

The Evolving Science of Peanut Allergy



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Peanut allergy is becoming a common childhood disorder, affecting up to 1% to 2% of the US population,¹ and can be a life-long allergy for most.² Because reactions due to accidental exposures can be severe,^{3,4} a peanut allergy diagnosis impacts not only medically but also psychosocially and financially on patients and their family.⁵ This theme issue of the *Journal of Allergy and Clinical Immunology: In Practice* reviews the diagnosis and management of peanut allergy as well as highlights the recent advances in prevention and treatment. Perspectives on the evolution of the field will be discussed, identifying gaps in need of attention and development.

It is critical to ensure an accurate diagnosis in patients with suspected peanut allergy because many more individuals are sensitized than are clinically reactive.⁶ Current diagnostic decisions and counseling are often made on the basis of routine skin prick testing and/or serum specific IgE levels. The Clinical Commentary Review by Sampson et al⁷ highlights the limitations of these current testing options and reminds clinicians that a thoughtful approach to identifying appropriate patients for testing and incorporating clinical history with test results remain essential.⁶ The time and resources required to perform oral food challenge as well as the risks involved pose barriers to widespread routine use of this diagnostic criterion standard.^{6,8} Thus, advances in diagnostics with high specificity and sensitivity that would reduce the need for food challenges are clearly needed. In addition, testing modalities that would provide prognostic information, such as the severity of allergic reactions and their natural history, are desirable. As discussed in the review, several promising approaches are in development such as the basophil activation test, mast cell activation test, and histamine release assay, but they still require standardization, validation, and assessments of feasibility and cost-effectiveness.

A frequent question for peanut-allergic individuals is their concern for other food allergies, specifically tree nuts and other legumes. Coallergy with tree nuts indeed affects 20% to 68% of those with peanut allergy.⁹ Although there is low clinical cross-reactivity between peanuts and legumes,¹⁰ they share several

similar proteins that can lead to positive test results.¹¹ The Grand Rounds Review by Chan et al¹² notes the potential geographic variations in the presence of these allergens in the food supply and the prevalence of allergy to these foods. The review provides guidance on how to approach questions concerning tree nuts and legumes that are posed by peanut-allergic patients and their families, on distinguishing molecular from clinically relevant cross-reactivity, and points out the possibility of misleading results if screening is pursued indiscriminately.

Venter et al¹³ focus on practical management issues for peanut allergy, such as interpreting ingredient labels, eating outside the home, and travel. It offers clinicians age- and developmentally appropriate management guidance to discuss with patients and families. An international perspective on labeling laws is included, highlighting differences in extent of allergens covered by these laws and noting ongoing efforts to increase safety while providing meaningful risk assessments that are family-friendly. The variable impacts on quality of life are also mentioned, expanding the awareness of clinicians on the diverse effects a peanut allergy diagnosis can have on patients and their family. The Grand Rounds Review concerning tree nuts and legumes also highlights management issues related to these allergens, including the need for awareness of cross-contamination risks.¹²

The significant burden of peanut allergy has motivated the development of therapies that raise the threshold for peanut exposure to induce allergic reactions. Vickery et al¹⁴ summarize the promising data supporting the desensitization effects of allergen-specific immunotherapy for peanut allergy and the evolution from small, single-center reports to large-scale international phase 3 studies by commercial entities moving toward Food and Drug Administration approval. The review outlines limitations of the current outcomes used in interventional clinical trials and identifies new research areas/priorities as new therapies are translated to widespread clinical practice. These first-generation therapies are not curative; thus, questions remain on how effectively these treatments will protect patients in practice and whether they will relieve the psychosocial burdens of peanut allergy. The authors also highlight the robust pipeline of novel therapies under investigation that will further transform the management of peanut allergy.

The Clinical Management Review by Fisher et al¹⁵ describes the fundamental shift in prevention strategy from one of avoidance to one of early introduction based on the compelling LEAP trial data.^{16,17} They review the evidence for allergic sensitization occurring through the skin and tolerance induction occurring via gut exposure. The data supporting early peanut introduction and the evolution of prevention guidelines translating this evidence into clinical practice are summarized. This review provides a global perspective on how guidelines are being developed and disseminated, but also highlights areas of ongoing debate—how to identify who is at risk and whether testing is necessary before

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introducing infants to peanut. Implications of population-level implementation as well as logistical and economic/health care resource utilization barriers will need to be assessed.

How we diagnose, treat, and educate patients with peanut allergy is changing rapidly. This theme issue of the *Journal of Allergy and Clinical Immunology: In Practice* highlights the tremendous efforts the research community has invested in optimizing the care of individuals with peanut allergy. The public health approaches to prevention will hopefully decrease the incidence of children with allergies, while newer testing modalities will not only provide accurate diagnoses but also aim to provide prognostic information that can guide management. An array of treatment options for peanut allergy are on the horizon and may allow for individualization to fit the goals and preferences of patients and their families.

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