

Food allergy: is there a rising prevalence and if so why?

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Avoidance of allergenic foods in the first year of life is no longer recommended

Since the 1980s, the world has experienced an epidemic of allergic disease. The prevalence of asthma rose rapidly during the 1990s, followed by increases in the prevalence of eczema and allergic rhinitis, both of which continue to rise. Of great concern is new evidence that yet another allergic condition — food allergy — is also on the rise, particularly in infants and young children. An estimated 10%–15% of the population report symptoms of food allergy,¹ although the prevalence of IgE-mediated food allergies (ie, symptoms such as urticaria,

angioedema, vomiting or anaphylaxis within minutes of food ingestion, in the context of a positive skin prick test result or food-specific serum IgE level) has not, until recently, been adequately studied at the population level.

Results of population studies examining food allergy prevalence have been hampered by small sample sizes, selection bias related to sampling methodology and response rates, and use of parental or self-report of allergy or a skin prick test result as a proxy for food allergy diagnosis. Even studies that have used the diagnostic

gold standard of oral food challenge, where the allergen of interest is fed to the child, have been limited by a lack of predetermined objective criteria to define the outcome. However, there have now been reports that hospitalisations for food allergy-related anaphylaxis — the most serious and life-threatening manifestation — have increased markedly since 1990 in the United Kingdom, the United States and Australia,² most dramatically, with a fivefold increase, in 0–4-year-olds.

The HealthNuts study was recently mounted to describe the prevalence of food allergy in 1-year-old infants in Melbourne, using a sampling frame designed to recruit a representative population sample and predetermined criteria to assess food allergy outcomes at oral food challenge.³ Recruitment occurred at childhood vaccination sessions. Participants' parents completed a questionnaire, and the infants received skin prick testing for commonly allergenic foods. Among 2848 participants (73% participation rate), those with any sensitisation to one of three foods (egg, peanut and sesame) were invited to attend an allergy research clinic for formal oral food challenge. Using this method, the study found population-based prevalences of 2.9% (95% CI, 2.3%–3.6%) for peanut allergy, 8.9% (95% CI, 7.8%–10.0%) for egg allergy, and 0.8% (95% CI, 0.5%–1.1%) for sesame allergy in 1-year-old infants.⁴

Certainly, these rates are the highest yet reported in the Western world, with up to 10% of 1-year-old infants in this study population exhibiting signs of IgE-mediated food allergy in a challenge setting. Although it is anticipated that many of those with egg or cows milk allergy will develop tolerance to these foods in the first 3–4 years of life, the high prevalence of peanut allergy remains concerning, as only 20% of children are expected to achieve resolution of this allergy by 5 years of age.⁵ Furthermore, there is now evolving evidence that food allergy, including cows milk and egg allergy, may represent the first step on the allergic pathway referred to as the “atopic march”.⁶ As such, the question remains as to whether this reported high prevalence of food allergy may reflect a second and evolving epidemic of allergic disease, with an early onset in the form of food allergy that will translate into increased rates of asthma and other chronic allergic disease later in life.

The reasons behind this apparent increase in serious food allergy are unknown and there is little evidence to guide effective prevention. One of the most topical theories for the rise in allergic disease in general — the hygiene hypothesis — states that very early exposure to microbial antigens promotes healthy immune development and reduces the risk of developing allergies. However, this hypothesis has not been examined specifically with regard to risk of food allergy. Another theory relates to vitamin D insufficiency, with recent reports in both the northern and southern hemispheres showing increasing rates of food allergy with increasing distance of children's residence from the equator.⁷ A further factor that has been thought to be important in the development of food allergy is food allergen exposure. Until very recently, expert guidelines for infants with a family history of allergy typically recommended delaying introduction of allergenic foods (including avoiding eggs until 2 years and nuts until 3 years of age in the US), as well as delaying solid foods until after 6 months of age, and breastfeeding for at least 12 months, to reduce the risk of food allergy. Until the publication of the HealthNuts study,⁴ no population study had directly

examined the relationship between infant feeding in the first year of life and risk of challenge-confirmed infant food allergy.

Data from the HealthNuts study were used to assess the impact of timing of introduction of allergenic foods. Compared with introduction at 4–6 months, introducing egg into the diet later was associated with higher rates of egg allergy (adjusted odds ratio for introduction after 12 months, 3.4 [95% CI, 1.8–6.5]).⁸ Most interestingly, introducing cooked egg (such as scrambled, boiled or fried) was more protective than simply introducing egg in baked goods (such as cakes and biscuits). Those introduced to cooked egg at 4–6 months of age were five times less likely to develop egg allergy than those waiting until the normally recommended age of 10–12 months, even after adjusting for confounding factors. There was no protective effect among infants who first had egg in baked goods introduced into their diet between 4 and 6 months of age, presumably because exposure to a lower dose does not provide protection. A further possibility is that early introduction of egg might increase the dose of vitamin D in the diet, and therefore the effect might indeed be mediated through a unifying concept of vitamin D sufficiency.

These results are the first evidence-based findings to inform recently revised feeding guidelines, in Australia⁹ as well as in Europe and the US, that avoidance of any allergenic food in the first year of an infant's life is no longer recommended. The findings also represent the first report of a modifiable lifestyle factor found to be associated with food allergy and, if these results are replicated in randomised controlled trials, it will have important public health implications for infant feeding worldwide.

The emergence of this new epidemic of allergic disease poses significant questions relevant to ensuring a healthy start to life for future generations of children, including whether some aspects of the modern lifestyle, which includes unquestionable improvements in public health, have had an unexpectedly adverse effect at the population level. We also need to understand whether this new wave of food allergy in early childhood is likely to persist into later childhood, and further assess whether early-onset food allergy plays a role in the development of other chronic allergic diseases such as asthma.

Competing interests

I am the Principal Investigator of the HealthNuts study, which was supported by a grant from the National Health and Medical Research Council, as well as the Ilhan Food Allergy Foundation, and I have received speaker fees from Nutricia, Pfizer and Abbott.

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Provenance: Commissioned; not externally peer reviewed.

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