Egg consumption in pregnancy and infant diets: How advice is changing

› Abstract

Eggs are a nutrient-dense, relatively inexpensive and convenient food, suitable for consumption by pregnant and breastfeeding women and infants. However, there appears to be some confusion among the public regarding the safety of egg consumption by these groups. Some evidence suggests that delayed introduction of potential food allergens such as eggs during weaning may be counterproductive for allergenic risk, and that introduction of the allergenic protein during a proposed 'critical window', at 4–7 months, may be necessary to induce tolerance. This hypothesis is currently being tested by two major studies, while two expert committees (Scientific Advisory Committee on Nutrition and Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment) are also reviewing evidence on complementary feeding and allergic risk, respectively. This article discusses historic and current advice on egg consumption during pregnancy and breastfeeding and in complementary feeding. It examines the evidence base for the advice in the context of both the microbiological safety of eggs and risks of egg allergy in these groups, presents a new analysis of nationally representative infant feeding data and reviews the latest nutritional composition data for British eggs in the context of the maternal and infant diet. It appears that historic concerns about food safety and allergy may have resulted in unnecessary avoidance of eggs during the introduction of complementary feeding.

Key words

› Nutrition › Diet › Eggs › Food › Pregnancy › Breastfeeding › Weaning › Complementary feeding › Allergy

Advice on egg consumption in pregnancy and infancy has historically been influenced by two key factors: concerns about eggs' potential allergenicity and risks related to potential salmonella contamination.

Government advice to pregnant and breastfeeding women does not recommend avoiding or restricting eggs or other allergenic foods in the maternal diet to reduce the risk of allergic (atopic) disease in their babies, and eggs can be consumed as part of a healthy balanced diet unless the woman herself is allergic to them (NHS Choices, 2012a; 2013a). However, egg proteins are among the most common food allergens in infants and, consequently, advice on the introduction of complementary feeding has emphasised the need for caution in introducing eggs and other potentially allergenic foods such as nuts and fish (NHS Choices, 2013b), particularly for children from atopic families.

More recently, it has been suggested that the avoidance of potentially allergenic foods such as peanuts and eggs in pregnancy, and their delayed introduction to an infant's diet, may actually be counterproductive in relation to the development of food-allergic disease (Lack, 2012). The hypothesis that early introduction of allergens might be beneficial in encouraging immune tolerance is currently being tested by two key studies: LEAP (Learning Early About Peanut Allergy; Du Toit et al, 2013) and EAT (Enquiring About Tolerance; EAT Study, 2010). Government advice concerning the appropriate timing of introduction of complementary feeding and of potentially allergenic foods, such as eggs, is also under review (Scientific Advisory Committee on Nutrition (SACN), 2011; Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), 2012).

In the context of the microbiological safety of eggs, Government advice for pregnant mothers, infants and young children is based on precautionary principles and, since 1988, has suggested that raw or lightly cooked eggs should be avoided because of the risk of salmonella (NHS Choices, 2013a; 2013c). However, since the introduction of the Lion Code of Practice for British eggs, it has been demonstrated that UK laying flocks and eggs are essentially salmonella-free (Food Standards Agency (FSA) 2004; European Food Safety Authority (EFSA) 2006; 2013; Animal Health and Veterinary Laboratories Agency (AHVLA), 2013).

Eggs are a nutrient-dense, relatively low-cost and convenient food, which provide high-quality

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protein, many micronutrients and essential fatty acids. As such, they should constitute a suitable nutritious food for pregnant women, infants and young children. However, despite their nutritional qualities, there is some evidence that consumption of eggs among pregnant women, infants and toddlers is lower than might be expected, and that this may be related to concerns about allergy and microbiological safety.

This article will: discuss historic and current advice on egg consumption during pregnancy and breastfeeding and in complementary feeding; examine the evidence base for the advice in the context of both the microbiological safety of eggs and risks of egg allergy in these groups; present new evidence that suggests that mothers may be avoiding eggs unnecessarily when introducing complementary feeding; and give an overview of the nutritional composition of eggs and their potential benefits in maternal and infant diets.

Egg consumption in pregnancy and complementary feeding

Microbiological safety

Pregnant and breastfeeding women, infants and young children are more vulnerable to food-borne disease than healthy (non-pregnant) adults, and they are advised by the Department of Health (DH) to avoid or be cautious when consuming certain foods (NHS Choices, 2012a; 2013a; 2013c). Because of the potential risk of salmonella food poisoning, and based on the precautionary principle, since 1988 these groups have been advised to avoid raw and partially cooked eggs and to ensure that eggs are thoroughly cooked until the whites and yolks are solid (DH, 1988; NHS Choices, 2012a; 2013a; 2013c).

Improvements in egg safety

Concerns about the microbiological safety of eggs came to the fore in 1988 with the statement from the then Junior Health Minister, Edwina Currie, that most of the UK's egg production was infected with salmonella (Doig, 1989). The escalation in cases of salmonellosis at this time was determined to be due to a new strain—*Salmonella enteritidis* phage type 4 (SE PT4)—which, unlike conventional strains, was shown to be present in the intact egg rather than only contaminating the shells (Humphrey et al, 1989). In fact, most eggs were not affected, with estimates from the Public Health Laboratory Service that only 1% of eggs from known infected flocks carried the organism (Humphrey et al, 1989). However, as a consequence of continuing problems with SE PT4 during the 1990s, the industry embarked on actions to overcome the problem and, in 1998, introduced the British Lion Code of Practice, the cornerstone of which is the vaccination of laying flocks against salmonella (British Egg Industry Council, 2013). The code also ensures that there is registration and traceability throughout the supply chain, strict hygiene and feed controls, the stamping of the Lion Quality mark and 'best before' date on each individual egg, and independent auditing. Around 90% of eggs produced in the UK are now within the scheme. Since the introduction of the code, successive reports have shown that UK laying flocks and eggs are now essentially free of salmonella (FSA, 2004; EFSA, 2006; 2013; AHVLA, 2013) and the British Egg Industry Council now advises that even in vulnerable groups eggs can be consumed normally i.e. without the need to cook fully. It is important, nonetheless, to follow guidelines for handling eggs (*Box 1*).

Box 1. Safe handling and storage of eggs

- Look for the British Lion mark: this guarantees that the eggs have come from hens vaccinated against salmonella
- Check that there is a 'best before' date on the egg
- Store eggs at a constant temperature below 20°C. In most domestic kitchens, the fridge is the best place to keep them
- Wash your hands before and after handling eggs
- Do not use dirty, cracked or broken eggs
- Egg shells are porous, so store eggs away from raw meat and strong-smelling food

From: British Egg Information Service, 2014

» Current governmental advice to pregnant and breastfeeding women does not recommend avoiding or restricting eggs … to reduce the risk of allergic disease in babies. «

Allergy

Pregnant and breastfeeding mothers

Current governmental advice to pregnant and breastfeeding women does not recommend avoiding or restricting eggs, or other allergenic foods, to reduce the risk of allergic disease in babies. Eggs can be consumed as part of a healthy balanced diet, unless the woman herself is allergic to them (NHS Choices, 2012a; 2013a).

However, the question of whether mothers

» Recent studies support the idea that the maternal consumption of potential dietary allergens—and thus early exposure of the fetus to these allergens—rather than causing sensitisation, may actually increase the likelihood of tolerance and reduce the risk of childhood allergy. «

should avoid certain foods in pregnancy—and, indeed, during breastfeeding—to prevent subsequent allergies in their children seems to be an area of confusion for the public. This confusion may have arisen because of historic concerns about the microbiological safety of eggs, as well as changing governmental advice on peanut consumption in pregnancy. In the past, the Government advised pregnant and breastfeeding women to avoid eating peanuts if there was a history of allergic disease (atopy) in the immediate family (COT, 1998). With the emergence of new evidence and a review of this topic by COT (2008), the advice was revised in 2009 and pregnant women are now told that they can eat peanuts if they wish to, unless they are themselves allergic to peanuts (FSA, 2009; NHS Choices, 2013a).

Complementary feeding

Historically, and based as much on the precautionary principle as firm evidence, advice for children from atopic families suggested delaying the introduction of specific allergenic foods for far longer than 6 months. During the 1990s, in the UK, it was suggested that high-risk infants should not be given cows' milk, fish or eggs until 10–12 months of age (Cant, 1991), although this was never formal Government advice. The American Academy of Pediatrics has previously advised that, in high-risk families, cows' milk should not be introduced until the child's first birthday, eggs at the second birthday, and fish and tree nuts at the third birthday; this advice was rescinded in 2008 (Greer et al, 2008).

Currently, exclusive breastfeeding for the first 6 months of life is recommended for all infants (NHS Choices, 2012b). Whether a mother is breastfeeding or bottle feeding, current recommendations on complementary feeding also suggest introducing solids at around 6 months while continuing with breastmilk or formula (NHS Choices, 2013b). In the UK, the DH also advises that eggs (as well as other potentially allergenic foods including wheat, gluten, nuts, peanuts, seeds, fish, shellfish and cows' milk) can be introduced in food from 6 months of age, although cows' milk should not be given as a drink until the child is 1 year old (NHS Choices, 2013b). It is currently recommended that if solids are introduced earlier than 6 months, introduction of the potentially allergenic foods should be delayed until 6 months (NHS Choices, 2013b).

In infants with a family history of atopy, eggs and other potentially allergenic foods should be introduced one at a time, with a gap of about 3 days between each new food, so that any adverse response can be observed (NHS Choices, 2013d; Allergy UK, 2014). For infants who have an egg allergy, there are clear management guidelines from the British Society for Allergy and Clinical Immunology (Clark et al, 2010).

Development of the evidence base on allergy and egg consumption in pregnancy/breastfeeding

It is known that maternal dietary antigens cross the placenta and can pass into breast milk (Kramer and Kakuma, 2012). During the 1980s and 1990s, there was particular interest in the possibility that modifying the maternal diet—by reducing maternal antigen exposure to common food allergens such as cows' milk and eggs during pregnancy—might reduce the incidence of atopic disease in the child (Fälth-Magnusson and Kjellman, 1992). However, studies failed to show any effect of such avoidance from birth to 5 years (Zeiger, 2003). In a more recent Cochrane review of five trials of maternal antigen avoidance, the authors concluded that the prescription of an antigen-avoidance diet for high-risk groups during pregnancy or lactation would be unlikely to substantially reduce the child's risk of allergic diseases, and that such diets may in fact adversely affect maternal and/or fetal nutrition (Kramer and Kakuma, 2012).

It is recognised that the fetus is not immunologically naive and that infants are born with the capacity to mount an immune response to environmental antigens (Warner, 2004). It has also been shown that circulating cells in newborns sometimes have some responsiveness to egg protein (ovalbumin). Consequently, fetal exposure to egg during pregnancy and subsequent development of egg allergy in infancy has been studied in highly atopic families (Vance et al, 2004). The authors carried out a randomised controlled trial of egg avoidance throughout pregnancy and lactation, using serial measurements of serum-specific immunoglobulin G (IgG) to ovalbumin (OVA), which acts as a surrogate of exposure to eggs, in conjunction with

dietary diary records. Cord-blood OVA correlated with maternal OVA levels at delivery, and when infants were evaluated for evidence of allergic disease at 6 months of age, those with the highest and lowest cord-blood OVA values were the least likely to be atopic at 6 months. In contrast, those with mid-range OVA values were most likely to be atopic at 6 months. In other words, the mothers who consumed either no eggs at all or 'higher' levels (estimated to be equivalent only to 1–2 eggs per week) gave birth to infants who had developed tolerance to egg proteins.

Subsequent studies have demonstrated similar, non-linear relationships to potential antigen exposure and allergic outcome, including a recent US prospective study which demonstrated that, among mothers who were not allergic to peanuts or tree nuts, higher consumption of these foods during pregnancy was associated with a lower risk of peanut or tree nut allergy in their children (Frazier et al, 2014). These studies support the idea that the maternal consumption of potential dietary allergens—and thus early exposure of the fetus to these allergens—rather than causing sensitisation, may actually increase the likelihood of tolerance and reduce the risk of childhood allergy.

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Development of the evidence base on allergy and egg consumption in complementary feeding

The prevalence of atopic disease such as eczema, asthma and rhinitis has increased significantly in recent years (Burr et al, 2006). Food allergies, defined as adverse reactions involving the immune system, which can be both IgE-mediated and (less frequently) non-IgE-mediated, are currently estimated to affect 4–6% of children and up to 4% of adults (Longo et al, 2013; British Society for Allergy and Clinical Immunology, 2014). However, the exact incidence is uncertain, with discrepancies between the prevalence of diagnosed food allergy and of self-reported allergies, which tend to be overstated (Burney et al, 2010; Longo et al, 2013). Cows' milk and egg protein (ovalbumin and/or ovomucoid) are the most common food allergens, and egg allergy—assessed using objective measures of symptoms combined with skin-prick/IgE tests—is estimated to affect 0.5–2.5% of children (Rona et al, 2007).

Eczema is the initial manifestation of the Allergic March, the progression in allergic symptomatology that begins at conception and develops through childhood (Allergy UK, 2012). Eggs, followed by cows' milk and then peanuts, are the most common cause of eczema in babies aged 1–2 years, and children who have eczema at this age have an increased risk of subsequently developing asthma (Warner et al, 2001). Fortunately, in most children, prognosis for egg allergy is good, with many developing tolerance (Longo et al, 2013). In a cohort of children with egg allergy, Savage et al (2007) predicted resolution in 4% of children by 4 years of age, 37% at 10 years, and 68% at 16 years. Some children are able to tolerate well-cooked egg in baked products but may still react to raw or undercooked egg proteins (Lack, 2012).

Evidence to support the delayed introduction of allergenic foods beyond 6 months is limited and contradictory (Grimshaw et al, 2009). It is now generally accepted, by the American Academy of Pediatrics and others, that delaying the introduction of food allergens into an infant's diet beyond 4–7 months is ineffective and may increase the risk of allergy (Lack, 2012; Longo et al, 2013). A position paper from the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition concluded that there was no scientific evidence that the delayed introduction or avoidance of potentially allergenic food such as eggs reduces allergic disease, either among infants considered to be at high risk because of family history of atopy or in infants from a non-

atopic background (Agostoni et al, 2008). The committee recommended that complementary feeding should be introduced no earlier than 17 weeks but no later than 26 weeks, and that each new food should be introduced singly in order to allow detection of any adverse reactions to individual foods. Similarly, a review carried out by an EFSA panel also concluded that there was no convincing scientific evidence that avoidance or delayed introduction of potentially allergenic foods reduced allergies in infants considered at either high or low risk of developing allergic disease (EFSA, 2009). The panel stated that the available data were insufficient to permit a conclusion on the appropriate age for introduction of complementary feeding in the context of allergy prevention.

The scientific evidence base and Government advice concerning the appropriate timing of introduction of solids and of potentially allergenic foods during complementary feeding is under review in the UK. Two key interconnected areas are being examined. The first is a review of the evidence for the appropriate timing of introduction of complementary feeding (SACN, 2011). The second is a review of the risks from the infant diet and the development of atopic and autoimmune disease (COT, 2012); the COT review was commissioned by SACN to inform its own review. It is anticipated that COT will issue a statement in relation to its review on allergenic foods towards the end of 2014, and that SACN will publish its review on complementary feeding for wider consultation during 2015.

There has been considerable research interest in the idea that introducing particular foods early into a child's diet in conjunction with continued breastfeeding might prevent the development of subsequent food allergies by inducing tolerance (Lack, 2012). Peanut allergy is rare in countries such as Israel, where peanuts are introduced early into the infant's diet (Longo et al, 2013). There is also evidence from several studies that delaying the introduction of allergenic foods such as milk, egg and wheat beyond 6 months might increase the risk of allergy (Zutavern et al, 2004; Poole et al, 2006). It has been suggested that there is a 'critical window' at around 4–7 months (Grimshaw et al, 2009; Longo et al, 2013) when the infant's immune response is maturing. It is hypothesised that repeated exposure of the immune system to a potentially allergenic food, such as eggs or peanuts, at this stage may educate the body to tolerate the food without generating an allergic response. Exposure to small quantities of the allergenic proteins is likely to result in sensitisation, while exposure to large quantities may be more likely to result in tolerance (Lack, 2012).

Two key studies are currently testing this hypothesis. The LEAP study has been designed to test whether the early introduction of peanuts

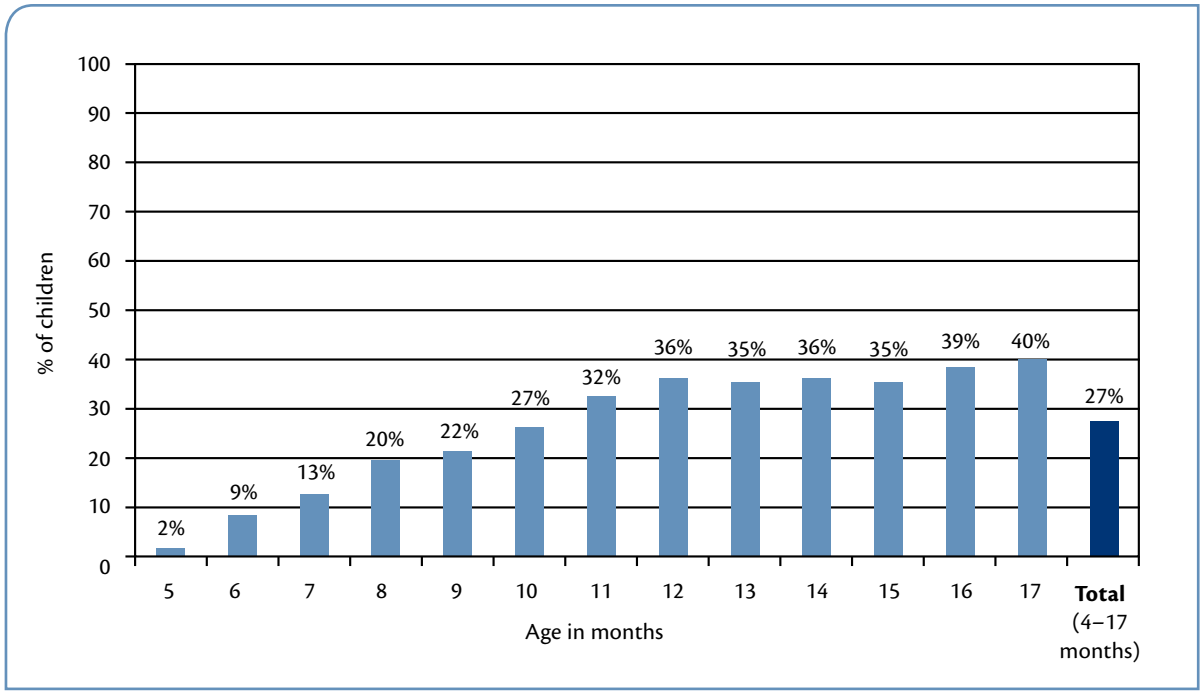

Figure 1. Percentage of children consuming eggs, by age.
From: authors' unpublished analysis of data from the DNSIYC (NatCen Social Research et al, 2013)

Table 1. Selected micronutrient content of eggs

Nutrient[1]	Per medium egg (raw)[2]	% RNI: pregnant women[3]	% RNI: infant 7–12 months
Vitamin A	64 µg	9	18
Vitamin D	1.6 µg	16	23
Vitamin B_2 (riboflavin)	0.25 mg	18	63
Vitamin B_{12}	1.4 µg	93	350
Folate	24 µg	8	48
Choline	144 mg	32[4]	96[4]
Iodine	25 µg	18	42
Selenium	12 µg	20	120

[1]Values calculated from DH, 2012; [2]Average weight with shell 58 g (edible weight 50.6 g); [3]Reference Nutrient Intake (DH, 1991); [4]AI (Adequate Intake) from: Institute of Medicine, 2006 (there are no UK dietary reference values for choline)

to induce oral tolerance can prevent subsequent peanut allergy in children at high risk of developing such an allergy (Du Toit et al, 2013). Similarly, the EAT study is investigating whether the early introduction (from 3 months) of six allergenic foods—cows' milk, peanut butter, fish, wheat, eggs and sesame—again in conjunction with continued breastfeeding until 6 months, can prevent the development of food allergies later in childhood (EAT Study, 2010). In contrast to LEAP, the majority of infants in the EAT study are from the general population.

The results of the LEAP and EAT studies, both of which are anticipated to report in 2015, will help to inform the Government review of recommendations concerning complementary feeding.

Egg consumption data for pregnant women, infants and young children

Evidence from large, representative national surveys shows that many mothers avoid feeding eggs to their babies, even at the late weaning stage (8–10 months) when they can be safely given. Among more than 10 000 mothers taking part in the latest (2010) UK Infant Feeding Study (McAndrew et al, 2012), 73% gave eggs to their children less than once a week and 12% avoided giving eggs entirely. When asked for their main reason for avoiding eggs, 40% cited allergies, 16% stated concern about food poisoning and 18% believed that the baby was too young.

Similar results were found in the Diet and Nutrition Survey of Infants and Young Children (DNSIYC), which collected data on infants aged from 4 months up to 18 months (NatCen Social Research et al, 2013), and which also included a 4-day food diary of everything consumed by the child. The authors of this review have reanalysed interview and diary data from the 2683 respondents to explore egg avoidance and children's consumption of eggs according to age. Mothers with babies over the age of 6 months gave 'allergy/allergy in the family/fear of allergy' as the major reason given for avoiding eggs, followed by 'other health reasons', while a few stated that their child was too young or that their health visitor had advised against eggs. Overall, the proportion of young children who consumed eggs at least once in 4 days was 9% at 6 months of age and rose to 40% at 17 months (*Figure 1*). Average consumption over the whole sample was less than one egg per week.

The diets of pregnant women are less well studied than the diets of infants and young children, but a recent OnePoll survey of 500 pregnant women, commissioned by the British Egg Information Service (BEIS), found that 50% had reduced or avoided egg consumption during pregnancy, mainly because of concerns about food safety (BEIS, 2013). Furthermore, 57% said they would introduce their baby to eggs only after 12 months of age, if at all.

Eggs offer many potential nutritional benefits to both pregnant mothers and babies; the following section presents a brief review of their nutritional properties.

Nutritional value of eggs

The compositional data for UK-produced eggs has recently been updated (Benelam et al, 2012; DH, 2012). As well as being a source of high-quality protein, eggs are a rich source of many micronutrients that are essential to women in pregnancy and for infant growth and development (Ruxton, 2013). *Table 1* shows the key nutrients in eggs that are important in pregnancy and early childhood; these include

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vitamin D, folate, iodine and selenium.

The vitamin D content of eggs, which are among the few natural sources of this nutrient, is particularly notable. The new compositional data (DH, 2012) indicate that eggs contain 72% more vitamin D than previously thought, and one medium egg would provide 1.6 µg of vitamin D_3, representing about 23% of the UK Reference Nutrient Intake (RNI) for children aged 6 months to 3 years. There has been a worrying re-emergence of rickets and vitamin D deficiency in some children in the UK since the mid-1990s (Callaghan et al, 2006; Davies, 2013), and evidence from various sources suggests that many pregnant women in the UK may be at risk of vitamin D insufficiency. For example, the Southampton Women's Survey has found evidence, in a group of 198 mothers in late pregnancy, of frank vitamin D deficiency in 18% and vitamin D insufficiency in 31% of mothers; the low maternal vitamin D status correlated with reduced whole-body and lumbar spine bone mineral content in their children at age 9 years (Javaid et al, 2006).

Eggs are one of the few dietary sources of choline, a nutrient which is essential to the structure of phospholipids and cell membranes and for which there is a high fetal demand (Caudill, 2010). There is also an increased demand for long-chain n-3 polyunsaturated fatty acids (omega-3 fatty acids) during pregnancy and for early infant development, where they are essential for normal brain and eye development as well as for immune function (European Commission, 2013). The new compositional analysis (DH, 2012) has shown eggs to be a significant source of omega-3 fatty acids, especially DHA (docosahexaenoic acid). Average intake of these long-chain omega-3 fatty acids is low in the UK and the richest source, oily fish, is not popular with many people (Bates et al, 2012). Eggs provide a useful alternative source of long-chain omega-3 fatty acids, with one medium-sized egg providing around 70 mg and therefore making a valuable contribution to the daily intake of 450 mg DHA/EPA recommended by SACN (2004).

Conclusions

Data presented in this paper, including a new secondary analysis of egg avoidance and consumption among 2683 respondents from the DNSIYC (NatCen Social Research et al, 2013), suggests that concerns about allergy are foremost among mothers. It appears that this may be resulting in egg avoidance even at the later stages of weaning, and that overall egg consumption among babies aged 6–17 months is low, averaging less than one egg per week.

Current governmental food safety advice—based on the precautionary principle and in place since 1988, when concerns about SE PT4 first arose—recommends that raw and partially cooked eggs should be avoided by vulnerable groups such as pregnant/breastfeeding women, infants and toddlers, because of the risk of salmonella infection (NHS Choices, 2012a; 2013a; 2013c). However, around 90% of British eggs are now produced in accordance with the strict requirements of the British Lion Code of Practice and it has been demonstrated that these laying flocks and eggs are essentially salmonella-free. The British Egg Industry Council advises that for pregnant and breastfeeding women, and infants who have tolerated eggs on first exposure, the microbiological safety record of British Lion eggs suggests that they can now be consumed normally i.e. without the need to cook fully, if handled correctly.

Women who are pregnant or breastfeeding are not advised to avoid eggs to reduce the risk of allergic disease in their offspring, and there is some evidence to suggest that avoiding allergenic foods such as eggs may be counterproductive and less likely to induce the desired state of tolerance in the child (Vance et al, 2004; Frazier et al, 2014). Similarly, delayed introduction of eggs into the infant diet beyond the age of 6 months may have unintended consequences in the context of allergy. As discussed, there is a growing body of evidence to suggest that there may be a critical window between 4–7 months when the introduction of allergens such as egg, peanuts and cows' milk proteins to the maturing immune system may induce tolerance, whereas attempted avoidance may be more likely to result in sensitisation in genetically predisposed infants (Grimshaw et al, 2004; Lack, 2012). This hypothesis is being tested by the LEAP and EAT studies (Du Toit et al, 2013; EAT Study, 2010).

Eggs are a highly nutritious and affordable

food containing key nutrients including high-quality protein, vitamin D, selenium, choline and omega-3 fatty acids, which are beneficial to both pregnant women and developing infants. The results of the EAT and LEAP studies, along with the COT and SACN reviews, are awaited with interest and are urgently needed to underpin and clarify recommendations that health visitors and other health professionals give to their clients/patients concerning the appropriate age for introduction of eggs and other allergenic foods during complementary feeding.

Although the current advice for pregnant/breastfeeding women and parents introducing complementary feeding from 6 months is that it is safe to include eggs as part of a healthy, balanced diet, there appears to be some confusion among the public concerning the safety of eggs at these times. This may in part have arisen because two different issues—the microbiological safety and allergic potential of eggs—have been conflated. Thus historic concerns about food safety and allergy may have resulted in unnecessary avoidance of eggs among these groups, which could have potential adverse effects on subsequent immunological tolerance and nutritional status. JHV

Key points

- There is evidence that, despite their nutritional benefits, consumption of eggs among pregnant women, infants and toddlers is relatively low
- Government dietary advice to pregnant and breastfeeding women does not recommend avoiding or restricting consumption of eggs
- Since 1988, vulnerable groups have been advised to avoid raw or partially cooked eggs. Recent evidence has shown that UK laying flocks and eggs are now essentially free of salmonella and the British Egg Industry Council advises that—even in vulnerable groups—British Lion eggs, if handled correctly, can be consumed without the need to cook fully
- The Department of Health advises that eggs (and other potentially allergenic foods) be introduced to infants' diets from 6 months of age; evidence to support delaying introduction beyond this age is limited and contradictory
- Recent studies suggest consumption of potential dietary allergens during pregnancy may increase the likelihood of tolerance in the fetus and therefore reduce the risk of childhood allergy
- The Scientific Advisory Committee on Nutrition and the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment are reviewing evidence for the appropriate timing of complementary feeding and the risks from the infant diet of developing atopic and autoimmune disease
- Two key allergy studies—LEAP (Learning Early About Peanut Allergy) and EAT (Enquiring About Tolerance)—are investigating whether early introduction of allergenic foods into infant diets can prevent the development of food allergies. These studies are expected to report in 2015 and will help to inform the Government review of complementary feeding recommendations

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