

EDITORIAL

Fatal Food Anaphylaxis in Children: A Statutory Review in England

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Funding: The authors received no specific funding for this work.

Fatal anaphylaxis is a very rare, unpredictable tragedy. For children and young people, most fatal anaphylaxis is caused by food allergy, and thus, carers of children and young people with food allergy may become preoccupied about the possibility of sudden, unexpected fatal anaphylaxis. Other unexpected causes of death such as severe acute asthma are less rare than fatal anaphylaxis, but the rapidity of fatal food anaphylaxis and its propensity to affect adolescents and young adults generate continued concern and societal interest.

The burden of avoiding known food allergens falls largely on people living with allergies and their families. Thus, an exposure leading to a fatal anaphylactic reaction may inspire fear and guilt in families and also in other carers, caterers and health professionals. Most anaphylactic reactions to food self-revert, with or without medical intervention [1]. In the past 30 years, several society-wide changes have been made to try to prevent fatal food anaphylaxis. In many countries such as the UK, these include widespread provision of adrenaline autoinjectors, new food allergen labelling laws, increased food allergy diagnostics and improved emergency service awareness of anaphylaxis and its management [2, 3]. Yet, fatal food anaphylaxis remains as common as it was 30 years ago, suggesting we need to go back a step and learn more about the condition [4]. Fatal food anaphylaxis is difficult to study prospectively, because it is very rare, unpredictable and usually occurs in the community. It is therefore important that we learn as much as we can from each tragic occurrence, and the recent statutory review of childhood fatal anaphylaxis and asthma provides an opportunity to do this (Figure 1, Table 1).

England is one of very few countries with a national, statutory, multi-professional review of all child deaths [5]. Since

2019, the National Child Mortality Database (NCMD) collates and analyses information about child deaths. For all deaths under age 18, a comprehensive summary of the circumstances of death and background information from professionals is collated. A final record summarises conclusions of a multi-agency panel documenting contributory, modifiable factors and learning. The latest NCMD thematic report analysed child deaths in England because of asthma or anaphylaxis. It identified key findings and made recommendations for policy, practice and research [6].

The report documents 54 child deaths from asthma and 19 from anaphylaxis in a 4-year period from 1 April 2019 to 31 March 2023. Many (54%) of the children who died from asthma also had a food allergy. However, the cause of death in these cases was thought to be asthma rather than food anaphylaxis. Fatal anaphylaxis was triggered by food allergy ($n=18$) and in one case by anaesthesia, a rare cause of fatal anaphylaxis in childhood [7]. Just over half of fatal anaphylactic events occurred at the child's home or another private residence (friend or relative's home), 26% occurred in a public place, 11% at school, one at hospital and one abroad. Just under half the children who died from food anaphylaxis attended an emergency department at least once in the year prior to their death. In 16% of emergency department attendances in the previous year, the primary diagnosis for the attendance was anaphylaxis and in 11% asthma. Twenty-one per cent of fatal anaphylaxis cases also had at least one emergency inpatient admission in the year prior to their death, in three cases for asthma. The child death review process was complete for 12 children with fatal food anaphylaxis. From the completed reviews, the causative food allergen was only established in nine cases, with cow's milk and nuts the commonest, consistent with previous findings. These data

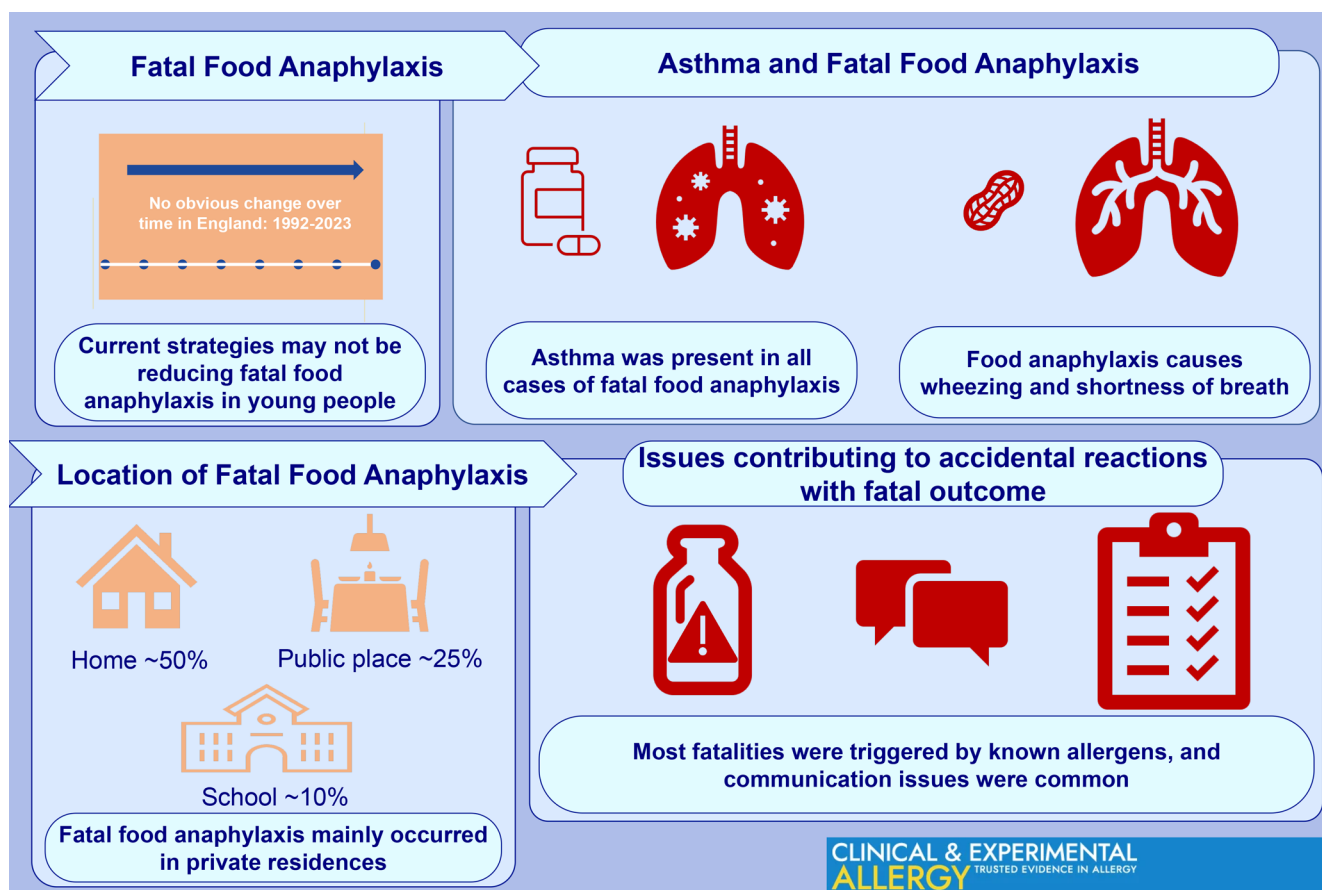


FIGURE 1 | Main findings of statutory review of fatal food anaphylaxis in England 2019–2023. Summary of key issues identified by the recent statutory review of fatal food anaphylaxis. The full review, including findings for fatal anaphylaxis and asthma in children and adolescents in England, is available at <https://www.ncmd.info/asthma>.

TABLE 1 | Key recommendations for preventing fatal food anaphylaxis.

Recommendations	Details of issues identified
<i>Potentially modifiable patient factors</i>	
Assess asthma control	Deaths from fatal food anaphylaxis occur in people who have asthma, and bronchospasm is a key feature. Recognition and management of co-existent asthma may reduce fatal food anaphylaxis risk.
Ensure access to effective medications for treating anaphylaxis	More effective emergency treatments are needed, and people with food allergy and their carers need clearer guidance on how and when to use relevant treatments.
<i>Public safety measures</i>	
Improve compliance with allergen labelling and food handling legislation	Issues were identified with communication around food labelling and contamination during handling. Most reactions were triggered by a known food allergen.
<i>Investigation</i>	
Follow Joint Agency Response to Suspected Child Death from Anaphylaxis or Asthma guidance	This includes timed, paired serum mast cell tryptase measurements and forensic investigation of potential sources of allergen, including food packaging.

build on a previous analysis of fatal food anaphylaxis in the UK between 1998 and 2018, and show a similar event rate to those years [8]. Although it is not possible to directly compare both analyses, as the data sources were different, there is no

obvious sign that the number of fatal food anaphylaxis cases is changing over time [4]. Cases remain rare, however what the national analysis of child deaths can add is the identification of potentially modifiable contributory factors that if addressed

with local or national interventions, may prevent future deaths in similar circumstances. This is at the heart of the value that a standardised child death process aims to bring.

One of the most significant findings in the NCMD report is that all 18 cases of fatal food anaphylaxis occurred in children who were known to have asthma. Only about half of children with food allergy have asthma, so asthma appears to be an important risk factor for fatal food anaphylaxis. Bronchospasm is also a dominant feature of food anaphylaxis and is likely to play an important part in the pathophysiology of fatal food anaphylaxis. The report also found that ingestion of the relevant allergen was not obvious in most cases. So, an important learning point from the analysis is that anaphylaxis should always be considered in a child with asthma and a known food allergy who has sudden breathing difficulty. In the absence of careful enquiry considering the possibility of an allergic reaction preceding death, fatal anaphylaxis as the cause of death may be missed.

The most common, potentially modifiable factors in cases of fatal food anaphylaxis were poor asthma control, lack of formal asthma diagnosis, poor communication around allergies, poor record-keeping and information-sharing between professionals and lack of access to effective emergency treatment. Most (89%) of those where the food allergen trigger was clear already knew they were allergic to the trigger allergen. There was limited information recorded about adrenaline autoinjector (AAI) use. Although these may not be effective for preventing fatal anaphylaxis, they are the current standard for self-administered emergency management of anaphylaxis [4]. There was lack of understanding of the role of emergency medicines, lack of availability of in-date emergency medications and lack of understanding about when and how to use them.

The most common public safety factors which were identified related to unclear, misleading or inaccurate labelling of food, either packaged or cooked, purchased from supermarkets or takeaway shops. In one case, there was presumed contamination of a packaged food which was opened and served at a public venue. Food suppliers and those serving customers, must ensure compliance with food labelling and handling regulations. Mast cell tryptase can be normal in cases of fatal anaphylaxis. However, a paired sample of mast cell tryptase in the context of a clinical presentation of anaphylaxis, can be informative in supporting investigation. The report found that there were instances where the mast cell tryptase test was not checked, collected without information regarding time of sample collection or only collected at the time of the post-mortem examination, reducing its usefulness [9].

A final, important recommendation from the report is that for all cases of fatal anaphylaxis the Joint Agency Response (JAR) to Suspected Child Death from Anaphylaxis or Asthma guidance, which supplements standard JAR guidance, should be followed. This covers mast cell tryptase testing in cases of suspected anaphylaxis, forensic investigation of potential sources of allergen for testing and collection of food packaging where food allergy is a possible cause. JAR is a mechanism for investigating unexpected child death, and it includes medical and forensic investigations, environmental assessment and post-mortem examination. If the specific JAR guidance is followed, this will

help us learn about fatal food anaphylaxis in a more systematic way, with a view to providing evidence-based advice for families and health professionals in the future.

In conclusion, this new report which summarises 4 years of fatal anaphylaxis data for children in England gives important insights. The report highlights potentially modifiable risks in terms of asthma recognition and management, and communication related to food allergens. There is no evidence for a recent change in event rate. But by calling for more thorough and systematic investigation of every case of fatal food anaphylaxis, the report has the potential to trigger a longer-term improvement in rate of learning from each case. This should lead, in due course, to improvements in our ability to prevent fatal food anaphylaxis in children and young people.

Author Contributions

S.S. wrote the original report and the first draft of the editorial. All authors edited and commented on the editorial and approved the final version.

Acknowledgements

This editorial summarises a report from the National Child Mortality Database on child deaths from asthma or anaphylaxis in England from 2019 to 2023 [6]. The full report can be accessed at <https://www.ncmd.info/asthma>.

Conflicts of Interest

R.J.B. declares payment for editorial work from Wiley and the British Society for Allergy and Clinical Immunology, consultancy payment from the World Health Organization, payment for work as a member of two UK Department of Health and Social Care expert advisory committees on nutrition, unpaid roles as a member of the UK Baby Feeding Law Group and a professional advisor to La Leche League, and payment for work as an expert witness in cases related to food anaphylaxis and cases related to infant formula health claims. The other authors declare no relevant conflict of interest.

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