, we've just gone off the fact we can see him …… he's growing'* (005/3). Another mother explained that she judged that her baby was developing well because he was happy, and that she worried if he was not happy. She said: *'He is a happy baby, he's dead smiley as well, so anything that sort of deviates from that you sort of think "Ooh"'* (010/2).

6.9 Conclusion

The interpretation presented in this chapter reveals that feeding and weaning are central to the nurturing of an infant, and that there are many and varied influences that shape the way in which mothers carry out infant feeding. There is also a lot of information about how mothers make judgments about the healthy development of their babies in relation to health and growth. It is evident that mothers' thoughts about weaning did not really change over time, although they perhaps became more realistic in the face of their everyday lives and responsibilities. In the following chapter, whether and how this may shed some light on the development of overweight in infants will be explored.

Chapter 7
Theorising infant feeding

7.1 Introduction

In this chapter, the findings from phase two of the study are discussed. The aim of this work was to explore weaning as a social process by focussing on the experience, knowledge, perceptions and actions of mothers in relation to the theory and practice of weaning, in order to consider whether this could shed any light on growth and development in general and the early development of overweight in particular. In keeping with the approach to grounded theory advocated by Charmaz (2006, p.132), a theory, or "plausible account" of the weaning process was developed. In constructionist grounded theory, any theory produced is an interpretation; it is about understanding the phenomenon - in this case the process of weaning - being studied. Thus, the theory should fit closely with the data generated, but may not be the only way of understanding and interpreting those data. In the process of theory generation, the way in which existing theory could progress the analysis was also considered (Dunne, 2011). The theory is presented first, and consideration is given to how this account may help to better understand growth and development outcomes, one of which may be the emergence of overweight in infants. Following this, there is some discussion of the current study in relation to the literature reviewed. Finally, strengths and limitations of this phase of the study are reflected upon and thoughts about future work are presented.

7.2 Infant feeding and weaning: a plausible account

Although the focus of this qualitative phase of the study was the weaning process, it became very evident during early data generation and preliminary analysis that what was salient to women in the antenatal period was milk feeding in terms of breast and formula feeding. Before their babies were born mothers talked a lot about milk feeding, indicating that infant feeding was an early preoccupation. It seemed that it would be difficult to understand weaning without having an understanding of how women thought about feeding their babies from the start. More importantly, it also became clear that in exploring weaning, an understanding of milk feeding was important as it was through this that mothers started to develop a feeding relationship with their baby. Feeding is central to nurturing during the early postnatal period, and is based on interaction between a mother and infant. Through feeding their babies mothers develop understanding of their babies' needs and how

they can be met through their own actions, which forms the basis of their emerging relationship. For mothers, milk feeding and weaning were a continuum, a perception explicitly acknowledged by some women in the study.

In general, milk feeding was seen as something that posed challenges for many. During the antenatal period, the formula/breastfeeding debate had to be negotiated. Initially, when mothers were thinking about milk feeding during this time, they did so with little knowledge of their baby. Their choices were abstract in that they were based on what they knew and believed about breast and formula feeding, perhaps coupled with their own previous experience. In addition, many mothers thought specifically about the role of their baby's father and how the mode of milk feeding might shape his involvement in this aspect of care. Often, women expressed different views. Equally, two women could have the same basic belief about milk feeding, for example that breastfeeding was natural, and come to a different conclusion about how to feed their own child, as these beliefs were interpreted in the context of their own circumstances. Mothers who went on to breastfeed talked about the difficulties they had in getting breastfeeding established, and in continuing. Women who formula fed also spoke about difficulties, such as a baby not appearing to like a particular formula milk or suffering from reflux. Milk feeding of whatever form, therefore, could have its problems, and these had to be negotiated. Weaning, however, was seen as more straightforward, and whether a baby was breastfed or formula fed seemed to make little difference to mothers' approaches to weaning. Although mothers had to think about such issues as when they were going to wean, how to progress, and what foods to offer, this did not appear to precipitate the same degree of worry or angst as contemplating milk feeding. That is not to say that mothers did not have any worries about weaning their infants, they did, but they seemed to deal with these worries more straightforwardly. This could have been for a number of reasons: for example, as their babies were growing older mothers may have felt more confident in their ability to care for the infant generally. However, the feeding relationship between the mother and her baby was key to how mother's managed weaning.

By the time mothers started to wean their babies, they had developed a relationship with their infant through milk feeding, and the knowledge they had developed of their baby through this relationship was central to the way in which they engaged with the weaning process. In essence, through feeding mothers developed embodied knowledge of their babies' preferences and practices. The interaction

between mother and baby concerning food developed from the moment their baby was born and there was a fine grain of observation and interaction between mothers and babies. Women used these interactions to respond to what they judged to be their babies' needs and wants; they followed the lead of their baby. Initially mothers looked at physical development, such as whether the baby had head control, but this developed quickly towards mothers interpreting and responding to their babies' behaviour, such as seeming to be interested in food. Mothers communicated a sense of a developing relationship between themselves and their baby over food and tended to place great trust in their babies to let them know when they should start weaning, how quickly to progress, that they were hungry, and to signal when they had eaten enough. Many of the ways of understanding how mothers acted, such as just 'getting on with it', seeing what other mothers do, working with the guidelines, weaning healthily and harming the baby can best be understood against the idea of following the lead of the baby. For example, mothers thought a lot about milk feeding, but they 'just got on with' weaning because they attended to what their baby seemed to want and their infant was the focus. Similarly, mothers were aware of official feeding and weaning guidelines but they interpreted these in the light of how their own infant was behaving and responding. Thus, in some situations, the embodied knowledge of their baby which they had developed steered their actions and was more relevant than external factors such as the guidelines.

However, there were times in their feeding and weaning experience when it seemed that mothers could not or did not maintain their focus on the baby. This could be conceptualised in two ways: focus falter; and focus shift. With focus falter, mothers appeared to lose some of their faith in following the lead of their baby. For example, mothers expressed concern about whether their baby was 'getting enough' in relation to sufficiency of milk during the transition onto solids, and enough food in general, even if their baby's weight was not a cause for concern and s/he appeared happy and healthy. Mothers did not want their baby to be a 'fussy eater' but instead desired that s/he eat anything that was offered, so worked hard to achieve this. Some of the mothers' concerns over adequate weight gain can also be understood in terms of their losing faith in following the baby's lead, or their focus on the baby faltering. If they had a bigger baby who was putting on weight well then this was fine, but a smaller baby or a baby putting on weight more slowly they experienced as more difficult to deal with. The wider social norms relating to the importance of babies eating well, weight, and weight gain meant that if mothers' experiences conflicted with these norms they became less sure of their baby and themselves

and this seemed to act as a counter to their earlier confidence in following the lead of the baby. This is where Bourdieu's concept of habitus can be used to understand mothers' behaviours, as mothers acted in accordance with their acquired predispositions, rather than depending on their relationship with their baby. Mothers with small babies struggled with the feeling that they were doing something wrong, or that they were being judged by others as not feeding their baby adequately, whilst the mothers of larger babies laughed and joked about their infant's size and weight gain.

Some mothers in this situation were able to deflect these ideas, to some degree, and continue to focus on their baby, for example by not increasing the amount of milk or food offered because a baby whom she considered to be perfectly healthy was gaining weight slowly. These mothers seemed to make a conscious decision to behave in this manner and they were keen to justify their actions. Some women just did not engage with the weighing process. They explained that they judged that their infant was growing adequately just by looking at her/him, because s/he was well and happy, and because the baby was growing out of clothes and nappies. So these mothers managed to maintain their focus on the baby, looking for signs that s/he was growing, rather than having it externally confirmed through weighing. In these circumstances, it seemed that it was easier to maintain faith in the baby without having weight confirmed. As an individual infant's weight is likely to fluctuate, which can cause anxiety for mothers, by not knowing their infant's exact weight but instead observing that they were getting bigger over time, these women may have been saving themselves such distress. A mother whose son had been referred to a dietician because of slow weight gain reported that if she had a second baby she would not have her/him weighed as frequently, because she considered that she had become too focussed on weight, and that this had not been useful. As she could see that her baby was growing, healthy and happy, although small, she did not think that the anxiety engendered through having him weighed regularly was productive.

Focus shift occurred when mothers had to look at the bigger picture of their lives, a picture in which the baby had to be accommodated. Thus, actions taken in relation to feeding and weaning were contingent on whatever else was happening in a woman's life and her other roles and responsibilities. So, for instance, mothers spoke about feeding their infant at a certain time of day because it fitted in with an older child; giving pre-prepared baby food because she did not have time to prepare

her own; or introducing a particular pattern of eating in order to fit in with the way feeding was managed at a nursery when she was returning to work outside the home. It was instances like this which revealed the complexity of women's lives and highlighted the multiple responsibilities they held, of which feeding the baby was only one. So, despite their underlying focus on the baby, compromises had to be made. This illustrates how feeding is shaped by the everyday reality of family lives and not by a straightforwardly rational set of choices; actions are constrained according to circumstances. Baby feeding and weaning cannot be understood in isolation.

Even when their focus appeared to falter or shift, mothers' actions could, nevertheless, be interpreted as being with the baby in mind. Mothers 'listened' to dominant discourses about weight and weight gain because they wanted the best for their infant. Establishing a feeding routine which fitted in with family life, even if not what, on the surface of it, would appear to be best for the baby, was enabling the baby to become an active member of her/his family and to benefit from interaction with and socialisation into the family. So the shift in focus incorporated a move from thinking solely about feeding to thinking about other aspects of nurturing in relation to family life. Thus, although slightly more removed from the direct focus on the baby which tended to characterise the early months of postnatal life when mothers looked for and interpreted signs in their behaviour to help to direct their feeding and weaning actions, mothers continued to act in relation to what was best for the baby.

In addition, there was an emotional aspect to the practice of everyday feeding which could be discerned in the narratives of the mothers. This was very evident during the earlier days of milk feeding, but continued particularly in relation to growth generally and the infant putting on weight. Women tended to question their competence as a mother if their baby was not, as they saw it, gaining weight sufficiently. Thus, actions in relation to feeding and weaning were not necessarily taken on the basis of rational decision making, but were often a complex mix of emotions and embodied knowledge, perhaps combined with more detached consideration such as weaning guidelines or speaking to health professionals.

It was also during milk feeding that mothers developed their relationships with health professionals, significant as health professionals were a source of influence – one way or the other – on mothers' feeding and weaning practices. Most of the

women in this study recalled being visited by a health visitor after the birth of their baby and all knew that they could contact the health visiting service should they want to. However, women did not always experience their interactions with health professionals as supportive or helpful. To an extent this arose because, as women explained, health professionals had to give advice congruent with the national feeding and weaning guidelines, which mothers acknowledged but generally thought were unrealistic. Women reported experiencing pressure from health professionals to breastfeed, so mothers not intending to feed in this way, as well as those who intended to but did not, came into 'conflict' with professional advice very early. All of the babies in this study were given solid food by six months of age, many considerably before that, illustrating how mothers did not follow the professional advice they had been given. Through feeling pressurised to breastfeed and then not doing so, and weaning earlier than recommended, mothers were acting on their own knowledge and beliefs interpreted in relation to, and interwoven with, the advice that they had received. An unintended consequence of this seemed to be that mistrust of health professionals could develop, which, in turn, seemed to give greater relevance to their own views and beliefs. Other aspects of experiences with health professionals could also contribute to this, for example being given conflicting advice or advice that did not fit in with a woman's life circumstances. Even the idea that some mothers wanted more proactive and directive support from health professionals can be conceptualised as contributing to a perception that health professionals could not always be trusted or relied upon.

Whilst for mothers following the lead of their baby was central to their approach to weaning, there were other factors that influenced them. Particularly significant was the value placed on the weaning experiences of other mothers. These mothers could be friends, family members or unknown mothers on internet forums, but the important thing was that they were a mother and had gone through the experience of weaning a baby themselves. Thus, mothers were attaching importance to the embodied knowledge of other women. This was also reflected in the way mothers spoke about health professionals: one mother explicitly stated that she did not put much faith in certain health professionals because they did not have children; another mother described how she had decided to follow one particular health professional's advice because she knew she was a mother. Thus, other mothers were a trusted source of information. Even when mothers behaved in different ways in relation to feeding their babies, they seemed to be able to empathise with others

and understand why they made particular decisions, in a way that health professionals might not, particularly if they themselves were not mothers.

The relatively straightforward way in which women approached weaning and negotiated any problems they encountered was also reflected in the way in which mothers were happy to pass on the responsibility of feeding their baby to others. Mothers contemplating working outside the home were happy to let parents, childminders or nurseries provide food for and feed their infant. When offered the opportunity to provide food at a nursery, for example, a mother was keen that her baby should fit in with the eating patterns and food provided at the nursery.

So how might this way of theorising the weaning process contribute towards an understanding of the development of overweight in young infants? It is not possible to say, and indeed was not the intention of this study to identify, that a specific weaning behaviour or practice would lead to the development of overweight in infants. This would be to over-simplify the complexity of the phenomenon, as discussed in Chapter 1. The ecological and systems mapping approaches used to understand the development of childhood overweight indicate the wide variety of influences that might shape its development, as well as the interactions between them. However, what this study has contributed is an understanding of micro-level processes that take shape during early postnatal life. Influences on growth and development in early life can set in motion a trajectory that could lead towards the development of childhood overweight. This is in keeping with the idea of the life course approach, in terms of 'social' entraining rather than biological.

As described and explained above, mothers developed a feeding relationship with their infants through which they learned to follow the lead of the baby, focusing on her/him to indicate how to progress. However, there were times when some mothers found it difficult to maintain this focus. For example, a dominant discourse about the importance of weight, weight gain and being bigger emerged from the accounts of the women, which appeared to make mothers question whether their baby was growing and developing adequately. Being bigger or putting on weight quickly were perceived as positive signs that their babies were developing well and were healthy, and mothers laughed about this. Being smaller or putting on weight more slowly were seen as problematic, and mothers worried about it, particularly in relation to how they might be judged by others. There was tension around weighing and acceptable weight gain and it seems that mothers become sensitised, perhaps

over-sensitised, to having smaller babies, but less so to having bigger ones. It was not that they were unaware that their baby was ‘big’ but just that this tended to be rejoiced in, rather than seen as a problem; on the other hand smaller babies, or those that grew more slowly, were seen as a problem and in need of attention. To some degree, this was also evident in health professionals’ responses to women and their babies. For mothers weight gain, faster weight gain, and following a higher centile line were indicative of sound growth and development. This also reflected the limited understanding that some mothers had of the growth charts, where a higher centile line or following the same line was seen as a good thing.

To some degree equating sound growth and development with weight gain is unsurprising given that it is only in the relatively recent past that the primary issue in relation to early postnatal life was that of failing to thrive; in other words, it is only relatively recently that larger babies and rapid weight gain have become a cause of some concern, at least for the health profession. However, there were a number of consequences emanating from how women judged the progress of their babies. Mothers with small babies tended to have them weighed more often in an effort to seek reassurance about growth and development. Mothers of larger babies seemed to have less need to have their babies weighed, indicating that the visual clues about the babies’ health precluded any necessity for reassurance that all was well. A consequence of this is that they were less likely to receive more ‘objective’ feedback about weight gain, which in turn would mean that signs of weight problems, such as upwardly crossing centiles, would go unnoticed, by mothers and health professionals, as well as missed opportunities for health professionals to talk to mothers about feeding. In general, the emphasis on weight, growth and health might contribute to a situation where mothers are less likely to recognise the early signs of developing overweight in their infant.

Mothers’ narratives indicated that they saw weaning as a process of socialising their infant into healthy eating patterns. They spoke about this in a number of ways. All mothers spoke about introducing the baby to healthy foods and to a wide range of different tastes. Avoiding fast foods, sweet foods and chocolate was also talked about, although mothers did not want to be too ‘strict’ and thought that the occasional treat should be allowed. In addition, some mothers spoke about mealtimes being enjoyable, indicating a wider purpose and understanding of food and mealtimes beyond simply supplying nutrition, and also about establishing family mealtimes when the family could all eat together. Eating with others such as

grandparents, and other children at nursery, was also spoken about. This implies socialisation in a broader sense; it is about the baby learning to behave in particular ways around food. It is evident therefore that from a very early age infants were being socialised about food, even before they could actually join in with mealtimes themselves. Therefore, these early experiences may develop the foundations upon which patterns of eating predisposing an individual towards overweight may develop.

The current debate about feeding and weaning guidelines could also, to an extent, have contributed to the early development of overweight, in a number of ways. Mothers, aware of the guidelines and some of the debate surrounding them, thought that, on the whole they were unrealistic. They thought that it was an unrealistic expectation that babies were standard packages who could be responded to in a standard way. They were very clear that every baby was different, so the idea of a fixed age for weaning, in particular, did not make sense. Thus they did not trust the guidelines. A consequence of this might be that mothers take less notice of other 'healthy eating' messages, or are suspicious of other 'official' messages, too, particularly where they conflict with their embodied knowledge of their own child and circumstances. In addition, as mothers perceived it, health professionals were required to supply official advice regarding weaning. Therefore mothers developed some mistrust of their advice too, which was compounded if they also received conflicting messages or messages that did not match their own life experiences. This early mistrust of health professionals might continue, such that mothers may be less likely to seek advice from health professionals in general as their infant gets older, than if their early experiences had made them feel supported. Mothers' reliance on embodied knowledge may have meant that more formal forms of knowledge were more likely to be displaced as they had less meaning and significance to them.

In developing this theory, an attempt has been made to understand how mothers negotiate the process of weaning and how this may shape the development of weight patterns in infants. The centrality of the baby, and the way in which mothers talk about following the lead of the baby as they wean has been highlighted, along with the ways in which this focus may falter or shift because of the complexity of influences on mothers' lives. It is a substantive theory, in that it is linked to the empirical situation in which it is generated, but it may be that aspects of it can be related to other aspects of nurturing an infant, besides feeding and weaning.

7.3 Reflections on the literature reviewed

In this section, the findings from the study and the theory developed will be discussed in the light of some of the issues raised in the literature. Material is organised under a number of sub-headings: feeding and weaning guidelines; accounts for feeding actions; feeding and weaning as emotional issues; weight and weight gain; working with health professionals; and the influence and role of fathers.

7.3.1 Feeding and weaning guidelines

This study suggests that many mothers are likely to be aware of national guidelines regarding milk feeding and weaning, through a variety of channels. Although some mothers were planning to follow the guidelines, others considered that they were not realistic: that it was not necessarily realistic to expect a mother to breastfeed exclusively for six months; or not to introduce any solids until that age. In the event, none of the mothers milk fed and weaned their babies totally in line with the guidelines. It was articulated frequently that all babies were different and thus could not be expected to feed and wean in exactly the same way at the same time, and indeed that all families were different so what worked for one would not necessarily work for all. Similar findings have been reported before (Hoddinott et al., 2012). However, unlike other studies, these interviews were conducted after the fairly widely publicised debate questioning the six-month breastfeeding and weaning guideline (Fewtrell et al., 2011). It was evident that mothers were aware of this debate. Mothers considered that because the guidelines had been changed, and there was disagreement about them, this rendered them less authoritative. They also suggested that the guidelines could in fact be unhelpful because of the confusion that changes had engendered. Therefore, not only did women think that the guidelines were unrealistic, they also knew that they were not universally supported by 'experts'. These are important findings as not only do they help to build up the context within which mothers are negotiating the process of weaning, they also have implications for the way in which the guidelines are presented to mothers. This will be explored further in Chapter 8.

7.3.2 Accounts of feeding actions

It has been suggested that in order to promote infant health and to support mothers with weaning advice that makes sense to them, an understanding of how women account for their actions when weaning needs to be developed (Arden, 2010; SACN, 2008). In revealing the extent to which mothers understand that they follow the lead of the baby when weaning, this study has specifically contributed to that

body of knowledge. There is evidence in the literature indicating the importance mothers attach to signs from their baby to indicate that they are ready to commence weaning, hence they consider it to be 'baby-led' (White, 2009; Wright et al., 2004). These signs range from physical characteristics such as teething or reaching a certain age, weight or size (Alder et al., 2004; Anderson et al., 2001; White, 2009), to more subjective signs such as a baby appearing to be hungry or taking a particular interest in food (Anderson et al., 2001; Synott et al., 2007). These were reflected in this study, but also revealed was the extent to which mothers continued to follow the lead of their baby as weaning progressed, from the first introduction of solid food through to introducing a greater variety of foods and the timing and amount of food offered. Also, it was evident that mothers interpreted and worked with these signs as their relationship with their infant developed. Some mothers suggested that whatever their own thoughts or plans may have been, the baby might decide differently, demonstrating their central focus on the baby. Many of the studies which have explored 'signs from the baby' have been cross sectional and tend to identify particular 'factors' that are significant in relation to weaning decisions, producing a somewhat static picture. This study has revealed the dynamic nature of family life and how by following the lead of the baby mothers are continually making judgements, although their actions are also shaped by contextual influences.

In addition, the findings from this study can make a theoretical contribution to the literature in that they illustrate how a 'baby-led' approach can be understood in much broader terms than the focus on signs from the baby would suggest. So, for example, a mother returning to work alters the meal pattern of her infant so that it fits with the routine at a nursery. Although, on the surface of it, this may not appear to be a baby-led action, in fact it illustrates how mothers act to support the baby in her/his transition to nursery. A consequence of this more adequate conceptualisation of a process as being 'baby-led' is that almost all of the actions which a mother carries out in relation to feeding her baby can be understood as led by the baby, either directly through visual and auditory cues (signs), or indirectly through mothers thinking about the next stage of an infant's development. It is the complex nature of women's lives that can, on occasion, obscure this. Therefore, the findings of this study suggest that the competing priorities of family life may mean that particular practices are adopted because they are constrained or enabled within the context of this complex network of relations. Thus there is interdependency between the mother and infant, and also the mother and her wider network,

although the actions of mothers can nevertheless be seen, to a greater or lesser extent, as ‘baby-led’.

7.3.3 Feeding and weaning as emotional issues

Feeding an infant has been described as an emotional issue (Pagnini et al., 2007), and it may be that it is not possible to understand adequately how mothers go about weaning their infant without engaging with the emotions that may be involved. In this study, the emotional nature of feeding was reflected particularly in the experiences of breastfeeding women. Once they had established feeding, women who were formula feeding continued comparatively uneventfully from an emotional point of view. Some women described that they changed the formula milk they were using as their infant was either not satisfied on it, did not seem to like it, or had reflux, but this seemed to generate few emotional reactions. Some women breastfed briefly and then switched to formula feeding, often because of the mother’s own health, and although they may have expressed some disappointment initially they settled into formula feeding comparatively easily. However, mothers who established breastfeeding and fed for more than one week, but then stopped before the six months officially recommended, expressed guilt about this. These women stopped breastfeeding because they did not think that their baby was satisfied with breast milk and their narratives suggested that they felt that in acting in this way they were not, at least in some ways, fulfilling their maternal role in feeding their baby. This reflects research which has suggested that for many women, being a ‘good’ mother and breastfeeding are linked (Hauck & Irurita, 2003; Murphy, 2000; Schmied et al., 2001; Shakespeare et al., 2004). Women who started formula feeding having breastfed for less than one week, or those who formula fed from the start, did not talk about this kind of emotion. This is also in accord with the findings of Lee (2007) who reported that mothers who had decided during the antenatal period that they were going to formula feed had less negative feelings about this than those who had thought they would breastfeed.

Although it certainly seemed that the longer breastfeeding had been established the more difficult it was for mothers to stop before the six month guideline, this was not the only way of understanding the issue. Another way of understanding women’s emotions about discontinuing breastfeeding was to look at the accounts they gave for stopping. Women tended to accept the situation more easily if the reason was, at least to some extent, out of the mother’s control, or clearly for the benefit of somebody else. Therefore, mothers who were ill, or stopped breastfeeding because

they thought it would benefit an older child for example, seemed to take this in their stride. However, mothers who discontinued because they did not think that they were producing enough milk, thus could see it as a failing in themselves for not fulfilling their role, tended to express guilt in these circumstances. The language that women used in these situations was revealing. A mother who stopped breastfeeding after six weeks because she did not think that breast milk was satisfying her daughter spoke of it in terms of 'giving up', an emotive term. In contrast, a woman who breastfed for one week and then ceased because she thought that it meant she could not give enough time to her older daughter explained that she 'went on' to formula milk, less emotive, and more positive, language. Emotive language was rarely employed when mothers talked about changing formula milk brands because they did not think that their baby was satisfied or liked the one they were having.

It has been reported in the literature that weaning is also an emotional issue and something that parents worry about (Allcutt & Sweeney, 2010; Arden, 2010; Davies & O'Hare, 2004). This was not particularly evident in the current study, other than in somewhat general terms about fulfilling the requirements of the guidelines; acting on the basis of following the baby tended to limit this anxiety. As has been explained, mothers viewed themselves as 'getting on with' weaning in a fairly straightforward and unproblematic manner, through following the lead of the baby. This included the women who had felt guilty over their breastfeeding experience, they too did not seem to have any problems with moving on to weaning. For example, two mothers who described feelings of guilt on stopping breastfeeding appeared unconcerned about the involvement of others in the weaning of their infant. One spoke about how a childminder had given her daughter finger foods (a breadstick) before she had introduced anything like that, but was not at all perturbed by it. The other talked about being happy for a nursery to take over feeding her infant when she went back in to paid employment. Thus, both of these mothers moved from feeling guilty because they were not feeding their baby exclusively themselves to being happy in a context where other people were, at least in part, responsible for nourishing their infant. This may reflect the idea that sharing the responsibility for feeding a baby means that less anxiety is generated about it.

7.3.4 Weight and weight gain

As has been described, weight monitoring has generally been viewed as having an integral role in infant health services in the UK (Hall & Elliman, 2003; Lucas et al., 2007; Panpanich & Garner, 2009; Sachs et al., 2006b). Many mothers in this study

considered that they ‘should’ have their infant weighed regularly, even those who were happy with their growth and development and did not need to know the baby’s weight in order to confirm that they were growing adequately. Some mothers reported feeling worried however if they took their baby to be weighed and s/he had not put on a lot of weight. In this study, mothers valued weight and weight gain, as has been reported in the literature (Pagnini et al., 2007). This could be problematic, given the evidence that rapid weight gain in early infancy is associated with overweight in childhood and/or adulthood (Baird et al., 2005; Baker et al., 2004; Monteiro & Victora, 2005). It will be of interest to see whether the introduction of the new UK-WHO growth charts, based on slower growing breastfed babies has any effect in this regard. This study also revealed that some parents misunderstand growth charts, for example the mother who was pleased that her infant was apparently upwardly crossing centiles, and mothers being concerned if their baby was not following one centile line exactly. This has been well documented in the literature (Ben-Joseph et al., 2009; Sachs et al., 2006a) and thus reflects an enduring issue, and furthermore, one which has implications for how mothers make sense of the growth of their child. It has also been reported that parents find weights in kilos confusing. Interestingly, when asked about the birthweight of her baby, all of the mothers spontaneously reported it in pounds and ounces, and generally when speaking about the weight of their infants they used imperial measures. This underlines, therefore, the idea that the use of kilos may be confusing for many.

From the literature it was apparent that parents are not good at recognising overweight in their children (Crawford et al., 2006), and that older children and girls are more likely to be recognised as overweight than younger children or boys (Wald et al., 2007). These studies have been carried out with children aged 2 years and older. In the current study, during which infants were aged up to nine months, mothers recognised their infant as ‘bigger’ or ‘smaller’, and this was the case for both boys and girls. It seems that at this early stage, in this group of mothers, there was an awareness of their babies’ size in relation to others, irrespective of the sex of the baby. The mother who asked her health visitor whether her baby was overweight was reassured that he was fine and growing along his birth centile. Therefore, it may be that although parents of young infants are aware of their weight and size relative to others, they are not clear of the point at which this may become in need of some attention, or be significant for the future. This concurs to an extent with research that has shown that the mothers of slightly older children are able to recognise obesity but not overweight in their children (Crouch et al., 2007), and

indicates that these patterns of recognition, or not, of weight issues develop very early on. It is apparent from this how the unwitting 'allowance' of the development of overweight could begin and might even be encouraged during infancy.

7.3.5 Working with health professionals

In terms of supporting mothers with infant feeding and weaning, health professionals, particularly midwives and health visitors, have a significant role in mothers' network of relations during this time. The importance to women of the early milk feeding experience in terms of their relationship with health professionals was evident. It has been reported that during the early stages of formula feeding, women experience pressure from midwives to breastfeed instead (Lee, 2007). None of the mothers in the current study expressed this, although one woman was asked to explain why she wanted to switch to formula feeding after she had attempted to breastfeed her baby. Instead, it was suggested that women who formula fed their babies were generally ignored and the focus was on breastfeeding women. This had consequences for both groups of women. Some formula feeding women were left feeling a little unsure about how to go about feeding their baby, particularly as formula feeding was not introduced during antenatal care. Although women said that during their antenatal care they were told that however they chose to feed their baby they would be supported by health professionals, this was not necessarily their initial experience. Mothers reported that whilst in the maternity unit, the focus of health professionals was generally on breastfeeding women, which was not always entirely welcomed by these women. The narratives of the women suggested that once a woman had commenced breastfeeding, midwives were keen to get feeding in this way established and there was pressure on her to continue. This has been reported elsewhere (Hoddinott et al., 2012). It is possible that this 'pressure' was actually intended to be support, but it was not necessarily experienced in that way.

Mothers spoke of health professionals offering useful advice, and examples were given of situations in which mothers had received helpful support. However, an issue that was emphasised in this study was that different women needed support to different extents and that this could change over time. In addition, it was not just first time mothers who needed help and advice, mothers with older children also felt unsure about how they were caring for their infant at times. Some mothers with older children perceived that health professionals generally did not think that they required a lot of support as they would be able to rely on their previous experience to guide them. However, this was not necessarily the case. Mothers said that

sometimes they could not remember what they had done before, or that because every baby was different what had worked for an older child did not necessarily work with a younger baby. One second-time mother expressed the concern that if she did ask for support, it might be assumed that she could not cope and was not a good mother. Other mothers with older children were perfectly happy being left to themselves and expressed the view that they could access help if they needed it. Thus, support needs were very individual.

The narratives of women in this study reflected findings from the literature regarding the perception that there is relatively little information available about weaning. Mothers did talk about written advice regarding weaning although they did not seem to think this was particularly plentiful, and there was a lot of discussion about the internet, which was an often used resource by this group of mothers. What was clear was that women would have liked advice from health professionals which they perceived was tailored to their needs, both in terms of the timing of that advice and the content. Mothers differed about when they thought it useful to start thinking about weaning, some liked to 'be prepared' and thought about it during the antenatal period, others thought that this was too soon and preferred to wait until after their baby was born. A particular issue which was mentioned by mothers was that invitations to the 'weaning parties' which were held across Halton by health visitors often arrived after the woman had commenced weaning, presumably because they were sent to coincide with the baby reaching six months of age. Women expressed disappointment at this as they articulated the view that there was not a lot of advice available about weaning and that they would have welcomed the opportunity to attend the session. Given that it is evident that the majority of women have commenced weaning before the six month guideline age, it can be argued that sending the invitations out slightly earlier would do no harm in terms of encouraging women to wean before they would otherwise have done so. There has been some suggestion that there may be an association between the timing of advice about weaning from health professionals and when a baby is actually weaned (White, 2009), which may explain why invitations to weaning parties were not sent out earlier. However this would seem to be 'overkill' if mothers were receiving the invitations after they had already weaned. Inviting women earlier may present an opportunity for health professionals to have contact with mothers and to talk about healthy weaning practices, before mothers have got too far into the process.

7.3.6 The influence and role of fathers

The focus on mothers in this research was deliberate as generally it is mothers who decide when, what and how to feed their infant (Savage et al., 2007; White, 2009), as was the case in this study. However, findings revealing the influence of fathers also emerged. The literature suggests that fathers are likely to be an important influence on mothers as they consider whether to breast or formula feed (Andrew & Harvey, 2011; Reid et al., 2010). In this study, women characterised the milk feeding 'decision' as being their own, all explaining that their male partners would be very supportive of either breast or formula feeding depending on the wishes of the mother. This might be explained because mothers frequently spoke about fathers in relation to their thinking about milk feeding, thus in this sense the fathers were taken into account in any 'decision', anyway. An unintended consequence of involving fathers more, for some women, seemed to be that they looked on breastfeeding less favourably as they conceptualised it as meaning the father would be less involved. Others looked for alternative ways to involve the father. There has been little research on the influence of fathers on the introduction of solid food (Anderson et al., 2009). This study indicated that fathers followed the lead of the mother, and although fathers were all involved in weaning their infant to some extent, mothers tended to take charge. This was the case even where the father was very involved in the care of the baby. For example, in the current study there was one couple who were sharing maternity leave, so the father was caring for the infant, and another couple who were both going to work part-time and share the care of their baby, but the mothers still took the lead.

7.4 Strengths and limitations of phase two of the study

There were a number of strengths and limitations to this phase of the study. The validity of research is concerned with the integrity of the conclusions that are drawn from it. In terms of internal validity, this can be a particular strength in qualitative research in that if the explicit focus of a piece of work is to understand a situation from the perspective of the participants, this encourages congruence between what is 'observed' and the conclusions drawn from this. Specifically, if a grounded theory approach, where there is explicit commitment to 'grounding' theory in the data generated, is used, as it was here, validity can be enhanced. The longitudinal nature of the study design with serial interviews meant that it was possible to elicit the timing and order of events accurately, and that it was possible to verify, clarify and check out issues raised at previous interviews. This allowed a deeper understanding of the women's behaviour, perceptions and actions to be developed. Validity was

also enhanced through enabling women to talk about weaning as it was unfolding. Although not all of the 21 participant mothers completed four interviews, all of the mothers had commenced weaning at the time of their final interview, and nine women were interviewed when their babies were aged between nine and 11 months old, so were well into the weaning process. Thus it was possible to generate much data relevant to the aim of the study.

A lack of generalisability, or external validity, is a criticism often levelled at qualitative research. Generalising from the findings of qualitative research can, however, be misunderstood (Denscombe, 2010). The purpose is not to make generalisations from a probability sample to a wider population as, for example, a survey approach might do, as qualitative researchers do not set out to obtain statistically representative samples so that generalisations can be made (Fade, 2003). The relationship between a sample and a whole population is of a different order to the relationship between the particular, as studied by a qualitative researcher, and the generic (Coffey & Atkinson, 2006). Qualitative researchers are trying to gain an *understanding* about a phenomenon, and much can be learned from the study of just one instance (Corbin & Strauss, 2008). Any generalisations that can be made are theoretical generalisations, that is, abstractions from the data which are conceptual (Denscombe, 2010). This is the way in which generalizability was used in this study. Qualitative researchers often refer to 'transferability' or 'wider resonance', that is, the extent to which findings may be applied to other contexts. The generalisability of qualitative research does not derive from the representativeness of the sample, but from the concepts and theoretical ideas developed which may be relevant to other settings or groups of people (Corbin & Strauss, 2008; Green, 1999). Thus, in this study, it was the theoretical concepts developed from the data that may have wider resonance for understanding how mothers, in other similar situations and places carry out weaning, with similar consequences for their children. The theoretical account developed here might also offer some insights into the early development of overweight in children.

A number of steps were taken in order to ensure the reliability of the work. In keeping with Guba and Lincoln's (1994) qualitative research quality criteria of dependability, which parallels reliability in quantitative research, an 'auditing' approach was adopted. A record was kept of all phases of the research process in order to track decisions made and actions taken. Regular supervision meetings were held to discuss the progress of the research. For example, the decision to halt

data generation was taken following discussion regarding the practicality of continuing given the timescale for the research and the likelihood that further interviews would generate new understandings. During the data analysis phase, vigorous discussion of the development of the categories of meaning helped to ensure that these were grounded in the data and were useful in understanding the phenomenon being studied.

In terms of limitations, the participant mothers were self-selected in that they volunteered to take part in the research and it may be that mothers who had a particular interest in feeding and weaning, or had particularly strong opinions about the issues, chose to participate. It is difficult to say whether this was the case. Participating mothers held a variety of views however, and whilst it was clear that some had experience of weaning and very definite ideas about how they would go about this, others had never really thought about it and did not, initially at least, have any particular knowledge about feeding or weaning babies.

Although the purpose of sampling was not to gain a representative sample of mothers in a quantitative sense, there were a range of women in terms of where they lived, whether they were first time mothers or had older children and in terms of socio-economic deprivation scores. However, the socio-economic deprivation scores were not unproblematic in that they reflected the area in which each mother lived rather than her own material circumstances. For example, one mother who had a professional occupation lived in a neighbourhood amongst the 10% most deprived in England, whilst another mother who had a semi-skilled occupation lived in an affluent area. Five of the mothers were not working outside the home at the time of their first interview (antenatally), however all of them were living with the father of their baby throughout the period of the study. Thus, no lone mothers were represented in this study, although there are a higher proportion of lone mothers in Halton than in England as a whole. Therefore, it is likely that mothers living in the poorest socio-economic circumstances were not included in the study.

There were no very young mothers in the study, with the ages of those participating ranging from 21 to 40 years at the time of their first interview. As described earlier, Halton has a higher percentage of teenage mothers than the England average, but the views of this group are not represented. It may have been that younger mothers had particular experiences which it would have been useful to access.

The total sample size of 21 mothers was adequate in that data saturation was reached and there were no new insights coming from the antenatal interviews. Not all mothers completed four interviews however, and although all babies had commenced weaning at the time of their mothers' last interview, and 16 interviews were carried out when babies were aged six-and-a-half to eight-and-a-half months old, it would have been good to have been able to complete more than the nine interviews that took place when infants were aged nine-and-a-half to 11 months. However, even at this stage, it did seem that data saturation had been reached.

7.5 Possible future work

A large amount of qualitative data were generated for this study and it may be illuminating to go back to this, perhaps using narrative analysis to draw out continuity and change over time and developing some in-depth case studies in order to better characterise processes. Only mothers were interviewed for the current study, which was the intention of the work. However, given the findings, it may be useful to interview both fathers and health professionals in order to get their perspective on some of the issues raised. Specifically, mothers very much perceived themselves as in charge of weaning in terms of deciding upon courses of action (notwithstanding their 'following the lead of the baby'). The perspectives of fathers, and clarifying how they see their role, may help develop an understanding of both the feeding and weaning actions of mothers and how babies are socialised into eating patterns, particularly within the wider family context. A lot of data generated concerned women's relationships with health professionals, an aspect of which was the national feeding and weaning guidelines. It could also be illuminating to explore the perspectives of health professionals on some of the issues that were raised, in terms of thinking about how best to support mothers during the feeding and weaning process.

Finally, it would be useful to be able to follow up this sample of mothers and their babies as they get older and progress with their eating habits. None of the babies were eating exactly the same as the family by the end of the study so it would be illuminating to see how this developed, and whether in fact family meals became healthier, as some of the mothers suggested. It would also be interesting to see how weaning and eating more generally develops and what shapes these processes. With this in mind, at the final interviews with mothers they were asked if they were happy for their contact details to be retained after the end of the study in case there was an opportunity to undertake follow-up work in the future. All agreed to this.

7.6 Conclusion

A grounded theory of the process of weaning was generated from this study. This sheds some light on weaning as a process, as part of a continuum from milk feeding, which will progress to the eventual inclusion of the infant in normal family meals. The complexity of the process was revealed, as well as the way in which mothers seem to work very much with their infants, following their lead, to commence and progress weaning. Ways in which weaning may influence the development of early overweight were also theorised about, and there was some discussion of the ways in which this work has concurred with and extended current knowledge. In the following chapter, the overall conclusions from this study and implications for policy and practice will be addressed, along with a reflection on this as a mixed methods study.

Chapter 8
Conclusions

8.1 Introduction

In this chapter, conclusions that can be drawn from the study are presented first, and then implications for policy and practice are explored. Finally, the strengths and limitations of this as a mixed methods study are presented with some suggestions about how the work could be carried forward.

8.2 Understanding the early development of childhood overweight and obesity: some conclusions

This study has employed mixed methods to explore patterns of weight and overweight in infants in Halton, Northwest England. First routinely collected weight data were utilised in order to establish patterns of weight in Halton infants and to explore trends over time. This was followed by the use of qualitative methods to explore one aspect of the early postnatal environment that might have a bearing on the weight patterns revealed, that of weaning. The major conclusions that can be drawn from this work are presented below. Some of these are confirmatory, that is they support the findings and conclusions of previous studies. Others have added new insights.

8.2.1 The early development of overweight

The quantitative data provided evidence of the early development of overweight in infants, both at birth and at eight months, the eight month patterns not being reported previously. Therefore, it would seem that the antenatal environment and/or the early postnatal environment are very important in this regard. Growth is not linear, and although an association between higher birthweight and an increased risk of overweight and obesity in childhood and adulthood is well established, it is perhaps not so clear what the growth trajectory of infants above the 85th centile at eight months might be. Nevertheless, the increasing proportions of infants above this level are cause for concern, and in Halton appears to be an entrenched position. It is difficult to know how far this is reflective of other similar local authority areas, but it is likely that this is not a unique pattern, and that in other areas with equivalent levels of socio-economic deprivation a similar picture would emerge. If this is replicated elsewhere it indicates a considerable public health problem.

The study also demonstrated clearly that relatively simple routinely collected statistics can be invaluable, particularly if data sets are high quality and largely complete, for monitoring trends in overweight in infants and young children. The longer this phenomenon is studied, the stronger will be the conclusions that can be drawn about trends.

8.2.2 Understanding how mothers shape early patterns of feeding and weaning

The conceptualisation of weaning as a process allowed the importance of the feeding relationship which developed between each mother and her infant to be clearly revealed, and the fine grain of interactions that developed over time has not been studied in this way before. The primacy of embodied knowledge, that is the knowledge that mothers built up through the experience of feeding and weaning their infant, and the significance of being a mother in terms of being an 'authority' on feeding and weaning, were clearly shown. In addition, the emotional element of feeding and weaning was demonstrated. Although mothers were concerned about healthy eating and feeding, their primary concern was often about whether their infant was 'getting enough' and if this did not seem to be the case they questioned their competence as mothers. This all points to the idea that mothers do not necessarily take actions based on rational thought: their embodied knowledge and emotions, as well as the constraints that they encounter in the wider context of their lives, will all shape how they feed and wean their infant. This may mean that less than optimal feeding patterns emerge. In addition, this illustrates the limitations of providing information, such as the feeding and weaning guidelines, and expecting mothers to follow them, without taking account of the individual mother and infant and their context. This is how some mistrust of the advice of health professionals, and possibly other official 'health messages' emerged, as mothers did not see the advice as appropriate to them, their infant, or circumstances.

8.2.3 Mothers' understanding of weight and overweight

A dominant discourse about the importance of weight, weight gain and being bigger emerged from the accounts of the women. The anxiety that could be engendered about weighing infants was apparent, and mothers' wishes that their baby should be putting on adequate weight, an issue that will be addressed in the section on implications. Mothers did recognise babies as 'bigger' or 'smaller', but through valuing weight and weight gain were particularly aware of having small babies, which may have limited their capacity for recognising the significance of early signs

of overweight in their infants. Although overweight might develop early it seems unlikely that it will be noticed as a problem in need of attention either by mothers or health professionals, in the way underweight might be for example, because of this dominant discourse. This poses problems for public health and points towards the need for primary prevention.

8.3 Implications for policy and practice

This study raises a number of implications for policy and practice: at an individual or micro level in terms of the way in which women are supported to feed and wean their babies; and at a population level in terms of the monitoring of weight. Implicit in these is that they may have the potential to contribute towards reducing the likelihood that overweight develops in infants and young children, although, as has been alluded to in this study, they will only be one among many influences, as discussed in Chapter 1, in the development of childhood overweight. However, taking a life course perspective suggests that at different points in time, different influences are more or less important. This study has focussed on what might be important during the very early postnatal period, particularly during the first 12 months of life. The policy and practice implications at an individual level centre on the feeding and weaning guidelines themselves, and also on the way in which health professionals interact with mothers during their routine encounters, as well as when mothers might proactively seek out help, advice and support. At the population level they focus on the use of routinely collected data.

In terms of the feeding and weaning guidelines, if mothers find the guidelines unrealistic and therefore irrelevant to them, or they are aware that they are contested and this leads to a lack of acceptance of them in terms of being a trusted source of advice, this raises questions about the value of the guidelines in supporting mothers. Therefore, consideration needs to be given to how the guidelines could be better developed in order to help mothers during the feeding and weaning processes. In some senses, guidelines can always be problematic in terms of the provisional nature of knowledge and how changes in thinking are translated: the lay perspective may be that changing guidelines over time is ‘unhelpful’ at best and ‘confusing’ at worst. Arden (2010) argued that research was required in order to assess whether a more flexible guidelines-based approach to recommendations about weaning would be justified. Hoddinott et al. (2012) have subsequently suggested that the messages should be changed to ‘breastfeed for as long as you can’ and ‘introduce solids as close to six months as possible’. Findings

from the current study would support this idea as a way forward. It could encourage mothers towards what researchers and health professionals currently consider to be optimum feeding and weaning patterns, but also allow for differences between individual infants and the circumstances that families may find themselves in to be taken into account. It could also mean that the idea that a mother was 'not following the guidelines' could be replaced with more positive thinking about how women were working with the guidelines. This may be facilitated by a re-consideration of the relevance of embodied knowledge in infant feeding and weaning and more acknowledgement of mothers' knowledge of their infant.

There were a number of implications of this study in relation to the promotion of breastfeeding. The significance of the antenatal period in terms of a decision to breastfeed was clearly demonstrated. Therefore, if breastfeeding is considered the optimum mode of infant feeding, the way in which it is introduced to women in the antenatal period needs careful consideration. As in the study conducted by Hoddinott et al. (2012), women in this study expressed the view that the promotion of breastfeeding by health professionals during the antenatal period could be perceived as propaganda, and actually put them off feeding in this manner. This is particularly relevant in the light of research which suggests that women have often made a decision about whether to breastfeed before conception or early in pregnancy, and that this is unrelated to any promotion of breastfeeding by health professionals (Earle, 2002). Hence, it seems that there may be potential for health professionals to put women who were considering breastfeeding off the idea. Indeed, in this study, women who were intending to breastfeed expressed the view that they were fed up with hearing about it. Therefore, ensuring that there is coordination between different health professionals caring for a woman in terms of asking about feeding or giving information about it may be helpful.

Breastfeeding was perceived as natural, but it was also seen as difficult, and something which women needed guidance and support to achieve. Thus, viewing something as 'natural' did not equate with it being 'easy'. Expectations of breastfeeding might influence whether a mother goes on to feed in this way; therefore it would seem important to understand how women think about the possible difficulties of breastfeeding. In this study, a consequence of thinking that breastfeeding was difficult was that women expressed a lack of confidence in their ability to carry it out. Although the importance of having realistic expectations of breastfeeding in terms of not thinking that it will be completely unproblematic has

been emphasised (Hauck & Irurita, 2003; Hegney et al., 2008), could it be that breastfeeding is sometimes portrayed, at least by some women, as too difficult? Getting this balance right in the promotion of breastfeeding could therefore also be important.

An important implication for health professionals' practice in terms of supporting women through weaning was the desire of mothers to receive information and support which they perceived was tailored to their needs, both in terms of the timing of that advice and the content. Health professionals have to manage their role in terms of what is professionally required of them, and women empathised with health professionals in that they articulated the view that they were duty bound to give advice at particular times congruent with the national feeding guidelines. However, women would have appreciated more flexible support in order that they were able to get advice according to the stage that they were actually at in the feeding and weaning process, rather than where they were 'supposed' to be, the weaning party invitations being a good example. Mothers spoke about not telling health professionals what they were doing in relation to their infants' weaning because they were not following the guidelines: this does not make for a productive working relationship.

The findings from this study also have implications for the way in which the monitoring of babies' weight is carried out. Although regular weight monitoring can be an invaluable tool for checking an infant's development and the sufficiency of infant feeding, and mothers like to track the growth of their baby, it was clear that weighing caused some mothers great concern. It is unfortunate that what could be a good opportunity for a mother to talk to a health professional about the care of her infant should be an encounter fraught with anxiety for some, and avoided by others. The frequency with which infants should be weighed during the early months has been much debated. Consideration could also be given to the context in which weighing babies is carried out. Certainly in Halton, some Sure Start services have developed a model of service in which the focus is more generally the health and well-being of mother and child and within this context babies are weighed and their development discussed, in what is perceived to be a supportive environment (Perry, 2007).

In terms of monitoring weight at a population level, this study demonstrated very clearly the usefulness of routinely collected data. It is worth highlighting, however,

that the proportion of children being measured at 40 months was declining over the years, between 1994 and 2006. This probably reflects changes in the organisation of health visiting practice and services at the time, but is an issue that warrants further consideration given the evidence indicating that overweight may have its roots early in a child's life. The National Child Measurement Programme has demonstrated that in Halton, by the time children reach reception year at school, 29.5% of males and 28.1% of females are overweight or obese. Data presented here indicate that similar proportions are overweight or obese earlier, at 40 months of age, and that there is evidence of overweight at 8 months. Identifying these population trends before children reach school age may enable earlier intervention where necessary. In order to do so, the data need to be collected, so ensuring that the systems are in place to facilitate this would seem critical.

8.4 Strengths and limitations of a mixed methods approach and future work

This study was mixed methods research in that quantitative and qualitative data were collected or generated in order to explore patterns of weight and overweight in Halton infants. Quantitative data were used to describe the patterns of weight and to generate hypotheses, whilst qualitative data were generated in order to attempt to shed some light on these patterns. Using mixed methods in this way allowed a much broader picture of the issue of patterns of weight and overweight in Halton infants, and what some of the contributory factors to those patterns might be, to emerge, than if a single research method had been used: different approaches can answer different questions. There are, however, particular challenges in taking this approach. One major challenge is managing the size and scope of the study as, almost inevitably, a lot of data can be generated in studies using combinations of methods. In the current study, more analysis could usefully be carried out on both the quantitative and qualitative data gathered, as indicated in Chapters 5 and 7. Adequate time can also be problematic in mixed methods studies, particularly if the study is of a sequential design, which the current study was. Another important challenge is the requirement to develop and use a range of research skills relating to quantitative and qualitative methods. For example, in the current study, external advice was sought regarding various aspects of the quantitative work and the researcher received training in using qualitative data analysis software.

Another challenge of using mixed methods within a single study lies in how to present the work. As the study was sequential, in that the quantitative work

preceded the qualitative and in fact was a ‘springboard’ for the qualitative element, it was logical that the quantitative results should be presented before the qualitative aspect of the study was explained. However, where to ‘discuss’ these findings was more of a challenge. It was decided to do this before the qualitative work was introduced as, again, it was considered that this discussion may help to lay some of the foundations for the qualitative study. However, the implications of both the quantitative and qualitative aspects of the work were presented together at the end of the whole study, so integrating the two elements.

In a study assessing the quality of mixed methods studies in health services research, O’Cathain et al. (2008) proposed a set of criteria for the good reporting of mixed methods research, which they present as guidance for researchers, rather than as a checklist. These were used as a guide in presenting the current study and are detailed below:

- describe the justification for using a mixed methods approach to the research question;
- describe the design in terms of the purpose, priority and sequence of methods;
- describe each method in terms of sampling, data collection and analysis;
- describe where integration has occurred and who has participated in it;
- describe any limitation of one method associated with the present of the other method;
- describe any insights gained from mixing or integrating methods.

(O’Cathain et al., 2008, p.97).

In terms of future work, ways in which the quantitative and qualitative elements of this study could be expanded and built upon have already been discussed in Chapter 5 and Chapter 7. From a mixed methods perspective, it could be valuable to undertake a study whereby yearly birth cohorts were followed prospectively in terms of their weight and development and these cohorts formed the sampling frame for a qualitative study of the way in which feeding and weaning are managed, following children through until school age. This would enable infants who were bigger or smaller to be identified, and their weight trajectories could be followed against the background of how their weaning progressed.

References

Ahern, K. (1999). Ten tips for reflexive bracketing. *Qualitative Health Research, 9,* 407-411.

Ailhaud, G., & Guesnet, P. (2004). Fatty acid composition of fats is an early determinant of childhood obesity: a short review and an opinion. *Obesity Reviews, 5,* 21-26.

Alder, E.M., Williams, F., Anderson, A., Forsyth, S., Florey, C., & van der Velde, P. (2004). What influences the timing of the introduction of solid food to infants? *British Journal of Nutrition, 92,* 527-531.

Allcutt, C., & Sweeney, M. (2010). An exploration of knowledge, attitudes and advice given by health professionals to parents in Ireland about the introduction of solid foods. A pilot study. *BMC Public Health, 10,* 201-208.

Amir, L. (2011). Social theory and infant feeding. *International Breastfeeding Journal, 6,* 7-9.

Anderson, A., Guthrie, C., Alder, E., Forsyth, S., Howie, P., & Williams F. (2001). Rattling the plate – reasons and rationales for early weaning. *Health Education research, 16,* 471-479.

Anderson, K., Nicklas, J., Spence, M., & Kavanagh, K. (2009). Roles, perceptions and control of infant feeding among low-income fathers. *Public Health Nutrition.* doi:10.1017/S1368980009991972

Anderson, S., Bradshaw, P., Cunningham-Burley, S., Hayes, F., Jamieson, L., MacGregor, A., Marryat, L., & Wassoff, F. (2007). *Growing up in Scotland.* Edinburgh, United Kingdom: Scottish Executive.

Andrew, N., & Harvey, K. (2011). Infant feeding choices: experience, self identity and lifestyle. *Maternal and Child Nutrition, 7,* 48-60.

Arden, M.A. (2010). Conflicting influences on UK mothers' decisions to introduce solid foods to their infants. *Maternal and Child Nutrition, 6,* 159-173.

Arenz, S., Rückerl, R., Koletzko, B., & von Kries, R. (2004). Breast-feeding and childhood obesity – a systematic review. *International Journal of Obesity, 28,* 1247-1256.

Armstrong, J., Dorosty, A., Reilly, J., Child Health Information Team, & Emmett, P. (2003). Coexistence of social inequalities in undernutrition and obesity in preschool children: population based cross sectional study. *Archives of Disease in Childhood, 88,* 671-675.

Avery, M., Duckett, L., Dodgson, J., Savik, K., & Henly, S. (1998). Factors associated with very early weaning among primiparas intending to breastfeed. *Maternal and Child Health Journal, 2,* 167-179.

Bailey, C., Pain, R., & Aarvold, J. (2004). A 'give it a go' breast-feeding culture and early cessation among low-income mothers. *Midwifery, 20,* 240-250.

Bain, M., Chalmers, J., & Brewster, D. (1997). Routinely collected data in national and regional databases – an under-used resource. *Journal of Public Health Medicine, 19,* 413-418.

Baird, J., Fisher, D., Lucas, P., Kleijnen, J., Roberts, H., & Law, C. (2005). Being big or growing fast: systematic review of size and growth in infancy and later obesity. *British Medical Journal, 331,* 929-935.

Baker, J., Michaelsen, K., Rasmussen, K., & Sorensen, T. (2004). Maternal prepregnant body mass index, duration of breastfeeding, and timing of complementary food introduction are associated with infant weight gain. *American Journal of Clinical Nutrition, 80,* 1579-1588.

Balakrishnan, R., Webster, P., & Sinclair D. (2008). Trends in overweight and obesity among 5–7-year-old White and South Asian children born between 1991 and 1999. *Journal of Public Health, 30,* 139-144.

Barker, D. (1998). *Mothers, babies and health in later life.* (2nd ed.). Edinburgh, United Kingdom: Churchill Livingstone.

Barker, D. (2007). Obesity and early life. *Obesity Reviews, 8 (supplement 1),* 45-49.

Barlow, J., Whitlock, S., Hanson, S., Davis, H., Hunt, C., & Rudolf, M. (2010). Preventing obesity at weaning: parental views about the EMPOWER programme. *Child: Care, Health and Development, 36,* 843-849.

Bartok C., & Ventura, A. (2009). Mechanisms underlying the association between breastfeeding and obesity. *International Journal of Pediatric Obesity, 4,* 196-204.

Baughcum, A., Burklow, K., Deeks, C., Powers., S., & Whitaker, R. (1998). Maternal feeding practices and childhood obesity. A focus group study of low-income mothers. *Archives of Pediatrics and Adolescent Medicine, 152,* 1010-1014.

Baughcum, A., Chamberlin, L., Deeks, C., Powers, S., & Whitaker, R. (2000). Maternal perceptions of overweight preschool children. *Pediatrics, 106,* 1380-1386.

Bazeley, P. (2007). *Qualitative data analysis with NVivo.* London, United Kingdom: Sage publications.

Becker, G., Remmington, S., & Remmington, T. (2011). Early additional food and fluids for healthy breastfed full-term infants. *The Cochrane database of Systematic Reviews, 12,* Art. No.: CD006462. doi: 10.1002/14651858.CD006462.pub2

Ben-Joseph, E., Dowshen, S., & Izenberg, N. (2009). Do parents understand growth charts? A national web-based survey. *Pediatrics, 124,* 100-1109.

Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology, 31,* 285-293.

Bennett, A., O'Connor, A., Canning, N., Kenny, A., Keaveney, E., Younger, K., & Flynn, M. (2011). *Weaning onto solid foods in Ireland: some of the challenges.* Paper presented at the meeting of the Joint Irish and American Society for Nutrition Meeting, 15-17 June 2011. doi:10.1017/S0029665111001121

Bentley, D., Aubrey, S. & Bentley, M. (2004). *Infant feeding and nutrition for primary care.* Oxford, United Kingdom: Radcliffe Publishing Limited.

Birch, L., & Davison, K. (2001). Family environmental factors influencing the developing behavioural controls of food intake and childhood overweight. *Pediatric Clinics of North America, 48,* 893-907.

Birks, M., & Mills, J. (2011). *Grounded theory. A practical guide.* London, United Kingdom: Sage.

Blair, N., Thompson, J., Black, J., Becroft, D., Clark, P., Han, D., Robinson, E., Waldie, K., Wild, C., & Mitchell, E. (2007). Risk factors for obesity in 7-year-old European children: the Auckland Birthweight Collaborative Study. *Archives of Disease in Childhood, 92,* 866-871.

Blyth, R., Creedy, D., Dennis, C., Moyle, W., Pratt, J., & De Vries, S. (2002). Effect of maternal confidence on breastfeeding duration: an application of breastfeeding self-efficacy theory. *Birth, 29,* 278-284.

Boddy, L., Hackett, A., & Stratton, G. (2009). Changes in BMI and prevalence of obesity and overweight in children in Liverpool, 1998-2006. *Perspectives in Public Health, 129,* 127-131.

Bolling, K., Grant, C., Hamlyn, B., & Thornton, A. (2007). *Infant feeding survey 2005.* London, United Kingdom: The Information Centre for Health and Social Care.

Bonuck, K., Huang, V., & Fletcher, J. (2010). Inappropriate bottle use: an early risk for overweight? Literature review and pilot data for a bottle-weaning trial. *Maternal and Child Nutrition, 6,* 38-52.

Bourdieu, P. (1977). *Outline of theory and practice.* Cambridge, United Kingdom: Cambridge University Press.

Bowling, A. (2002). *Research methods in health*. Buckingham, United Kingdom: Open University Press.

Bowling, A. (2009). *Research methods in health. Investigating health and health services.* (3rd ed.). Berkshire, United Kingdom: Open University Press.

Boynton, P. (2005). *The research companion: a practical guide for the social and health sciences.* Hove, United Kingdom; Psychology Press.

Boys, A., Marsden, J., Stillwell, G., Hatchings, K., Griffiths, P., & Farrell, M. (2003). Minimizing respondent attrition in longitudinal research: practical implications from a cohort study of adolescent drinking. *Journal of Adolescence, 26,* 363-373.

Brannen, J. (2005*). Mixed methods research: a discussion paper. (NCRM/005).* London, United Kingdom: ESRC National Centre for Research Methods.

Brisbois, T., Farmer, A., & McCargar, L. (2011). Early markers of adult obesity: a review. *Obesity Reviews, 13,* 347-367.

British Sociological Association. (2004). *The British Sociological Association's Statement of Ethical Practice.* Retrieved January 30 2012 from http:www.britsoc.co.uk/equality/Statement+Ethical+ractice.htm

Britten, N. (1995). Qualitative research. Qualitative interviews in medical research. *British Medical Journal, 311,* 251-253.

Britton, C., McCormick, F., Renfrew, M., Wade, A., & King, S. (2007). Support for breastfeeding mothers. *The Cochrane Database of Systemic Reviews,* 1, art. No.: CD001141. doi: 10.1002/14651858.CD001141.

Brown, A., & Lee, M. (2011a). A descriptive study investigating the use and nature of baby-led weaning in a UK sample of mothers. *Maternal and Child Nutrition, 7,* 34-47.

Brown, A., & Lee, M. (2011b). Maternal control of child feeding during the weaning period: differences between mothers following a baby-led or standard weaning approach. *Maternal and Child Health Journal, 15,* 1265-1271.

Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? *Qualitative Research, 6,* 97-113.

Bryman, A. (2008). *Social research methods.* (3rd ed.). Oxford, United Kingdom: Oxford University Press.

Bundred, P. (2008). *Association between infant weight gain and childhood obesity: the secular trends.* Proceedings of the Association for the Study of Obesity Conference Early development and obesity: food preferences, diet and appetite regulation; 2008 March 28; Liverpool, United Kingdom

Bundred, P., Kitchiner, D., & Buchan, I. (2001). Prevalence of overweight and obese children between 1989 and 1998: population based series of cross sectional studies. *British Medical Journal, 322*, 326-329.

Burdette, H., Whitaker, R., Hall, W., & Daniels, S. (2006).Breastfeeding, introduction of complementary foods, and adiposity at 5 y of age. *American Journal of Clinical Nutrition, 83,* 550-558.

Burke Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33,* 14-26.

Burns, E., Schmied, V., Sheehan, A., & Fenwick, J. (2010). A meta-ethnographic synthesis of women's experience of breastfeeding. *Maternal and Child Nutrition, 6,* 201-219.

Butland, B., Jebb, S., Kopelman, P., McPherson, K., Thomas, S., Mardell, J., Parry, V. (2007). *Tackling obesities: future choices - project report.* (2nd ed.). London, United Kingdom: Department of Innovation, Universities and Skills.

Butte, N. (2009). Impact of infant feeding practices on childhood obesity. *The Journal of Nutrition, 139,* 412S-416S.

Cameron, N. (2002). British growth charts for height and weight with recommendations concerning their use in auxological assessment. *Annals of Human Biology, 29,* 1-10.

Campbell, N.D., Soeken, K.L., & Rankin, E.A.D. (2007). Infant weaning patterns and related maternal-infant health outcomes. *Public Health Nursing, 3,* 57-63.

Canoy, D., & Buchan, I. (2007). Challenges in obesity epidemiology. *Obesity Reviews, 8 (suppl.1),* 1-11.

Carnell, S., Edwards, C., Croker, H., Boniface, D., & Wardle, J. (2005). Parental perceptions of overweight in 3-5y olds. *International Journal of Obesity, 29,* 353-355.

Carruth, B.R., & Skinner, J.D. (2002). Feeding behaviors and other motor development in healthy children (2-24 months). *Journal of the American College of Nutrition, 21,* 88-96.

Carruth, B.R., Ziegler, P.J., Gordon, A., & Hendricks, K. (2004). Developmental milestones and self-feeding behaviours in infants and toddlers. *Journal of the American Dietetic Association, 104 (supplement 1),* s51-s56.

Carter, S., & Little, M. (2007). Justifying knowledge, justifying method, taking action: epistemologies, methodologies, and methods in qualitative research. *Qualitative Health Research, 17,* 1316-1328.

Catalano P., Farrell K., Thomas A., Huston-Presley .L, Mencin P., Hauguel de Mouzon S., Amini, S. (2009). Perinatal risk factors for childhood obesity and metabolic dysregulation. *American Journal of Clinical Nutrition, 90,* 1303-1313.

Chamberlin, L.A., Sherman, S.N., Jain, A., Powers, S.W., Whitaker, R.C. (2002). The challenge of preventing and treating obesity in low-income, preschool; children: perceptions of WIC health care professionals. *Archives of Pediatrics and Adolescent Medicine, 156,* 662-668.

Chambers, J., & McInnes, R. on behalf of the Breastfeeding Expert Group (BEG) convened by NHS Health Scotland in partnership with the Health Improvement Strategy Division, Scottish Executive. (2006). *Psychosocial factors associated with breastfeeding: a review of breastfeeding publications between 1990-2005.* Edinburgh, United Kingdom: NHS Health Scotland.

Charmaz, K. (2000). Grounded theory. Objectivist and constructivist methods. In N.K. Lincoln, & Y.S. Denzin (Eds.). *Handbook of qualitative research (2nd ed.). (pp 509-535).* Thousand Oaks, California: Sage.

Charmaz, K. (2004). Premises, principles, and practices in qualitative research: revisiting the foundations. *Qualitative Health Research, 14,* 976-993.

Charmaz, K. (2006). *Constructing grounded theory. A practical guide through qualitative analysis.* London, United Kingdom: Sage Publications.

Cheater, F. (2003). Questioning design and method: is the tail wagging the dog? *Primary Healthcare Research and Development, 4,* 109-118.

Child Growth Foundation. (1996). UK cross sectional reference data: 1990/1. London, United Kingdom: Child Growth Foundation.

ChiMat. (2012). *Child health profile.* Retrieved April 3 2012 from www3halton.gov.uk/councilanddemocracy/statisticsandcensusinformation/105684

Chinn, S., Price, C., & Rona, R. (1989). Need for new reference curves for height. *Archives of Disease in Childhood, 64,* 1545-1553.

Chinn, S., & Rona, R. (2001). Prevalence and trends in overweight and obesity in three cross sectional studies of British children, 1974-94. *British Medical Journal, 322*, 24-26.

Chinn, S., & Rona, R. (2002). International definitions of overweight and obesity for children: a lasting solution? *Annals of Human Biology, 29,* 306-313.

Clark, B., & Laing, S. (1990). Infant feeding : a review of weaning. *Journal of Human Nutrition and Dietetics, 3,* 11-18.

Clark, H., Goyder, E., Bissell, P., Blank, L., & Peters, J. (2007). How do parents' child-feeding behaviours influence child weight? Implications for childhood obesity policy. *Journal of Public Health, 29,* 132-141.

Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data. Complementary research strategies.* Thousand Oaks, California: Sage Publications.

Cohen, R., Brown, K., Dewey, K., Canahuati, J., & Landa Rivera, L. (1994). Effects of age of introduction of complementary foods on infant breast milk intake, total energy intake, and growth: a randomised intervention study in Honduras. *Lancet, 344,* 288-293.

Cole, T.J., Bellizzi, M.C., Flegal, K.M., & Dietz, W.H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal*, *320*, 1240-1245.

Cole, T., Freeman, J., & Preece, M. (1995). Body mass index reference curves for the UK, 1990. *Archives of Disease in Childhood, 73,* 25-29.

Cole, T., Freeman, J., & Preece, M. (1998). British 1990 growth reference centiles for weight, height, body mass index and head circumference fitted by maximum penalised likelihood. *Statistical Medicine, 17,* 407-429.

Corbin, J., &, Strauss, A. (2008). *Basics of qualitative research.* (3rd ed.). Thousand Oaks, California: Sage.

Coulthard, H., Harris, G., & Emmett, P. (2009). Delayed introduction of lumpy foods to children during the complementary feeding period affects child's food acceptance and feeding at 7 years of age. *Maternal and Child Nutrition, 5,* 75-85.

Coveney, J. (2005). A qualitative study exploring socio-economic differences in parental lay knowledge of food and health: implications for public health nutrition. *Public Health Nutrition, 8,* 290-297.

Crawford, D. (2002). Population strategies to prevent obesity. *British Medical Journal, 235,* 728-729.

Crawford, D., Timperio, A., Telford, A., & Salmon, J. (2006). Parental concerns about childhood obesity and the strategies employed to prevent unhealthy weight gain in children. *Public Health Nutrition, 9,* 889-895.

Creswell, J. (2003). *Research design: qualitative, quantitative and mixed methods approaches.* (2nd ed.). Thousand Oaks, California: Sage.

Creswell, J., & Plano Clark, V. (2011). *Designing and conducting mixed methods research.* (2nd ed.). Thousand Oaks, California: Sage.

Cross-Government Obesity Unit. (2010). *Healthy weight, healthy lives: two years on.* London, United Kingdom: Department of Health.

Crouch, P., O'Dea, A., & Battisti, R. (2007). Child feeding practices and perceptions of childhood overweight and childhood obesity risk among mothers of preschool children. *Nutrition and Dietetics, 64,* 151-158.

Daly, A., MacDonald, A., & Booth, I.W. (1998). Diet and disadvantage: observations on infant feeding from an inner city. *Journal of Human Nutrition and Dietetics, 11,* 381-389.

Davies, D.P., & O'Hare, B. (2004). Weaning: a worry as old as time. *Current Paediatrics, 14,* 83-96.

Davison, K.K., & Birch, L.L. (2001). Childhood overweight: a contextual model and recommendations for future research. *The International Association for the study of obesity. Obesity reviews, 2,* 159-171.

Deacon, L., Perkins, C., & Bellis, M. (2011). *Child height and weight in the North West: analysis of the Child Measurement Programme 2009/2010).* Accessed 12 February, 2012, from www.nwph.info/nwpho/Publications/NWNCMP200910.pdf

de Onis, M., Garza, C., Onyango, A., & Rolland-Cahera, M. (2009). WHO growth standards for infants and young children. *Archives of Paediatrics, 16,* 47-53.

de Onis, M., Wijnhoven, T., & Onyango, A. (2004). World-wide practices in child growth monitoring. *Journal of Pediatrics, 144,* 461-465.

Dennis, C., (2002). Breastfeeding initiation and duration: a 1990-2000 literature review. *Journal of Obstetric, Gynaecologic, and Neonatal Nursing, 31,* 12-32.

Denscombe, M. (2003). *The good research guide for small scale social research projects.* (2nd ed.). Philadelphia: Open University Press.

Denscombe, M. (2009). *Ground rules for social research: guidelines for good practice.* (2nd ed.). London, United Kingdom: Open University Press.

Denscombe, M. (2010). *The good research guide for small scale social research projects.* (4th ed.). Maidenhead, United Kingdom: Open University Press.

Department of Health. (1994). *Weaning and the weaning diet.* London, United Kingdom: HMSO.

Department of Health. (2003). *Infant feeding recommendation.* Accessed 17 December, 2008, from www.breastfeeding.nhs.uk/en/docs/FINAL_QA.pdf

Department of Health. (2005). *Research Governance Framework for Health and Social Care.* (2nd ed.). Retrieved 1 Febuary 2012 from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4108962

Department of Health. (2007). *Birth to five – Your complete guide to parenthood and the first five years of your child's life.* London, United Kingdom: HMSO.

Department of Health. (2008). *Healthy weight, healthy lives: A cross government strategy for England.* London, United Kingdom: Department of Health and Department for Children, Schools and Families.

Department of Health. (2009a). *Birth to five. A complete guide.* Accessed 17 March, 2012, from *www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh_117167.pdf*

Department of Health. (2009b). Start4Life: No rush to mush. Accessed 17 March, 2012, from www.nhs.uk/start4life/pages/no-rush-to-mush.aspx

Department of Health. (2010). Start4Life - a good start for a healthier life. Accessed 13 June, 2012, from http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/MediaCentre/Currentcampaigns/Change4Life/DH_107727

Department of Health. (2011). *Halton* London, United Kingdom: Department of Health.

Department of Health. (2012). Statistical release on breastfeeding quarter 3 2011/12. Accessed 1 March, 2012, from www.transparency.dh.gov.uk.2012/02/16breastfeeding-statistics/

Department of Health and Social Security. (1974). *Present day practice in infant feeding. Report on Health and Social Subjects 9.* London, United Kingdom: HMSO.

Department of Health and Social Security. (1980). *Present day practice in infant feeding. Report on Health and Social Subjects 20.* London, United Kingdom: HMSO.

Department of Health and Social Security. (1988). *Present day practice in infant feeding. Report on Health and Social Subjects 32.* London, United Kingdom: HMSO.

Dewey, K., Cohen, R., Brown, K., & Landa Rivera, L. (1999). Age of introduction of complementary foods and growth of term, low-birth-weight breast-fed

infants: a randomized intervention study in Honduras. *American Journal of Clinical Nutrition, 69,* 679-686.

Dietz, W.H. (1998). Childhood weight affects adult morbidity and mortality. *Journal of Nutrition, 128*, 411s-414s.

Dinsdale, H., Ridler, C., & Rutter, H. (2011). *National Child measurement Programme: changes in children's body mass index between 2006/07 and 2009/10.* Oxford: National Obesity Observatory.

Dinsdale, H., Ridler, C., & Rutter, H. (2012). *National Child measurement Programme: changes in children's body mass index between 2006/07 and 2010/11.* Oxford, United Kingdom: National Obesity Observatory.

Druet, C., Stettler, N., Sharp, S., Simmons, R., Cooper, C., Davey Smith, G., Ekelund, U., Lévy-Marchal, C., Jarvelin, M-R., Kuh, D., & Ong, K. (2011). Prediction of childhood obesity by infancy weight gain: an individual level meta-analysis. *Pediatric and Perinatal Epidemiology, 26,* 19-26.

Dubois, L., & Girard, M. (2003). Social inequalities in infant feeding during the first year of life. The Longitudinal Study of Child Development in Québec (LSCDQ 1998-2002). *Public Health Nutrition, 6,* 773-783.

Dunne, C. (2011). The place of the literature review in grounded theory research. *International Journal of Social Research Methodology, 14,* 111-124.

Dykes, F. (2004). What are the foundations of qualitative research? In T. Lavender, G. Edwards, & Z. Alfirevic (Eds.), *Demystifying qualitative research in pregnancy and childbirth* (pp 17-34). Salisbury, United Kingdom: Quay Books.

Dykes, F. (2005). 'Supply' and 'demand': breastfeeding as labour. *Social Science and Medicine, 60,* 2283-2293.

Dykes, F. (2006). The education of health practitioners supporting breastfeeding women: time for critical reflection. *Maternal and Child Nutrition, 2,* 204-216.

Dykes, F. (2011). Twenty-five years of breast-feeding research in Midwifery. *Midwifery, 27,* 8-14.

Dyson, L., McCormick, F., & Renfrew, M. (2008). Interventions for promoting the initiation of breastfeeding (Review). *The Cochrane Database of Systemic Reviews,* 2, art. No.: CD001688. doi: 10.1002/14651858.CD1688

Earland, J., Ibrahim, S., & Harpin, V. (1997). Maternal employment: does it influence feeding practices during infancy? *Journal of Human Nutrition and Dietetics, 10,* 305-311.

Earle, S. (2002). Factors affecting the initiation of breastfeeding: implications for breastfeeding promotion. *Health Promotion International, 17,* 205-214.

Elias, N. (1987). Involvement and detachment. Oxford, United Kingdom: Basil Blackwell.

El-Sayed, A., Scarborough, P., & Galea, S. (2011). Ethnic inequalities in obesity among children and adults in the UK; a systematic review of the literature. *Obesity Reviews, 12,* e516-e534.

Eriksson, J., Forsén, T., Osmond, C., & Barker, D. (2003). Obesity from cradle to grave. *International Journal of Obesity, 27,* 722-727.

Ertem, I., Votto, N., & Leventhal, J. (2002). The timing and prediction of the early termination of breastfeeding. *Pediatrics, 107,* 542-548.

Etelson, D., Brand, D., Patrick, P., & Shirali, A. (2003). Childhood obesity: do parents recognise this health risk? *Obesity Research, 11,* 1362-1368.

European Food Safety Authority Panel on Dietetic Products, Nutrition and Allergies. (2009). Scientific opinion on the appropriate age for introduction of complementary feeding of infants. *EFSA Journal, 7,* (12), 1423 (38pp).

European Network for Public Health Nutrition. (2006). *Infant and young child feeding: Standard recommendations for the European Union.* Trieste: EC/WHO.

European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. (2008). Complementary feeding: A commentary by the ESPGHAN committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition, 46,* 99-110.

Ewing, G., & Green, J.M. (2000). Infant weaning: lay and professional accounts of the weaning process. *Final report to Oxford and Anglia NHS Regional R&D. MIRU No. 2000.*

Fade, S.A. (2003). Communicating and judging the quality of qualitative research: the need for a new language. *Journal of Human Nutrition and Dietetics, 16,* 139-149.

Faith, M., Scanlon, K., Birch, L., Francis, L., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Reviews, 12,* 1711-1722.

Fewtrell, M., Lucas, A., & Morgan, J. (2003). Factors associated with weaning in full term and preterm infants. *Archives of Disease in Childhood Fetal and Neonatal Edition, 88,* F296-F301.

Fewtrell, M.S. Morgan, J.B., Duggan, C., Gunnlaugsson, G., Hibberd, P., Lucas, A., & Kleinman, R. (2007). Optimal duration of exclusive breastfeeding: what is the evidence to support current recommendations? *American Journal of Clinical Nutrition, 85,* 635s-638s.

Fewtrell, M., Wilson, D., Booth, I., & Lucas, A. (2011). When to wean? How good is the evidence for six months' exclusive breastfeeding. *British Medical Journal, 342,* 209-212.

Finegood, D., Merth, T., & Rutter, H. (2010). Implications of the Foresight obesity system map for solutions to childhood obesity. *Obesity, 18,* s13-s16.

Fisher, J., & Birch, L., (1995). Fat preferences and fat consumption of 3- to 5-year-old children are related to parental adiposity. *Journal of the American Dietetic Association, 95,* 759-764.

Fisher, J., & Birch, L. (1999). Restricting access to foods and children's eating. *Appetite, 32,* 405-419.

Fisher, L., Fraser, J., & Alexander, C. (2006). Caregivers' inability to identify childhood adiposity: a cross-sectional survey of rural children and their caregivers' attitudes. *Australian Journal of Rural Health, 14,* 56-61.

Foote, K.D., & Marriott, L.D. (2003). Weaning of infants. *Archives of Disease in Childhood, 88,* 488-492.

Forsyth, J., Ogston, S., Clark A., Florey, C., & Howie, P. (1993). Relation of early introduction of solid food to infants and their weight and illnesses during the first two years of life. *British Medical Journal, 306,* 1572-1576.

Freeman, J., Cole, T., Chinn, S., Jones, P., White, E., & Preece, M. (1995). Cross sectional stature and weight reference curves for the UK, 1990. *Archives of Disease in Childhood, 73,* 17-24.

Freeman, V., Hof, M., & Haschke, F. (2000). Patterns of milk and food intake in infants from birth to 36 months: The Euro-growth study. *Journal of Pediatric Gastroenterology and Nutrition, 31,* s76-s85.

Gable, S., & Lutz, S. (2000). Household, parent, and child contributions to childhood obesity. *Family Relations, 49,* 293-300.

Gardner, D., Hosking, J., Metcalf, B., Jeffrey, A., Voss, L., & Wilkin, T. (2009). Contribution of early weight gain to childhood overweight and metabolic health: a longitudinal study (EarlyBird 36). *Pediatrics, 123*, e67-e73.

Gibbs, G. (2007). *Analyzing qualitative data.* London, United Kingdom: Sage.

Gildea, A., Sloan, S., & Stewart, M. (2009). Sources of feeding advice in the first year of life: who do parents value? *Community Practitioner, 82,* 27-31.

Gillman, M., Rifas-Shiman, S., Camargo, C., Berkey, C., Frazier, A., Rockett, H., Field, A., & Colditz, G. (2001). Risk of overweight among adolescents who were breastfed as infants. *Journal of the American Medical Association, 285,* 2461-2467.

Glaser, B.G., & Strauss, A.L. (1967). *The discovery of grounded theory.* Chicago: Aldine.

Golan, M., & Crow, S. (2004). Parents are key players in the prevention and treatment of weight-related problems. *Nutrition Reviews, 62,* 39-50.

Grant, R., & Sugarman, J. (2004). Ethics in human subjects research: do incentives matter? *Journal of Medicine and Philosophy, 29,* 717-738.

Green, J. (1999). Commentary: generalizability and validity in qualitative research. *British Medical Journal, 319,* 421.

Griffiths, L., Tate, A., Dezateux, C., & the Millennium Cohort Study Child Health Group. (2005). The contribution of parental and community ethnicity to breastfeeding practices : evidence from the Millennium Cohort Study. *International Journal of Epidemiology, 34,* 1378-1386.

Griffiths, L., Tate, A., Dezateux, C., & the Millennium Cohort Study Child Health Group. (2007). Do early infant feeding practices vary by maternal ethnic group? *Public Health Nutrition, 10,* 957-964.

Grimshaw, K. (2009). Infant feeding and allergy prevention: a review of current knowledge and recommendations. A EuroPrevall state of the art paper. *Allergy, 64,* 1407-1416.

Groh-Wargo, S., Jacobs, J., Auestad, N., O'Connor, D., Moore, J., & Lerner, E. (2005). Body composition in preterm infants who are fed long-chain polyunsaturated fatty acids: a prospective, randomized, controlled trial. *Pediatric Research, 57,* 712-718.

Guba, E., & Lincoln, Y. (1994). Competing paradigms in qualitative research. In N. Denzin, & Y. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed) (pp 105-117). Thousand oaks, California: Sage Publications.

Hall, D., & Elliman, D. (2003). Health for all children. (4th ed.). Oxford, United Kingdom: Oxford University Press.

Hallberg, L. (2006). The "core category" of grounded theory: making constant comparisons. *International Journal of Qualitative Studies on Health and Well-being, 1,* 141-148.

Halton Borough Council. (2010). *Index of Multiple Deprivation (IMD) 2010.* Retrieved 31 August, 2011, from http://www3.halton.gov.uk/councilanddemocracy/statisticsandcensusinformation/135044

Halton Borough Council. (2011). Halton. Retrieved 3 March 2012, from http://www3.halton.gov.uk/councilanddemocracy/statisticsandcensusinformation/

Hamlyn, B., Brooker, S., Oleinikova, K., & Wands, S. (2002). *Infant feeding 2000*. London, United Kingdom: The Stationery Office.

Harder, T., Bergmann, R., Kallischnigg, G., & Plagemann, A. (2005). Duration of breastfeeding and risk of overweight: a meta-analysis. *American Journal of Epidemiology, 162,* 397-403.

Hart, C., Raynor, H., Jelalian, E., & Drotar, D. (2010). The association of maternal food intake and infants' and toddlers' food intake. *Child: care, health and development, 36,* 396-403.

Hastrup, K. (1995). *A passage to anthropology: between experience and theory.* London, United Kingdom: Routledge.

Hauck, Y., & Irurita, V. (2003). Incompatible expectations: the dilemma of breastfeeding mothers. *Health Care for Women International, 24,* 62-78.

Hawkins, S., Cole, T., Law, C., & the Millennium Cohort Study Child Health Group. (2009). An ecological systems approach to examining risk factors for early childhood overweight: findings from the UK Millennium Cohort Study. *Journal of Epidemiology and Community Health, 63,* 147-155.

Hegney, D., Fallon, T., & O'Brien, M. (2008). Against all odds: a retrospective case-controlled study of women who experienced extraordinary breastfeeding problems. *Journal of Clinical Nursing, 17,* 1182-1192.

Henderson, J. (2010). Expert and lay knowledge: a sociological perspective. *Nutrition and Dietetics, 67,* 4-5.

Henn, M., Weinstein, M., & Foard, N. (2006). *A short introduction to social research.* London, United Kingdom: Sage.

Henwood, K., & Pidgeon, N. (2003). Grounded theory in psychological research. In P. Camic, J. Rhodes, & L. Yardley (Eds.), *Qualitative research in psychology: expanding perspectives in methodology and design* (pp 131-155). Washington, DC: American Psychological Association.

Hetzner, N.M., Razza, R.A., Malone, L.M., & Brooks-Gunn, J. (2009). Associations among feeding behaviors and child illness at two years. *Maternal and Child Health Journal, 13,* 795-805.

Hoddinott, P., Craig, L., Britten, J., & McInnes, R. (2012). A serial qualitative interview study of infant feeding experiences: idealism meets realism. *BMJ Open,* 2:e000504. doi:10.1136/bmjopen-2011-000504

Hoddinott, P., Kroll, T., Raja, A., & Lee, A. (2010). Seeing other women breastfeed: how vicarious experience relates to breastfeeding intention and behaviour. *Maternal and Child Nutrition, 6,* 134-146.

Hoddinott, P., & Pill, R. (1999). Qualitative study of decisions about infant feeding among women in east end of London. *British Medical Journal, 318,* 30 -34.

Hoddinott, P., Pill, R., & Hood, K. (2000). Identifying which women will stop breast feeding before three months in primary care: a pragmatic study. *British Journal of General Practice, 50,* 888-891.

Hodges, E. (2003). A primer on early childhood obesity and parental influence. *Pediatric Nursing, 29,* 13-16.

Holloway, I., & Wheeler, S. (2002). *Qualitative research in nursing.* (2nd ed.). Oxford, United Kingdom: Blackwell.

Jackson, D., Mannix, J., Faga, P., & McDonald, G. (2005). Overweight and obese children: mothers' strategies. *Journal of Advanced Nursing, 52,* 6-13.

Jackson, D., McDonald, G., Mannix, J., Faga, P., & Firtko, A. (2005). Mothers' perceptions of overweight and obesity in their children. *Australian Journal of Advanced Nursing, 23,* 8-13.

Jain, A., Sherman, S., Chamberlin, L., Carter,Y., Powers, S., & Whitaker, R. (2001). Why don't low-income mothers worry about their pre-schoolers being overweight? *Pediatrics, 107,* 1138-1146.

Jebb, S., Rennie, K., & Cole, T. (2003). Prevalence of overweight and obesity among young people in Great Britain. *Public Health Nutrition, 7,* 461-465.

Jeffrey, A., Voss, L., Metcalf, B., Alba, S., & Wilkin, T. (2005). Parents' awareness of overweight in themselves and their children: cross sectional study within a cohort (EarlyBird 21). *British Medical Journal, 330,* 23-24.

Kipping, R., Jago, R., & Lawlor, D. (2008). Obesity in children. Part 1: epidemiology, measurement, risk factors and screening. *British Medical Journal, 337,* 922-927.

Kirkland, V., & Fein, S. (2003). Characterising reasons for breastfeeding cessation throughout the first year postpartum using the construct of thriving. *Journal of Human Lactation, 19,* 278-285.

Kopelman, P. (2007). Health risks associated with overweight and obesity. *Obesity Reviews, 8 (suppl. 1),* 13-17.

Kramer, M. (1981). Do breast-feeding and delayed introduction of solid foods protect against subsequent obesity? *Journal of Pediatrics, 98,* 883-887.

Kramer, M., & Kakuma, R. (2002). *The optimum duration of breast feeding: a systematic review.* Geneva, Switzerland: World Health Organisation.

Kramer, M., & Kakuma, R. (2007). *Optimal duration of exclusive breastfeeding (Review).* The Cochrane collaboration.

Kramer, M., Matush, L., Bogdanovich, N., Aboud, F., Mazer, B., Fombonne, E. … Ward Platt, R. (2009). Health and development outcomes in 6.5-y-old children breastfed exclusively for 3 or 6 mo. *American Journal of Clinical Nutrition, 90,* 1070-1074.

Lampl, M., & Thompson, A. (2007). Growth chart curves do not describe individual growth biology. *American Journal of Human Biology, 19,* 643-653.

Lanigan, J.A., Bishop, J.A., Kimber, A.C., & Morgan, J. (2001). Systematic review concerning the age of introduction of complementary foods to the healthy full-term infant. *European Journal of Clinical Nutrition, 55,* 309-320.

Laraway, K., Birch, L., Shaffer, M., & Paul, I. (2010). Parent perception of healthy infant and toddler growth. *Clinical Pediatrics, 49,* 343-349.

Lavender, T., & Briscoe., L. (2000). Research incentives: a thank you or a bribe? *British Journal of Midwifery, 8,* 206.

Lee, E. (2007). Health, morality and infant feeding: British mothers' experiences of formula milk use in the early weeks. *Sociology of Health and Illness, 29,* 1075-1090.

Lobstein, T. (2010). Prevalence and trends in childhood obesity. In D. Crawford, R. Jeffery, K. Ball, & J. Brug (Eds.), *Obesity epidemiology. From aetiology to public health* (pp. 3-16). Oxford, United Kingdom: Oxford University Press.

Lobstein, T., Baur, L., & Uauy, R. (2004). Obesity in children and young people: a crisis in public health. *Obesity Reviews, 5 (s1),* 4-85.

Lobstein, T., James, W., & Cole, T. (2003). Increasing levels of excess weight among children in England. *International Journal of Obesity, 27,* 1136-1138.

Lucas, P., Roberts, H., Baird, J., Kleijnen, J., & Law, C. (2007). The importance of size and growth in infancy: integrated findings from systematic reviews of scientific evidence and lay perspectives. *Child: Care, Health and Development, 33,* 635-640.

Lucas, A., & Zlotkin, S. (2003). *Infant nutrition.* Oxford, United Kingdom: Health Press Limited.

MacDonald, A. (2003). Is breast best? Is early solid feeding harmful? *Journal of the Royal Society for the Promotion of Health, 123,* 169-174.

Maffeis, C., Micciolo, R., Must, A., Zaffanello, M., & Pinelli, L. (1994). Parental and perinatal factors associated with childhood obesity in north-east Italy. *International Journal of Obesity Related Metabolic Disorders, 18,* 301-305.

Manning, D. (2004). What are the ethical considerations? In T. Lavender, G. Edwards, & Z. Alfirevic (Eds.), *Demystifying qualitative research in pregnancy and childbirth* (pp 35-47). Salisbury, United Kingdom: Quay Books.

Marcellus, L. (2004). Are we missing anything? Pursuing research on attrition. *Canadian Journal of Nursing Research, 36,* 83-98.

Marriott, L., Foote, K., Bishop, J., Kimber, A., & Morgan, J. (2003). Weaning preterm infants: a randomised controlled trial. *Archives of Disease in Childhood Fetal Neonatal Edition, 88,* F302-F307.

Mason, J. (1996). Qualitative researching. London, United Kingdom: Sage.

Maynard, L., Galuska, D., Blanck, H., & Serdula, M. (2003). Maternal perceptions of weight status of children. *Pediatrics, 111,* 1226-1231.

Maziak, W., Ward, K., & Stockton, M. (2007). Childhood obesity: are we missing the big picture? *Obesity Reviews.* doi:10.1111/j.1467-789X.2007.00376.x

McCarthy, H.D., Ellis, S.M., & Cole, T. (2003). Central overweight and obesity in British youth aged 11-16 years: cross sectional surveys of waist circumference. *British Medical Journal*, *326*, 624-627.

McDougall, P. (2003). Weaning: parents' perceptions and practices. *Community Practitioner,* 76, 25-28.

McFadden, A., Renfrew, M., Dykes, F., & Burt, S. (2006). Assessing learning needs for breastfeeding: setting the scene. *Maternal and Child Nutrition, 2,* 196-203.

McFadden, A., & Toole, G. (2006). Exploring women's views of breastfeeding: a focus-group study within an area with high levels of socio-economic deprivation. *Maternal and Child Nutrition, 2,* 156-168.

McInnes, R., & Chambers, J. (2008). Supporting breastfeeding mothers: a qualitative synthesis. *Journal of Advanced Nursing, 62,* 407-427.

McLeroy, K., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly, 15,* 351-377.

McPherson, K., Marsh, T., & Brown, M. (2007). Tackling obesities: future choices-modelling future trends in obesity and the impact on health. *Foresight, 2,* 1-71.

Mehta, K., Specker, B., Bartholmey, S., Giddens, J., & Ho, M. (1998). Trial on timing of introduction to solids and food type on infant growth. *Pediatrics, 102,* 569-573.

Meyer, P.G. (2000). Tongue, lip and jaw differentiation and its relationship to orofacial myofunctional treatment. *International Journal of Orofacial Myology, 26,* 44-52.

Mitchell, R., McDougall, C., & Crum, J. (2007). Decreasing prevalence of obesity in primary schoolchildren. *Archives of Disease in Childhood, 92,* 153-154.

Moffat, T. (2001). A biocultural investigation of the weaning dilemma in Kathmandu, Nepal: do universal recommendations for weaning practice make sense? *Journal of Biosocial Science, 33,* 321-335.

Monasta, L., Batty, G., Cattaneo, A., Lutje, V., Ronfani, L., van Lenthe, F., & Brug, J. (2010). Early-life determinants of overweight and obesity: a review of systematic reviews. *Obesity Reviews, 11,* 695-708.

Monasta,L., Lobstein, T., Cole, T., Vignerova, J., & Cattaneo, A. (2011). Defining overweight and obesity in pre-school children: IOTF reference or WHO standard? *Obesity Reviews, 12,* 295-300.

Monteiro, P., & Victora, C. (2005). Rapid growth in infancy and childhood and obesity in later life – a systematic review*. Obesity Reviews, 6,* 1443-154.

Moorcroft, K., Marshall, J., & McCormick, F. (2011). Association between timing of introducing solid foods and obesity in infancy and childhood: a systematic review. *Maternal and Child Nutrition, 7,* 3-26.

Moore, A., Milligan, P., & Goff, L. (2011). *Knowledge of the UK weaning guidelines influences the timing of the introduction of solid foods to infants.* Paper presented at the Proceedings of the Nutrition Society, 4-6 July 15-17 2011. doi:10.1017/S0029665111002497

More, J., Jenkins, C., King, C., & Shaw, V. (2010). *Weaning infants onto solid foods.* The British Dietetic Association Specialist Paediatric Group.

Morgan, J.B., Lucas, A. & Fewtrell, M.S. (2004). Does weaning influence growth and health up to 18 months? *Archives of Disease in Childhood, 89,* 728-733.

Morse, J., & Harrison, M. (1987). Social coercion for weaning. *Journal of Nurse-Midwifery, 32,* 205-210.

Moschonis, G., Grammatikaki, E., & Manios, Y. (2008). Perinatal predictors of overweight at infancy and preschool childhood: the GENESIS study. *International Journal of Obesity, 32,* 39-47.

Murphy, E. (1999). 'Breast is best': Infant feeding decisions and maternal deviance. *Sociology of Health and Illness, 21,* 187-208.

Murphy, E. (2000). Risk, responsibility and rhetoric in infant feeding. *Journal of Contemporary Ethnography, 29,* 291-325.

Murphy, E. (2003). Expertise and forms of knowledge in the government of families. *The Sociological Review,* 433-462.

Must, A., & Anderson, S. (2006). Body mass index in children and adolescents: considerations for population-based applications. *International Journal of Obesity, 30,* 590-594.

Must, A., & Strauss, R. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity, 23,* 2-11.

Nader, P., Huang, T., Gahagan, S., Kumanyika, S., Hammond, R., & Christoffel, K. (2012). Next steps in obesity prevention: altering early life systems to support healthy parents, infants, and toddlers. *Childhood Obesity, 8,* 195-204.

Nader, P., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R. … Susman, E. (2006). Identifying risk for obesity in early childhood. *Pediatrics, 118,* e595-e601.

National Health Service Information Centre. (2009). *National Health Measurement Programme: England, 2008/09 school year.* London, United Kingdom: The Health and Social Care Information Centre.

NHS Health Research Authority. (2012a). *NHS R+D approval.* Retrieved 30 January 2012 from http://www.nres.npsa.nhs.uk/applications/approval-requirements/nhs-rd-approval/

NHS Health Research Authority. (2012b). *Welcome to the National Research Ethics Service.*
Retrieved 30 January 2012 from http://www.nres.npsa.nhs.uk/

National Obesity Observatory. (2010). *National Child Measurement Programme.* Retrieved 13 June 2012 from http://www.noo.org.uk/NCMP

Noble, S., Emmett, P. (2006). Differences in weaning practice, food and nutrient intake between breast- and formula-fed 4 month old infants in England. *Journal of Human Nutrition and Dietetics, 19,* 303-313.

Northstone, K., Emmett, P., & Nethersole, F. (2001). The effect of age of introduction to lumpy solids on food eaten and reported feeding difficulties at 6 and 15 months. *Journal of Human Nutrition and Dietetics, 14,* 43-54.

Oakley, A. (1981). Interviewing women: a contradiction in terms. In H. Roberts (Ed.), *Doing feminist research* (pp 30-59). London, United Kingdom: Routledge and Keegan Paul.

O'Brien, M., Buikstra, E., Fallon, T. & Hegney, D. (2009). Exploring the influence of psychological factors on breastfeeding duration, phase 1: perceptions of mothers and clinicians. *Journal of Human Lactation, 25,* 55-63.

O'Cathain, A., Murphy, E., & Nicholl, J. (2008). The quality of mixed method studies in health services research. *Journal of Health Services Research and Policy, 13,* 92-98.

Office for National Statistics (2011). 2011 census: KS107EW Lone parent households with dependent children, local authorities in England and Wales. Accessed 15 March, 2013, from www.ons.gov.uk

Office for National Statistics (undated). Neighbourhood statistics. Accessed 12 February, 2012, from http://neighbourhood.statistics.gov.uk/dissemination

Oliver, P. (2003). *The student's guide to research ethics.* Berkshire, United Kingdom: Open University Press.

Ong, K., Ahmed, M., Emmett, P., Preece, M., & Dunger, D., and the Avon Longitudinal Study of Pregnancy and Childhood Team. (2000). Association between postnatal catch-up growth and obesity in childhood: prospective cohort study. *British Medical Journal, 320,* 967-971.

Owen, C., Martin, R., Whincup, P., Davey Smith, G., & Cook, D. (2005). Effect of infant feeding on the risk of obesity across the life course: a quantitative review of published evidence. *Pediatrics, 115,* 1367-1377.

Pagnini, D., Wilenfeld, R., King, L., Booth, M., & Booth, S. (2007). Mothers of pre-school children talk about childhood overweight and obesity: The weight of opinion study. *Journal of Paediatrics and Child Health, 43,* 806-810.

Panpanich, R., & Garner, P. (2009). Growth monitoring in children. *The Cochrane database of Systematic Reviews, 4,* Art. No.: CD001443. doi: 10.1002/146518558.CD001443

Péneau, S., Rouchaud, A., Rolland-Cahera, M-F., Arnault, N., Hercberg, S., & Castetbon, K. (2011). Body size and growth from birth to 2 years and risk of overweight at 7-9 years. *International Journal of Pediatric Obesity, 6,* e162-e169.

Perry, C. (2007). Evaluation of a Pampering Group. In J. Schneider, M. Avis, & P. Leighton (Eds.). *Supporting Children and Families: Lessons from Sure Start for Evidence-Based Practice in Health, Social Care and Education* (pp. 21-30). London, United Kingdom: Jessica Kingsley Publishers.

Perry, C., Thurston, M., & Green, K. (2004). Involvement and detachment in researching sexuality: reflections on the process of semistructured interviewing. *Qualitative Health Research, 14,* 135-148.

Pieters, R., Baumgartner, H., & Bagozzi, R. (2006). Biased memory for prior decision making: evidence from a longitudinal field study. *Organizational Behavior and Human Decision Processes, 99,* 34-48.

Pope, C., Ziebland, S., & Mays, N. (2000). Analysing qualitative data. *British Medical Journal, 320,* 114-116.

Popkin, B.M., Conde, W., Hou, N., & Monteiro, C. (2006). Is there a lag globally in overweight trends for children compared with adults? *Obesity, 14,* 1846-1853.

Power, E. (1999). An introduction to Pierre Bourdieu's key theoretical concepts. *Journal for the Study of Food and Society, 3,* 48-52.

Preece, M., Freeman, J., & Cole, T. (1996). Sex differences in weight in infancy: published centile charts have been updated. *British Medical Journal, 313,* 1486.

Prentice, A., & Jebb, S. (2001). Beyond body mass index. *Obesity Reviews, 2,* 141-147.

Prescott, S.L., Smith, P., Tang, M., Palmer, D.J., Sinn, J., Huntley, S.J., Cormack, B., Heine, R.G., Gibson, R.A., & Makrides, M. (2008). The importance of early complementary feeding in the development of oral tolerance: concerns and controversies. *Pediatric Allergy Journal, 19,* 375-380.

Punch, K. (1998). *Introduction to social research. Quantitative and qualitative approaches.* London, United Kingdom: Sage.

Punch, K. (2005). *Introduction to social research. Quantitative and qualitative approaches.* (2nd ed.). London, United Kingdom: Sage.

Raman, R. (2002). Obesity and health risks. *Journal of the American College of Nutrition, 21,* 134s-139s.

Rapley, G. (2006). Baby-led weaning. A developmental approach to the introduction of complementary foods. In V. Hall Moran & F. Dykes (Eds.), *Maternal and infant nutrition and nurture. Controversies and challenges* (pp. 275-298). London, United Kingdom: Quay Books.

Rapley, G. (2003). *Can babies initiate and direct the weaning process?* Unpublished MSc Interprofessional Health and Community Studies (Care of the breastfeeding mother and child). Kent: Canterbury Christ Church University College.

Rapley, G., & Murkett, T. (2008). *Baby-led weaning. Helping your baby to love good food.* London, United Kingdom: Vermilion.

Reeves, S. (2008). Baby-led weaning. *British Nutrition Foundation Nutrition Bulletin, 33,* 108-110.

Reid, J., Schmied, V., & Beale, B. (2010). 'I only give advice if I am asked': examining the grandmother's potential to influence infant feeding decisions and parenting practices of new mothers. *Women and Birth, 23,* 74-80.

Reilly, J. (2002). Assessment of childhood obesity: national reference data or international approach? *Obesity Research, 10,* 838-840.

Reilly, J. (2007). Prevention of childhood obesity: the new search for the holy grail? *Future Lipidology, 2,* 271-276.

Reilly, J., Armstrong, J., Sherriff, A, Dorosty, A., Emmett, P., Ness, A. , Rodgers, I., Steer, C., for the ALSPAC Study Team. (2005). Early risk factors for obesity in childhood: cohort study. *British Medical Journal, 330,* 1357.

Reilly, J., Dorosty, A., & Emmett, P. (1999). Prevalence of overweight and obesity in British children: cohort study. *British Medical Journal, 319,* 1039.

Reilly, J., Methven, E., McDowell, Z., Hacking, B., Alexander, D., Stewart, L., & Kelnar, C. (2003). Health consequences of obesity. *Archives of Disease in Childhood, 88,* 748-752.

Reilly, J., Ness, A., & Sherriff, A. (2007). Epidemiological and physiological approaches to understanding the etiology of pediatric obesity: finding the needle in the haystack. *Pediatric Research, 61,* 646-652.

Reilly, J., Wilson, M., Summerbell, C., & Wilson, D. (2002). Obesity: diagnosis, prevention and treatment; evidence based answers to common questions. *Archives of Disease in Childhood, 86*, 392-395.

Renfrew, M., Dyson, L., Wallace, L., D'Souza, L., McCormick, F., & Spoby, H. (2005). *The effectiveness of public health interventions to promote the duration of breastfeeding: systematic reviews of the evidence.* London, United Kingdom: National Institute for Health and Clinical Excellence.

Richards, L. (2009). *Handling qualitative data: a practical guide.* (2nd ed.). London, United Kingdom: Sage.

Ritchie, J., Spencer, L., & O'Connor, W. (2003). In J. Ritchie, & J. Lewis (Eds.), *Qualitative research practice: a guide for social science students and researchers* (pp 219-262)*.* London, United Kingdom: Sage.

Robinson, S., Marriott, L., Poole, J., Crozier, S., Borland, S., Lawrence, W. et al. (2007). Dietary patterns in infancy: the importance of maternal and family influences on feeding practice. *British Journal of Nutrition, 98,* 1029-1037.

Robson, C. (2011). *Real world research. A resource for users of social research methods in applied settings.* (3rd ed.). Chichester, United Kingdom: Wiley.

Rokholm, B., Baker, J., & Sørensen, T. (2010). The levelling off of the obesity epidemic since the year 1999 – a review of evidence and perspectives. *Obesity Reviews, 11,* 835-846.

Routen, A., Edwards, M., Upton, D., & Peters, D. (2011). The impact of school-day variation in weight and height on National Child Measurement Programme body mass index-determined weight category in year 6 children. *Child: Care, Health and Development, 37,* 360-367.

Royal College of Paediatrics and Child Health. (2009a). *UK-WHO growth charts – fact sheet 2. The UK-WHO growth charts: what is the difference?* Retrieved 10 March 2012 from www.rcpch.ac.uk/child-health/research-projects/uk-who-growth-charts-early-years/uk-who-0-4-years-growth-charts-initi#parents

Royal College of Paediatrics and Child Health. (2009b). *UK-WHO growth charts – fact sheet 1. What are growth charts and why do we need them?* Retrieved 10 March 2012 from www.rcpch.ac.uk/child-health/research-projects/uk-who-growth-charts-early-years/uk-who-0-4-years-growth-charts-initi#parents

Royal College of Paediatrics and Child Health. (2009c). *UK-WHO growth charts – fact sheet for parents. Understanding growth charts: what they tell you about*

your child's growth. Retrieved 10 March 2012 from RCPCH website: www.rcpch.ac.uk/child-health/research-projects/uk-who-growth-charts-early-years/uk-who-0-4-years-growth-charts-initi#parents

Sachs, M. (2011). Baby-led weaning and current UK recommendations – are they compatible? *Maternal and Child Nutrition, 7,* 1-2.

Sachs, M., Dykes, F., & Carter, B. (2005). Weight monitoring of breastfed babies in the UK – centile charts, scales and weighing frequency. *Maternal and Child Nutrition, 1,* 63-76.

Sachs, M., Dykes, F., & Carter, B. (2006a). Feeding by numbers: an ethnographic study of how breastfeeding women understand their babies' weight charts. *International Breastfeeding Journal, 1, 29*. doi:10.1186/1746-4358-1-29

Sachs, M., Dykes, F., & Carter, B. (2006b). Weight monitoring of breastfed babies in the UK – interpreting, explaining and intervening. *Maternal and Child Nutrition, 2,* 3-18.

Sachs, M., Sharp, L., Bedford, H., & Wright, C. (2011). 'Now I understand': consulting parents on chart design and parental information for the UK-WHO child growth charts. *Child: Care, Health and Development, 38,* 435-440.

Saunders, K.L. (2007). Preventing obesity in pre-school children: a literature review. *Journal of Public Health, 29,* 368-375.

Savage, J., Orlet Fisher, J., & Birch, L. (2007). Parental influence on eating behaviour: conception to adolescence. *Journal of Law, Medicine and ethics, Spring,* 22-34.

Savage, S., Reilly, J., Edwards, C., Durnin, J. (1998). Weaning practice in the Glasgow longitudinal infant growth study. *Archives of Disease in Childhood, 79,* 153-156.

Saxena, S., Ambler, G., Cole, T., & Majeed A. (2004). Ethnic group differences in overweight and obese children and young people in England: cross sectional survey. *Archives of Disease in Childhood, 89,* 30-36.

Scaglioni, S., Agostoni, C., De Notaris, R., Radaelli, G., Radice, N., Valenti, M., Giovannini, M., Riva, E. (2000). Early macronutrient intake and overweight at five years of age. *International Journal of Obesity, 24,* 777-781.

Schack-Nielsen, L., Sørensen, T., Mortensen E., & Michaelsen, K. (2010). Late introduction of complementary feeding, rather than duration of breastfeeding, may protect against adult overweight. *American Journal of Clinical Nutrition, 91,* 619-627.

Schmied, V., Sheehan, A., & Barclay, L. (2001). Contemporary breast-feeding policy and practice: implications for midwives. *Midwifery, 17,* 44-54.

Scientific Advisory Committee on Nutrition. (2008). *Infant feeding survey 2005: A commentary on infant feeding practices in the UK.* London, United Kingdom: The Stationery Office.

Scott, J., & Binns, C. (1999). Factors associated with the initiation and duration of breastfeeding: a review of the literature. *Breastfeeding Review, 7,* 5-16.

Scottish Intercollegiate Guidelines Network. (2003). *Management of obesity in children and young people.* Edinburgh, United Kingdom: Scottish Intercollegiate Guidelines Network.

Seach, K., Dharmage, S., Lowe, A., & Dixon, J. (2010). Delayed introduction of solid feeding reduces child overweight and obesity at 10 years. *International Journal of Obesity, 34,* 1475-1479.

Seaman, C., D'Alessandro, S., & Swannie, M. (1996). Choice of weaning foods. *British Food Journal, 98,* 13-16.

Shakespeare, J., Blake, F., Garcia, J. (2004). Breast-feeding difficulties experienced by women taking part in a qualitative interview study of postnatal depression. *Midwifery, 20,* 251-260.

Sheehan, A., Schmied, V., & Barclay, L. (2010). Complex decisions: theorizing infant feeding decisions in the first 6 weeks after birth. *Journal of Advanced Nursing, 66,* 371-380.

Sherburne Hawkins, S., & Law, C. (2006). A review of risk factors for overweight in preschool children: a policy perspective. *International Journal of Pediatric Obesity, 1,* 195-209.

Shribman, S., & Billingham, K. (2009). *Healthy Child Programme. Pregnancy and the first five years of life.* London, United Kingdom: Department of Health.

Shuster, E. (1997). Fifty years later: the significance of the Nuremberg Code. *New England Journal of Medicine, 337,* 1436-1440.

Silverman, D. (2001). *Interpreting qualitative data. Methods for analysing talk, text and interaction.* (2nd ed.). London, United Kingdom: Sage.

Simmer, K., & Askie, L. (2009). Preterm formula milk versus term formula milk for feeding preterm or low birth weight infants. *The Cochrane Database of Systemic Reviews,* 2, art. No.: CD004204. doi: 10.1002/14651858.CD004204

Simondon, K., & Simondon, F. (1995). Infant feeding and nutritional status: the dilemma of mothers in rural Senegal. *European Journal of Clinical Nutrition, 49,* 179-188.

Singh, K. (2007). *Quantitative social research methods.* New Delhi, India: Sage.

Singh, P., Sachdev, H., Nagpal, J., Bajaj, M., & Dubey, A. (2005). Short term effect of complimentary feeding frequency on total ad-libitum consumption in 6-10 month old breast fed Indian infants. *Journal of Pediatric Gastroenterology and Nutrition, 41,* 422-425.

Singhal, A., & Lanigan, J. (2007). Breastfeeding, early growth and later obesity. *Obesity Reviews, 8 (supplement 1),* 51-54.

Singhal A., & Lucas, A. (2004). Early origins of cardiovascular disease. Is there a unifying hypothesis? *Lancet, 363,* 1642-1645.

Sloan, S., Gildea, A., Stewart, M., Sneddon, H., & Iwaniec, D. (2008). Early weaning is related to weight and rate of weight gain in infancy. *Child: Care, Health and Development, 34,* 59-64.

Spruijt-Metz, D., Lindquist, C., Birch, L., Fisher J., & Goran, M. (2002). Relation between mothers' child-feeding practices and children's adiposity. *American Journal of Clinical Nutrition, 75,* 581-586.

Stamatakis, E., Primatesta, P., Chinn, S., Rona, R., & Falascheti, E. (2005). Overweight and obesity trends from 1974 to 2003 in English children: what is the role of socioeconomic factors? *Archives of Disease in Childhood, 90,* 999-1004.

Stamatakis, E., Wardle, J., & Cole, T. (2010). Childhood obesity and overweight prevalence trends in England: evidence for growing socioeconomic disparities. *International Journal of Obesity, 34,* 41-47.

Stanek, K., Abbott, D., & Cramer, S. (1990). Diet quality and the eating environment of preschool children. *Journal of American Dietetic Association, 90,* 1582-1584.

Stenhouse, E., Wright, D., Hattersley, A., & Millward, B. (2004). Weight differences in Plymouth toddlers compared to the British growth reference population. *Archives of Disease in Childhood, 89,* 843-844.

Stettler, N., Stallings, V., Troxel, A., Zhao, J., Schinnar, R., Nelson, S., Ziegler, E., & Strom, B. (2005). Weight gain in the first week of life and overweight in adulthood. *Circulation, 111,* 1897-1903.

Stettler, N., Zemel, B.S., Kumanyika, S., & Stallings, V.A. (2002). Infant weight gain and childhood overweight status in a multicenter cohort study. *Pediatrics, 109,* 194-199.

Stewart-Knox, B., Gardiner, K., & Wright, M. (2003). What is the problem with breastfeeding? A qualitative analysis of infant feeding perceptions. *Journal of Human Nutrition and Dietetics, 16,* 265-273.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: grounded theory procedures and techniques.* (2nd ed.). Thousand Oaks, California: Sage.

Synnott, K., Bogue, J., Edwards, C.A., Scott, J.A., Higgins, S., Norin, E., Frias, D., Amarri, S., & Adam, R. (2007). Parental perceptions of feeding practices in five European countries: an exploratory study. *European Journal of Clinical Nutrition, 61,* 946-956.

Tanner J., & Buckler, J. (1997). Revision and update of Tanner-Whitehouse clinical longitudinal charts for height and weight. *European Journal of Paediatrics, 156,* 248-249.

Tarrant, R.C., Younger, K.M., Sheridan-Pereira, M., White, M.J., & Kearney. J.M. (2010). Factors associated with weaning practices in term infants: a

prospective observational study in Ireland. *British Journal of Nutrition, 104,* 1544-1554.

The NHS Information Centre, IFF Research. (2011). Infant Feeding Survey 2010: Early results. London, United Kingdom: The Health and Social Care Information Centre.

The NHS Information Centre, Lifestyle Statistics. (2009). *National Child Measurement Programme: England, 2008/09 school year.* London, United Kingdom: The Health and Social Care Information Centre.

The NHS Information Centre, Lifestyle Statistics. (2011). *National Child Measurement Programme: England, 2010/11 school year.* London, United Kingdom: The Health and Social Care Information Centre.

Thomson, R., Plumridge, L., & Holland, J. (2003). Longitudinal qualitative research: a developing methodology. *International Journal of Social Research Methodology, 6*, 185-187.

Townsend, E., & Pitchford, N. (2012). Baby knows best? The impact of weaning style on food preferences and body mass index in early childhood in a case-controlled sample. *BMJ Open,* 2:e000298. doi:10.1136/bmjopen-2011-000298

University of Chester. (2011). *Research Governance Handbook.* Chester, United Kingdom: University of Chester.

Ventura, A.K., & Birch, L.L. (2008). Does parenting affect children's eating and weight status? *International Journal of Behavioral Nutrition and Physical Activity, 5,* 1-12.

Wake, M., Salmon, L., Waters, E., Wright, M., & Hesketh, K. (2002). Parent-reported health status of overweight and obese Australian primary school children: a cross-sectional population survey. *International Journal of Obesity and Related Metabolic Disorders, 26,* 717-724.

Wald, E., Ewing, L., Cluss, P., Goldstrohm, S., Cipriani, L., Colborn, D., & Weissfeld, L. (2007). Parental perception of children's weight in a paediatric primary care setting. *Child: Care, Health and Development, 33,* 738-743.

Walker, R., Conn, J., Davies, M., & Moore, V. (2006). Mothers' views on feeding infants around the time of weaning. *Public Health Nutrition, 9,* 707-713.

Walker, R., Hoggart, L., & Hamilton, G. (2008). Random assignment and informed consent: a case study of multiple perspectives. *American Journal of Evaluation, 29,* 156-174.

Wallace, L.M., & Kosmala-Anderson, J. (2007). Training needs survey of midwives, health visitors and voluntary sector breastfeeding support staff in England. *Maternal and Child Nutrition, 3,* 25-39.

Wang, Y., & Lobstein, T. (2006). Worldwide trends in childhood overweight and obesity. *International Journal of Pediatric Obesity, 1,* 11-25.

Ward Platt, M.P. (2009). Demand weaning: infants' answers to professional dilemmas. *Archives of Disease in Childhood, 94,* 79-80.

Wardle, J., Henning Brodersen, N., Cole, T., Jarvis, M., & Boniface, D. (2006). Development of adiposity in adolescence: five year longitudinal study of an ethnically and socioeconomically diverse sample of young people in Britain. *British Medical Journal, 322,* 1130-1135.

Weaver, L.Y. (2007). Meeting an unmet need: healthcare professionals and toddler nutrition and feeding. *Nutrition Bulletin, 32,* 65-68.

Wen, X., & Hui, S. (2010). Chinese parents' perceptions of their children's weights and their relationship to parenting behaviours. *Child: Care, Health and Development, 37,* 343-351.

Whitaker, R. (2004). Predicting pre-schooler obesity at birth: the role of maternal obesity in early pregnancy. *Pediatrics, 114,* e29-e36.

White, J.M. (2009). Weaning: what influences the timing? *Community Practitioner, 82*, 34-37.

Wilkin, T. (2009, May). *Childhood obesity starts early. The EarlyBird study.* Paper presented at the Champs Public Health Network Healthy lives for under fives conference, Liverpool, United Kingdom.

Williams, A., & Pinnington, L. (2003). Nurses' knowledge of current guidelines for infant feeding and weaning. *Journal of Human Nutrition and Dietetics, 16,* 73-80.

Williams, J., Wake, M., Hesketh, K., Maher, E., & Waters, E. (2005). Health-related quality of life of overweight and obese children. *Journal of the American medical Association, 293,* 70-76.

Wilson, A., Forsyth, J., Greene, S., Irvine L., & Hau, C., Howie, P. (1998). Relation of infant diet to childhood health: seven year follow up of cohort of children in Dundee infant feeding study. *British Medical Journal, 316,* 21-5.

Woolford, S., Clark, S., Lumeng, J., Williams, D., & Davis, M. (2007). Maternal perspectives on growth and nutrition counselling provided at preschool well-child visits. *Journal of the National Medical Association, 99,* 153-158.

World Health Organisation. (1995). *Physical status: the use and status of anthropometry.* Geneva, Switzerland: World Health Organisation.

World Health Organisation. (2001). *The optimal duration of exclusive breastfeeding: report on an expert consultation.* Geneva, Switzerland: World Health Organisation.

World Health Organisation/NUT/98. (1998). *1. Complementary feeding of young children in developing countries: a review of current scientific knowledge.* Geneva, Switzerland: World Health Organisation.

World Health Organisation/UNICEF. (2002). *Global strategy for infant and young child feeding.* Geneva, Switzerland: World Health Organisation.

World Medical Association Declaration of Helsinki. (2000). *Ethical principles for medical research involving human subjects.*

Wright, C., Booth, I., Buckler, J., Cameron, N., Cole, T., Healy, M., Hulse, J., Preece, M., Reilly, J., & Williams, A. (2002). Growth reference charts for use in the United Kingdom. *Archives of Disease in Childhood, 86,* 11-14.

Wright, C, Cameron, K., Tsiaka, M., & Parkinson. K.N. (2011). Is baby-led weaning feasible? When do babies first reach out for and eat finger foods? *Maternal and Child Nutrition, 7,* 27-33.

Wright, C., Corbett, S., & Drewett, R. (1996). Sex differences in weight in infancy and the British 1990 growth standards. *British Medical Journal, 313,* 513-514.

Wright, C., Parkinson, K., & Drewett, R. (2004). Why are babies weaned early? Data from a prospective population based cohort study. *Archives of Disease in Childhood, 89,* 813-816.

Wright, C., Parkinson, K., & Drewett, R. (2006). The influence of maternal socioeconomic and emotional factors on infant weight gain and weight faltering (failure to thrive): data from a prospective birth cohort. *Archives of Disease in Childhood, 91,* 312-317.

Wright, C, Parkinson, K., & Scott, J. (2006). Breast-feeding in a UK urban context: who breast-feeds, for how long and does it matter? *Public Health Nutrition, 9,* 686-691.

Yu, Z., Han, S., Zhu, G., Zhu, C., Wang, X., Cao, X., & Guo, X. (2011). Birthweight and subsequent risk of obesity: a systematic review and meta-analysis. *Obesity Reviews, 12,* 525-542.

Appendix 1

Participant information sheet

University of Chester

Participant Information Sheet

A qualitative study exploring the process of weaning

You are being invited to take part in a research study looking at how mums go about weaning their babies, that is, how, as their babies get older, they change from feeding their babies only milk to feeding them the same foods as the rest of the family.

Before you decide whether or not to take part, it would help if you know why this research is being done and what you will be asked to do if you agree to take part. Please read this sheet and discuss it with others if you wish. Ask if there is anything that is not clear or if you would like more information.

Thank you for reading this

What is the research for?

The research is being done because not a lot is known about how mums wean their babies, who they talk to about it and what they think helps or doesn't help them. Finding out about this might help mums in the future and also help people who work with mums and babies to support them better when babies are beginning to eat food.

Who is paying for and carrying out the research?

The University of Chester is paying for the study. The research will be carried out by Catherine Perry, who works at the University, and who is doing the study as part of her doctorate research (PhD).

Why have I been chosen?

You have been chosen because you are going to be having a baby soon.

Do I have to take part?

No. Taking part is voluntary and it is up to you to decide if you want to. Taking part or not taking part will make no difference to your care before or after your baby is born in any way. If you decide to take part you are free to change your mind at any time without giving a reason and withdraw from the study.

What will happen to me if I take part?

If you decide you might be interested in taking part, you should keep this information sheet, and let the researcher have your telephone number or address by filling in the attached form. She will contact you in about a week to see if you are still happy to take part. If you are, then she will arrange to come and talk to you about what you think about feeding your baby. This interview could be at your house or at the clinic or Children's Centre, whatever would suit you the best. The interview will last about an hour and with your permission would be audiotaped. After that, the researcher would like to come and see you again when your baby is 3 months old, 6 months old and 9 months old.

She will ring you up to arrange these visits and again they could be at your house, at the clinic or Children's Centre, whichever you prefer. This is to find out about how your baby gets on with milk feeding and weaning and how you manage the change.

What are the possible disadvantages and risks of taking part?
Each interview will take about an hour of your time. Apart from this we do not think that there are any disadvantages or risks in taking part in the study.

What are the possible benefits of taking part?
There are no direct benefits in taking part in the study. However, you might like the chance to talk about what you think about feeding your baby, and by sharing your views and experiences it may help other mums in the future when they are starting to feed their babies food other than milk.

Will my taking part in this study be kept confidential?
Yes. Taking part is strictly confidential and no names or details that could identify you would ever be used in any written or verbal report of the study. No information will be passed to any other parties. The only time that the researcher might need to talk to somebody else would be if your baby was being harmed in any way.

What will happen to the results of the research study?
A written report of the research will be produced for the researcher's PhD as she is doing the work as part of an academic study. You can be sent a summary of this report if you would like one. Parts of it might also be written up to be published in journals. As already explained, nobody who takes part in the study will be identifiable in any report from the study.

What if something goes wrong?
If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Professor Sarah Andrew, Dean of the School of Applied and Health Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, 01244 513055.

Who may I contact for further information?

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact Catherine Perry on 01244 512029 or write to Catherine at the Centre for Public Health Research, University of Chester, Parkgate Road, Chester, CH1 4BJ. Or, you can also email Catherine at c.perry@chester.ac.uk

Thank you very much for thinking about taking part in this study

A qualitative study exploring the process of weaning

The research study about weaning babies has been explained to me and I am happy for the researcher, Catherine Perry, to contact me in about a week to see if I would be willing to take part.

My name is:

The best way to contact me is

Telephone number ☎

Address

Thank you very much for thinking about taking part in this study

Appendix 2

Consent form

INTERVIEW CONSENT FORM

Title of project: A qualitative study exploring the process of weaning

Name of Researcher: Catherine Perry

Please tick each box if you agree with the statement

1. I have had and understand the information sheet about the research and have had the chance to ask questions. ☐

2. I understand that the interview will be audio recorded on a digital recorder. ☐

3. I agree to the researcher using direct quotes from the interview, as long as the quotes do not identify me. ☐

4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐

5. I agree to take part in the weaning research. ☐

| --- | --- | --- |
| Name of Participant | Signature | Date |

| --- | --- | --- |
| Name of Interviewer | Signature | Date |

One copy to be taken by the participant and one by the interviewer

Appendix 3

Interview schedules

A qualitative study exploring the process of weaning

Interview schedule

Antenatal

Please note that this schedule is to serve as a guideline to the various areas that are to be covered in the interview. Responses given by women to the questions will be followed up, and the interview schedule will be kept under review as the interviews progress in order to incorporate any other areas that may be useful to the study.

1 General

Can you tell me a bit about your pregnancy?

Is this your first baby, how many other children do you have?
When is your baby due?
Do you know if you have a girl or a boy?
Have you thought about names?
Have you been well during this pregnancy (go on to explore weight and weight gain in pregnancy)?

Can you just tell me a little bit about yourself, as background information?

Do you live in Runcorn/Widnes?
Have you lived here for long?
Do you have family nearby?
Are you working at the moment or have you been working while you have been pregnant?
Are you intending to go back to work after your baby has been born? Do you know when this might be?

Can you tell me about the antenatal care that you have been having?

How often have you come to the clinic?
What sort of information and support has been given to you at clinic visits?
Have you been given any information about weaning at clinic visits?
Have you seen anybody between clinic visits? Have they given you information about weaning?
Have you been going to antenatal classes?
What kind of things have you done at antenatal classes?
Did you get any information about weaning at antenatal classes?
Is there any other information or support that you think you might have found useful?

2 Feeding intentions

Have you thought very much about how you will feed your baby once she/he is born?

Are you going to breast feed or bottle feed?
How have you come to this decision?
Has anybody particularly influenced you in this decision (friends, family, partner, midwife, doctor, other health professional)?

Previous history of breast feeding or bottle feeding?

Have you thought about how, when your baby is older, you will wean her/him?

When did you begin to think about this?
What have you thought about it?
Have you got any strong thoughts or views about how you will do this?
What do you know about weaning?
Where have you got your information about weaning from?
Have you been given any information about weaning during this pregnancy (link back to previous questions about antenatal care)?
Have you talked to anybody about it (family, partner, friends, midwife, doctor, other health professional)?
Would you like more information about weaning at this stage?
Has anybody particularly influenced what you think?

3 Previous experience

Have you any previous experience of weaning a baby (older children, siblings, other relatives, friends' babies)?

If experience with an older child:

What has this experience made you think about weaning?
How did it go?
How old was your baby when you started to wean?
How did you decide to start?
How did you know that the time was right?
Did anybody or anything particularly influence your decision to start weaning?
How did you start to wean (e.g. what foods, what impact did it have on your daily routine, any particular difficulties)?
How did you progress with weaning (e.g. how did you move on to new foods, what kind of foods did you give, did your baby like trying new foods)?
What did you use to guide you (e.g. books, leaflets, advice from health visitor, advice from family or friends, advice from partner, own judgement)?
Was anybody particularly helpful to you when you were weaning?
Would you do things the same again or are there things you would do differently?
Was there anything that really helped you?
Was there anything that made it more difficult for you?

If experience with a sibling/other relative/friends' babies, ask questions above as appropriate.

4 Concluding comments

Is there anything else that you would like to say about your plans to feed your baby?

Is it something that you think it is important to think about?
Do you think that you need more help, information or advice?

A qualitative study exploring the process of weaning

Interview schedule

3 months/6 months/9 months

Please note that this schedule is to serve as a guideline to the various areas that are to be covered in the interview. Responses given by women to the questions will be followed up, and the interview schedule will be kept under review as the interviews progress in order to incorporate any other areas that may be useful to the study.

1 General

Can you tell me a bit about your baby and how you are both getting on?

How old is she/he now?
Was she/he born early/on time/late?
What weight was she/he when she/he was born?
How is she/he generally? Has she/he been well?
How is she/he feeding in general?
How is she/he sleeping?
How has she/he fitted in to your family and life (what do siblings make of her/him)?
What is the pattern of your day together?
How is everything going for you?
Are you still planning to go back to work/have you gone back to work (as appropriate)? Who looks after her/him while you are working?

2 Growth and development

Can you tell me about how your baby has developed and changed since she/he was born?

What kind of things is she/he doing now (looking around, grasping things, smiling etc)?
What are her/his sleeping patterns like? Has this changed?
Do you know what weight she/he is now? (If mother does not know, ask if it might be possible to weigh the baby).
Do you know how her/his weight has been going since she/he was born (has she/he put weight on quickly or slowly? Steadily? Gone up and down)?
Have you been happy with her/his weight gain? Why?
Would you say she/he is generally well?
How do you know when she/he is healthy or when she/he is unwell?
How do you know that your baby is making good progress (sleeping well, feeding well, putting on weight, being alert, being 'happy')?

3 Feeding experience

Can you tell me about how you have got along with milk feeding your baby?

How have you been feeding your baby milk? Have you been bottle feeding or breast feeding?
How did you decide whether to bottle or breast feed? Did you change your mind, did you have different ideas after your baby was born?
If bottle feeding, did you breast feed at all? For how long? What made you decide to stop? Did anybody or anything influence you particularly in this decision?
How has the baby's feeding pattern fitted in with the rest of your life/family?

Have you enjoyed feeding her/him?
Role of father in milk feeding.

Has your baby had any fluids other than milk?

What has she/he had?
How old was she/he when you first gave this to her/him?
Who or what influenced your decision to do this?
Did you use anything to guide you (e.g. books, leaflets, advice from health visitor, advice from family, partner or friends, other people's advice, own judgement)?
Was any advice that was given to you easy to understand?
Was any advice that was given to you easy to follow?
Was there any advice that you were given that you ignored? Why was this?
How often does she/he have this to drink?
Has giving your baby this to drink had any particular effects that you have noticed on her/him, as far as you can say (settles down, cries less, drinks more/less milk)? Why do you say that?

Has your baby had any food other than milk feeds, have you started to wean her/him?

*** If the answer is yes**

Can you tell me how you started to wean him/her?
What food did you give first (e.g. baby rice, rusks, prepared baby food, home cooked food, finger food)?
How did you offer the food (e.g. puree from spoon, in bottle, finger foods)?
How old was she/he when you first gave this to her/him?
How did you know that the time was right (e.g. guided by age, physiological development, behaviour, peers)?
Who or what influenced your decision to start weaning?
How did you decide what foods to give her/him?
Did you use anything to guide you (e.g. books, leaflets, advice from health visitor, advice from family, partner or friends, other people's advice, own judgement)?
Was any advice that was given to you easy to understand?
Was any advice that was given to you easy to follow?
Was there any advice that you were given that you ignored? Why was this?

What has starting to wean her/him been like? (Interested here in both the practice of weaning and the experience of doing it)

What foods has she/he had so far e.g. baby rice, rusks, prepared baby food, home cooked food)?
How did you decide what foods to give her/him?
How often does she have food other than milk? What times of day? How much?
How often does she/he have milk feeds?
How is she/he doing with weaning? Does she/he seem to enjoy it? Why do you say that?
How has it gone? Are you enjoying feeding her/him?
Has the process of weaning been as you expected?
How does feeding her/him fit in with your daily routine? Does she/he eat at the same time as other family members?
Do you ever eat away from home? How do you manage that with the baby?
How has she/he responded to the changes that you have started to introduce? Why do you say that?

Has starting to wean your baby had any particular impact on your life and your family life (made things easier/more difficult)? Why do you say that?
Have you changed what you think about weaning since before your baby was born? In what ways?
Role of father in weaning?

(If baby had commenced weaning at previous interview) How are you progressing with weaning now?

What foods has she/he had so far (e.g. baby rice, rusks, prepared baby food, home cooked food)?
Have you given her different/more types of food since we last talked?
How did you introduce new foods?
Did you use anything to guide you (e.g. books, leaflets, advice from health visitor, advice from family, partner or friends, other people's advice, own judgement)?
Was any advice that was given to you easy to understand?
Was any advice that was given to you easy to follow?
How often does she have food other than milk? What times of day? How much?
How often does she/he have milk feeds?
How is she/he doing with weaning? Does she/he seem to enjoy it? Why do you say that?
Are you enjoying feeding her/him?
Has the process of weaning been as you expected?
How does feeding her/him fit in with your daily routine? Does she/he eat at the same time as other family members?
Do you ever eat away from home? How do you manage that with the baby?
Has continuing to wean your baby had any particular effects on her/him? How has she/he responded to the changes you have introduced? Why do you say that?
Has continuing to wean your baby had any particular impact on your life and your family life (made things easier/more difficult)? Why do you say that?
Have you changed what you think about weaning since you started to do it? In what ways?

Have you had any particular problems with weaning?

How have you found deciding what to feed her/him?
Would you describe your baby as a fussy eater?
Does she/he seem to be intolerant to any particular foods?
What about the cost of food for your baby?
Do you ever eat away from home? Is this a problem with the baby?
How has weaning your baby fitted in with your daily life?

*** If the answer is no**

Is she/he satisfied at the moment with milk feeds?
Have you thought about weaning or do you have a plan about when you are going to start weaning your baby?
Is the decision not to begin weaning a conscious one or has it just not happened?
If a conscious decision, what has this been based on?
How will you decide when to do it?
How do you feel about the idea (looking forward to it, worried, it will make things easier)?
Has anybody (partner, family, friends) talked to you about weaning your baby?

4 Knowledge about weaning

Do you think that you know very much about weaning?

As much as you need to? As much as anybody else? Not really?

Where have you got most of your knowledge about weaning from?

Pick up on answers given to previous questions about sources of advice.
Have you relied/will you rely on your own knowledge whilst weaning your baby or have you gone/will you go to other people/sources?
Possible sources may be books, leaflets, health visitor, other health professionals, family, partner, friends, other people? Other sources?
Has any information or advice that has been given to you been easy to understand?
Are you aware of any official guidelines about weaning? If so have you followed them? If you have followed them, why? If you have not followed them, why?
Have you looked at weaning baby foods sold in the shops? Have you bought any of these? What do you think about the labelling (easy to understand, confusing)?
Have you ever been given free samples of baby weaning foods?

Are there any other places or people from whom you think it would be useful to be able to obtain advice about weaning?

5 Feeding intentions

What are your next aims or goals to progress your baby's feeding?

Introduction of new foods?
Fitting her/his meals in with family mealtimes?
Are you using anything to guide you (e.g. books, leaflets, advice from health visitor, advice from family, partner or friends, other people's advice, own judgement)?

6 Reflection on experience so far

Looking back, how do you feel weaning (or milk feeding) your baby has gone so far?

What have you achieved?
What has gone well?
What has not gone so well?
Have you done things differently to the way that you imagined? Why was this?
Would you do anything differently another time?
Is there anything that you wish you had known when you started?
Is there anything that could have been improved or could have been different to make it easier for you?
How has the whole business of weaning your baby affected your life in general?
Is there any particular advice that you would give to a new Mum, based on your experience of feeding your baby so far?

7 Concluding comments

Is there anything else that you would like to add about your experience of weaning your baby on to food so far?

Appendix 4

Ethical approval (phase one study)

Cathy Perry
Centre for Public Health Research
University of Chester

30 May 2007

Dear Cathy

Study title: **Childhood overweight and obesity in Halton**
SREC reference: **129/07/CP/CPHR**
Version number: **1**

Thank you for sending the above-named application to the School of Applied and Health Sciences Research Ethics Committee for review.

The application has been considered on behalf of the Committee by Katie Liston as Lead Reviewer and reported to the School Research Ethics Committee.

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation.

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	1	March 2007
Letter giving approval from NHS R&D Dept.	1	May 2007
Correspondence from database managers	1	2007

With the Committee's best wishes for the success of this project.

Yours sincerely,

Stephen Fallows
Chair, School Research Ethics Committee

Enclosures *Standard conditions of approval.*

c.c. Supervisor
SREC Representative

Appendix 5

Permission from Halton Primary Care Trust (phase one study)

Halton & St Helens NHS
Primary Care Trust

Catherine Perry
Centre for Public Health Research
University of Chester
Parkgate Road
Chester
CH1 4BJ

Research & Development Dept
Suite 2 Unit 1H
Midwood House
Midwood Street
Widnes
Cheshire
WA8 6BH
Tel: 0151 420 4036

Date: 18.05.07

RE: "Exploring Patterns of Childhood overweight and obesity in Halton"

Dear Cathy

I write to confirm that the R&D Department has received the necessary documentation for the above study. The project has been submitted to the Research & Effectiveness Group (REG) and has been registered on our database.

I am pleased to inform you that your project has been approved by the PCT. I acknowledge the correspondence from Rob Emmett, Cheshire REC, who advised that this study would not require NHS ethics review.

It is imperative that you inform the PCT should any adverse events occur when carrying out the research. Should this arise, please contact myself immediately.

PCT approval is given on the understanding that the research will be disseminated via a presentation to the REG. Please therefore let us know when the research is complete and we will arrange a date. We also expect an executive summary of your main findings within 3 months of completion of the research (please contact us for guidance on the summary). The aim of this is to celebrate your research and discuss any practical implications for service delivery.

I wish you every success in your research. If you require any further information or assistance please do not hesitate to contact me.

Yours sincerely

KPine

Kirsty Pine
Research Officer

Appendix 6

Permission from Data Manager (phase one study)

Catherine Perry - RE: RE: child health database[Scanned]

From: "Kieran Colton"
To: "Catherine Perry"
Date: 28/06/2007 08:46
Subject: RE: RE: child health database[Scanned]

Hi Cathy

Thanks for that, I have not seen the document before. However having looked at it this morning it would appear you are fine. It is your intention to keep a data on a secure password controlled server and also the data will be stripped of all identifiable info then you should be fine.

Hope this helps.

Kieran

From: Catherine Perry [mailto:c.perry@chester.ac.uk]
Sent: 27 June 2007 09:26
To: Kieran Colton
Subject: Fwd: RE: child health database[Scanned]

Dear Kieran,

Apologies if you have already received the message below, I don't want to appear to be hounding you! The university email system suffered a rather huge problem a couple of weeks ago, just after I sent the email, and we had no email for nearly a week. I was just concerned that although my message to you appeared to have been sent it may not have actually gone as I have found that this happened to a couple of other messages.

So, I would be very grateful if you could have a look at the attached document and let me know if it is okay to go ahead from your perspective.

Thanks

Regards
Cathy

Catherine Perry
Senior Researcher/Deputy Director
Centre for Public Health Research
University of Chester
Parkgate Road
Chester
CH1 4BJ

01244 512029 (direct line)

>>> Catherine Perry 11/06/2007 16:35 >>>

Dear Kieran,

As we have briefly discussed via email, please find attached a document with some details about the data that I am requesting access to. I have had confirmation from the LREC that I do not need NHS ethical approval to carry out this work, I have got ethical approval from a University Ethics Committee (as all our work has to receive ethical approval from somewhere) and I have approval for the work from Halton and St Helens PCT Research and Effectiveness Group. I can of course supply you with copies of the relevant approval documents if you need those for your records. I have spoken to both of the data managers who have said that as long as I have the relevant permissions they are happy to supply the data. I have an honorary contract with the PCT myself.

I am not sure exactly what I need to tell you so please do contact me if you need more information than is supplied in the attached document. Also, if there are other measures that I can take to ensure the security of the data then please let me know as obviously I don't want to do anything that I shouldn't or to fall foul of data protection laws.

Thanks for your help.

Regards
Cathy

Catherine Perry
Senior Researcher/Deputy Director
Centre for Public Health Research
University of Chester
Parkgate Road
Chester
CH1 4BJ

01244 512029 (direct line)

>>> "Kieran Colton" <kieran.Colton@hsthpct.nhs.uk> 29/05/2007 08:29 >>>

Hi Catherine

The good news is that I am the right person, however the bad news is I will need to know in writing the details of the data being collected, how it will be used, where it will be stored (i.e. Lap Top, Server etc) and what security is in place to protect the data.

Any problems let me know.

Kind regards

Kieran

Kieran Colton

Records, Data Protection and Information Governance Manager

01744 626675

From: Catherine Perry [mailto:c.perry@chester.ac.uk]
Sent: 25 May 2007 16:40
To: Kieran Colton
Subject: child health database[Scanned]

Dear Kieran,

Re: Exploring patterns of childhood overweight and obesity in Halton

I have recently had the above work approved by the REG at the meeting of 23rd April at which I know you were present. I am wanting to access data held on the child health database managed by Ian Hart at Western Cheshire. Ian has said that he will also need confirmation from the Information Governance Manager at Halton and St. Helens PCT that it is okay to release the data, but he is not sure who that person is. Is that you? If so, would you be able to give permission based on what you know from the REG? Or do you need me to write to you with information specifically. Or if you are not the right person do you know who is?

I hope that makes sense! Thank you for any help.

Regards
Catherine

Catherine Perry
Senior Researcher/Deputy Director
Centre for Public Health Research
University of Chester
Parkgate Road
Chester
CH1 4BJ

01244 512029 (direct line)

Appendix 7

Ethical approval (phase two study)

National Research Ethics Service

North West 3 Research Ethics Committee – Liverpool East
North West REC Centre
Barlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

Telephone: 0161 6257835

16 November 2010

Ms Catherine Perry
Senior Lecturer
University of Chester
Centre for Public Health Research
Parkgate Road, Chester
CH14BJ

Dear Ms Perry

Study Title: **Exploring patterns of weight, overweight and obesity in Halton children: a longitudinal qualitative study exploring the process of weaning**

REC reference number: **10/H1002/65**

Thank you for your letter of 08 November 2010, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisation(s) involved in the study in accordance with NHS research governance arrangements. Guidance on applying for NHS permission for research is available in the Integrated Research Application System (IRAS) or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Investigator CV	Supervisor	
Investigator CV	CI/Student	
Protocol	2	05 November 2010
Letter of support from Head of Midwifery and pre school services manager		02 August 2010
REC application	54934/153377/1/714	04 October 2010
Covering Letter		28 August 2010
Letter from Sponsor		09 September 2010
Interview Schedules/Topic Guides - Antenatal	1	22 July 2010
Interview Schedules/Topic Guides - 3 month/6 month/9 month	1	22 July 2010
Advertisement - Flyer	1	22 July 2010
Participant Information Sheet	2	05 November 2010
Response to Request for Further Information		08 November 2010
Participant Consent Form	1	22 July 2010
List of references		
Evidence of insurance or indemnity		01 August 2010
Referees or other scientific critique report		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/H1002/65	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

pp R Bell

Mrs Jean Harkin
Chair

Email: rinat.jibli@northwest.nhs.uk

Enclosures: "After ethical review – guidance for researchers"

Copy to:

Prof Miranda Thurston
Centre for Public Health Research
University of Chester
Parkgate Road, Chester
CH14BJ

Dr Mark Helsdon
Research and Knowledge Transfer
Office, University of Chester,
Parkgate Road, Chester
CH1 4BJ

Ms Kirsty Pine
Halton and St Helens PCT
Suite 2, Unit 1H, Midwood House
Gerrard Street
Widnes, WA86BF

Appendix 8

Ethical approval amendment (phase two study)

NHS
National Research Ethics Service

North West 3 Research Ethics Committee – Liverpool East
North West REC Centre
Barlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

Tel: 0161 625 7373

23 February 2011

Ms Catherine Perry
Senior Lecturer
University of Chester
Centre for Public Health Research
University of Chester
Parkgate Road, Chester
CH14BJ

Dear Ms Perry

Study title:	**Exploring patterns of weight, overweight and obesity in Halton children: a longitudinal qualitative study exploring the process of weaning**
REC reference:	**10/H1002/65**
Amendment number:	**Amendment Number 1 – Minor**
Amendment date:	**10 February 2011**

Thank you for your letter of 10 February 2011, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	Version	Date
Notification of a Minor Amendment: - - Recruit women who are attending antenatal classes. - To interview women when their babies are slightly younger.	Amendment Number 1 - Minor	10 February 2011

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

10/H1002/65:	**Please quote this number on all correspondence**

Yours sincerely

Miss Charlene Mike
Assistant Committee Co-ordinator

E-mail: charlene.mike@northwest.nhs.uk

Copy to:

Dr Mark Helsden
Senior Assistant Registrar
University of Chester
Parkgate Road
Chester
CH1 4BJ

Kirsty Pine
NHS Halton and St Helens
R & D Department
Suite 1, Unit 1H
Midwood House
Midwood Street
Widnes
WA8 6BH

Appendix 9

Permission from Halton & St Helens Primary Care Trust (phase two study)

NHS
Halton and St Helens

Research and Development Department
Suite 1 Unit 1H
Midwood House
Midwood Street
Widnes
Cheshire
WA8 6BH
Tel: 0151 495 5480

Mrs Catherine Perry
Centre for Public Health Research
University for Chester
Chester
CH1 4BJ

Human Resources Directorate

Date: 30 November 2010

Dear Mrs Perry

Letter of access for research study entitled 'Exploring patterns of weight, overweight and obesity in Halton children: longitudinal qualitative study exploring the process of weaning'

This letter confirms your right of access to conduct research through NHS Halton and St Helens for the purpose and on the terms and conditions set out below. This right of access commences on 30 November 2010 and ends on 30 June 2012 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.

The information supplied about your role in research at NHS Halton and St Helens has been reviewed and you do not require an honorary research contract with this NHS organisation. We are satisfied that such pre-engagement checks as we consider necessary have been carried out.

You are considered to be a legal visitor to NHS Halton and St Helens premises. You are not entitled to any form of payment or access to other benefits provided by this NHS organisation to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through NHS Halton and St Helens, you will remain accountable to your employer University of Chester but you are required to follow the reasonable instructions of Kirsty Pine in this NHS organisation or those given on her/his behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with NHS Halton and St Helens policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with NHS Halton and St Helens in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on NHS Halton and St Helens premises. You must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of any other contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

NHS Halton and St Helens will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

If your current role or involvement in research changes, or any of the information provided in your Research Passport changes, you must inform your employer through their normal procedures. You must also inform your nominated manager in this NHS organisation.

Yours sincerely

Kirsty Pine

Kirsty Pine on behalf of
Director of Human Resources, NHS Halton and St Helens

cc: R&D office at NHS Halton and St Helens
HR department at NHS Halton and St Helens
HR department of the substantive employer

Appendix 10

Coding framework

Descriptive heading	Analytic category	Dimensions of meaning
Accounting for milk feeding intentions	Pressure to breastfeed	• Direct pressure • Indirect pressure • Resistance to breastfeeding
	What mother nature intended	• Natural so will do it • Natural but does not appeal • Best for baby
	Breastfeeding as being difficult	• Cannot be accomplished easily by everyone • Doubt about being able to do it physically • Doubt about being prepared to do it
	Being or doing what is normal	• Individual level – how mother was fed • Individual level – mother's feeding experience • Wider social norms
	Involving fathers	• Bottle feeding to involve fathers • Expressing to involve fathers • Fathers can be involved in other things
	Regaining life	
Experiences of milk feeding	Adapting to changing circumstances	• Health of mother • Family circumstances
	Fulfilling the maternal role	• Giving up breastfeeding • Breastfeeding for a number of months

Descriptive heading	Analytic category	Dimensions of meaning
Moving on to weaning	Just get on with it	• Doing what I did before • Common sense • Trial and error
	What other mothers do	• Family and friends • Health professionals • Internet forums
	Working with the guidelines	• Will follow • Will not follow • Confusing • For breastfed babies
	Following the lead of the baby	• Babies as individuals • Behaviour of baby • Physical development of baby • Health and well-being of baby • Experience of first solid food • Baby signalling hunger • Baby had enough
	Providing adequate nutrition	• Getting enough milk • Getting enough food • Fussy eater
	Weaning healthily	• Good intentions • Making own food • Time pressures • Commercial food convenient • Commercial food as healthy
	Harming the baby	• Choking • Allergies

Descriptive heading	Analytic category	Dimensions of meaning
	Fitting in with family life	• Trade offs • Establishing family mealtimes • Family changing to suit baby
	Handing over the reins	• No worries/unconcerned • Impressed with nurseries
Interaction with health professionals	Mode of support	• More proactive • More directive
	Towing the party line	• Breastfeeding • Age at weaning • Dismissing advice • Not speak to health professionals/on your own
	Conflicting messages	• Different health professionals • Same health professional • Contradicting own experience/knowledge
Growth and development	Valuing weight and weight gain	• Being smaller • Being bigger
	The tyranny of weighing	• Worry if baby not weighed • Worry if baby not put on enough weight • Worry if baby lost weight/crossed centile lines downwards
	Just look at the baby	• Growing out of clothes • Baby happy