



Letters

Pediatric provider knowledge of early peanut introduction recommendations

Peanut allergy affects approximately 2% of children in the United States.¹ Delayed introduction of allergenic foods was recommended by the American Academy of Pediatrics in 2000 in an effort to reduce the incidence of allergic disease.² This recommendation was withdrawn in 2008 owing to insufficient evidence, and no specific guidance was provided on the timing of allergenic food introduction.³ In January 2017, evidence-based recommendations for the early introduction of peanut were made.⁴ The results of the Learning Early About Peanut (LEAP) trial suggest that early introduction of peanut may prevent peanut allergy among high-risk infants.⁵ Currently, the guidelines of the National Institute of Allergy and Infectious Diseases (NIAID) recommend the introduction of peanut around 6 months of age in infants with mild to moderate eczema. For infants with severe eczema, egg allergy, or both, it is recommended to strongly consider testing for peanut sensitivity, and if appropriate, introduce peanut as early as 4 to 6 months of age.⁴

The understanding of primary care pediatricians and advanced practitioners (providers) on these recommendations is essential to decrease the incidence of peanut allergy. As the approach to allergenic food introduction has evolved recently, there may be a gap in provider knowledge that could be addressed by targeted education.

A 2-part, voluntary, anonymous online survey study was created using REDCap and distributed electronically. Participants included pediatric attendings, nurse practitioners, and residents from Nemours/Alfred I. duPont Hospital for Children and St. Christopher's Hospital for Children. Part 1 was conducted from November 2017 to February 2018 and assessed provider knowledge of NIAID guidelines for peanut allergy prevention. Part 2 was conducted in July 2018 and assessed pediatric resident knowledge of NIAID guidelines immediately before and after an educational intervention. The intervention consisted of an in-person presentation on food allergy, including the LEAP study results and NIAID guidelines. The survey questions were not discussed during the presentation. In both parts of the study, the survey included 5 case-based scenarios (eFig 1). Additional questions assessed practice demographics in part 1. Participant self-confidence in addressing allergic conditions and questions regarding the intervention were included in part 2.

In part 1 of the study, 138 providers from 21 Nemours/Alfred I. duPont Hospital for Children and St. Christopher's Hospital for Children practice sites were contacted via e-mail. A total of 60 participants (44%) completed the survey. Part 2 of the study was conducted during pediatric resident conferences at each center. A total of 60 residents attended the conferences. A total of 33 residents (55%) completed the presurvey and 30 of the initial 33 completed the

postsurvey. Incomplete surveys were excluded. The primary outcome was the number of scenarios answered correctly. A generalized estimating equation with a logit link was used to compare the likelihood of correct answers between pre- and postsurvey responses. Odds ratios (ORs), along with 95% confidence interval (CI) and *P* value, were used to measure the efficacy of the educational intervention. All tests were 2-tailed at the level of significance of .05. The statistical software SAS, version 9.3 (SAS Institute, Cary, North Carolina) was used for data analysis.

In part 1 of the study, most participants (88%) were pediatric attendings, and most participants (80%) practiced full-time (eFig 2). Only 12% of the providers answered 5 of 5 scenarios correctly, and 17% answered 4 of 5 scenarios correctly (Fig 1). Most providers (67%) reported confidence in applying the NIAID guidelines; however, only 18% of these participants answered 5 of 5 scenarios correctly and 15% answered 4 of 5 correctly. Of total participants, 8% reported that they were not familiar with the recommendations (eFig 3). The participants were not queried regarding previous education on the LEAP study or NIAID guidelines. Interestingly, the providers had a better understanding of the guidelines for infants with mild to moderate eczema vs. infants with severe eczema, egg allergy, or both. Most providers (87%) were able to identify the correct answer in the scenario regarding an infant with mild to moderate eczema, whereas only 38% were able to identify the correct answer regarding an infant with egg allergy and 53% regarding an infant with severe eczema. It is notable that 28% of the providers chose to refer an infant with severe eczema, egg allergy, or both, and negative peanut-specific immunoglobulin E (sIgE) to an allergist, which could result in delayed introduction. For an infant with severe eczema, egg allergy, or both, and positive sIgE, 23% of the providers chose not to refer to an allergist and 3% opted for home introduction, raising concern for safety.

In part 2 of the study, 21% of the pediatric residents answered 4 or 5 of the scenarios correctly before the intervention (Fig 1). A significant improvement (OR, 17.7; 95% CI, 5.2–66.3; *P* < .001) was revealed after the intervention, with 83% of residents answering 4 or 5 of the scenarios correctly. Before the intervention, 24% of the residents reported that they were not familiar with the NIAID recommendations, and only 18% felt confident in applying the guidelines, whereas 93% felt confident after the intervention (OR, 63; 95% CI, 11.7–339.8; *P* < .001) (eFig 4). Initially, 33% of the residents chose to delay peanut introduction until 2 to 3 years of age for 1 or more scenarios; after the intervention, this decreased to 7% (OR, 0.14; 95% CI, 0.03–0.71; *P* = .009). The pre-intervention survey revealed that the residents did not feel comfortable managing food allergy, with 97% reporting they were not at all or only somewhat comfortable. The educational intervention was rated to be very or extremely helpful by 93% of the residents and effective in increasing knowledge of the NIAID guidelines by 100% of the residents.

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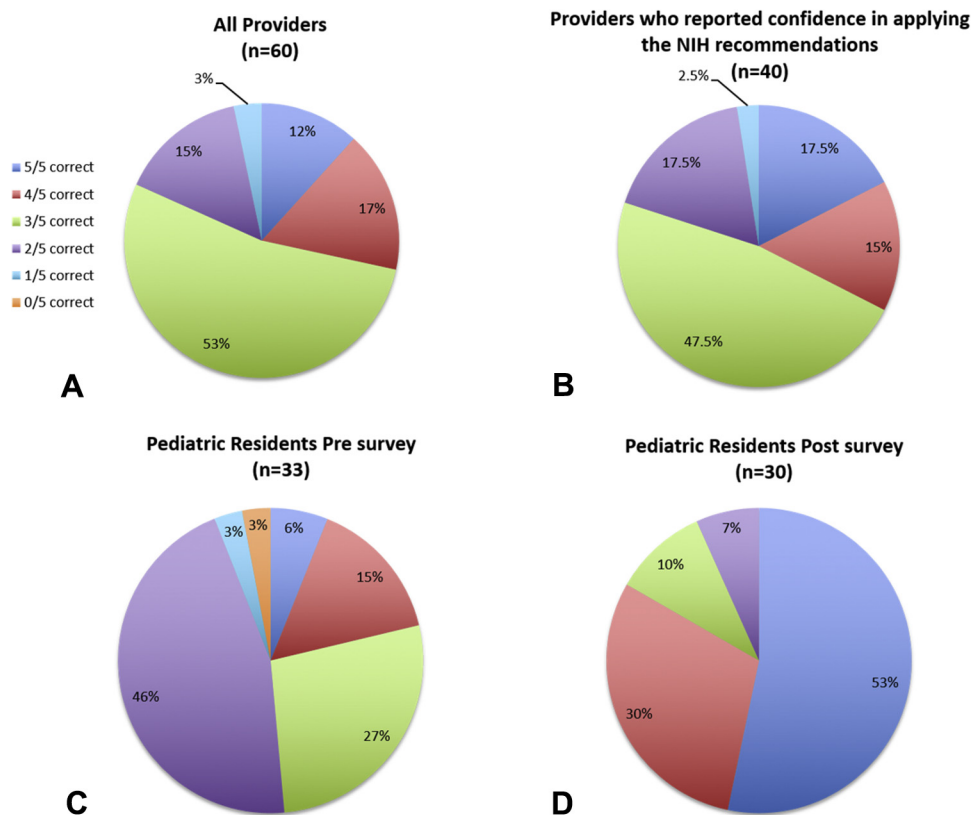


Figure 1. Percentage of survey participants who answered case-based scenarios correctly. A, All providers. B, Providers who reported confidence in applying the NIH recommendations. C, Pediatric residents presurvey. D, Pediatric residents postsurvey. NIH, National Institutes of Health.

The strengths of this study include a high survey response rate, anonymous responses, and participants from 2 centers with multiple practice sites. The limitations include a small sample size and potential for selection bias owing to participation being voluntary. In an effort to limit survey length, scenarios were focused on the NIAID guidelines 1 and 2. Future directions could address knowledge decay or subsequent changes in practice. In the scenario answer choices, the phrase “during the first year of life” was used because the recommended age of introduction is a range that depends in part on developmental readiness.

Primary care providers play a pivotal role in the prevention of peanut allergy. These study findings suggest that most providers are not proficient in applying the NIAID guidelines regarding early peanut introduction. A brief in-person educational intervention may be effective in improving knowledge of the recommendations.

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Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.anaai.2020.06.037>.

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Scenarios
What would your recommendations be regarding age-appropriate peanut product introduction in the following 5 scenarios:
Scenario 1 Which of the following would you recommend for a 5-month-old infant with mild to moderate eczema? –Age-appropriate peanut product introduction at 2 to 3 years of age –Age-appropriate peanut product introduction during the first year of life* –Conduct peanut-specific IgE –Refer to an allergy specialist **Would you introduce age-appropriate peanut product: –At home –In the primary care doctor's office
Scenario 2 Which of the following would you recommend for a 5-month-old infant with severe eczema? –Age-appropriate peanut product introduction at 2 to 3 years of age –Age-appropriate peanut product introduction during the first year of life –Conduct peanut-specific IgE* –Refer to an allergy specialist* **Would you introduce age-appropriate peanut product: –At home –In the primary care doctor's office
Scenario 3 Which of the following would you recommend for a 5-month-old infant with egg allergy? –Age-appropriate peanut product introduction at 2 to 3 years of age –Age-appropriate peanut product introduction during the first year of life –Conduct peanut-specific IgE* –Refer to an allergy specialist* **Would you introduce age-appropriate peanut product: –At home –In the primary care doctor's office
Scenario 4 Which of the following would you recommend for a 5-month-old infant with severe eczema and/or egg allergy and a negative peanut-specific IgE? –Age-appropriate peanut product introduction at 2 to 3 years of age –Avoid peanut products at this time, will retest at an older age –Age-appropriate peanut product introduction during the first year of life* –Refer to an allergy specialist **Would you introduce age-appropriate peanut product: –At home –In the primary care doctor's office
Scenario 5 Which of the following would you recommend for a 5-month-old infant with severe eczema and/or egg allergy and positive peanut-specific IgE? –Lifetime avoidance of peanut products –Avoid peanut products at this time, will retest at an older age –Age-appropriate peanut product introduction during the first year of life –Refer to an allergy specialist* **Would you introduce age-appropriate peanut product: –At home –In the primary care doctor's office
*Answers considered correct in each scenario **This question appeared only if age-appropriate introduction during the first year of life was chosen as the previous answer choice

eFigure 1. Survey scenarios. IgE, immunoglobulin E.

Provider Demographics (n=60)			
Provider Credentials	% of providers	Practice Time	% of providers
Physician	88%	Full-time	80%
Nurse Practitioner	12%	Part-time	20%
Number of infants per week with food allergy	% of providers	Number of infants per week with atopic dermatitis	% of providers
0-5 patients	70%	0-5 patients	25%
6-10 patients	16.7%	6-10 patients	58.3%
11-20 patients	1.7%	11-20 patients	6.7%
>20 patients	11.7%	>20 patients	10%
Frequency of laboratory testing for food allergy evaluation	% of providers	Confident in interpretation of food allergy laboratory testing	% of providers
Rarely/Never	75%	Yes	41.7%
Some of the time	25%	No	43.3%
Most of the time	0%	N/A, I do not conduct testing	15%
Always	0%		

eFigure 2. Provider demographics. N/A, not applicable.

Provider Survey Results (n=60)				
Scenario 1 (mild-moderate eczema)	Introduction at 2-3 years	Introduction during the 1 st year*	Conduct peanut-specific IgE	Refer to allergist
	5%	86.7%	1.7%	6.7%
Scenario 2 (severe eczema)	Introduction at 2-3 years	Introduction during the 1 st year	Conduct peanut-specific IgE*	Refer to allergist*
	1.7%	45%	20%	33.3%
Scenario 3 (egg allergy)	Introduction at 2-3 years	Introduction during the 1 st year	Conduct peanut-specific IgE*	Refer to allergist*
	1.7%	60%	6.7%	31.7%
Scenario 4 (severe eczema and/or egg allergy, and a negative peanut-specific IgE)	Introduction at 2-3 years	Avoid peanut, retest at an older age	Introduction during the 1 st year*	Refer to allergist
	1.7%	5%	65%	28.3%
Scenario 5 (severe eczema and/or egg allergy, and a positive peanut-specific IgE)	Lifetime avoidance of peanut	Avoid peanut, retest at an older age	Introduction during the 1 st year	Refer to allergist*
	0%	20%	3.3%	76.7%
Are you confident in applying the NIH recommendations regarding age appropriate peanut product introduction?	Yes	No	I am not familiar with the recommendations	
	66.7%	25%	8.3%	
*Answers considered correct in each scenario				

eFigure 3. Provider survey results. IgE, immunoglobulin E; NIH, National Institutes of Health.

Pediatric Resident Survey Results				
Scenario 1 (mild-moderate eczema)	Introduction at 2-3 years	Introduction during the 1st year*	Conduct peanut-specific IgE	Refer to allergist
Pre-Intervention (n=33)	15.2%	78.8%	3%	3%
Post-Intervention (n=30)	3.3%	93.3%	0%	3.3%
Scenario 2 (severe eczema)	Introduction at 2-3 years	Introduction during the 1st year	Conduct peanut-specific IgE*	Refer to allergist*
Pre-Intervention (n=33)	12.1%	42.4%	30.3%	15.2%
Post-Intervention (n=30)	0%	6.7%	66.7%	26.7%
Scenario 3 (egg allergy)	Introduction at 2-3 years	Introduction during the 1st year	Conduct peanut-specific IgE*	Refer to allergist*
Pre-Intervention (n=33)	9.1%	51.5%	15.2%	24.2%
Post-Intervention (n=30)	0%	16.7%	66.7%	16.7%
Scenario 4 (severe eczema and/or egg allergy, and a negative peanut-specific IgE)	Introduction at 2-3 years	Avoid peanut, retest at an older age	Introduction during the 1st year*	Refer to allergist
Pre-Intervention (n=33)	21.2%	0%	57.6%	21.2%
Post-Intervention (n=30)	3.3%	0%	76.7%	20%
Scenario 5 (severe eczema and/or egg allergy, and a positive peanut-specific IgE)	Lifetime avoidance of peanut	Avoid peanut, retest at an older age	Introduction during the 1st year	Refer to allergist*
Pre-Intervention (n=33)	6%	36.4%	12.1%	45.5%
Post-Intervention (n=30)	0%	10%	6.7%	83.3%
Are you confident in applying the NIH recommendations regarding age appropriate peanut product introduction?	Yes	No	I am not familiar with the recommendations	
Pre-Intervention (n=33)	18.2%	57.6%	24.2%	
Post-Intervention (n=30)	93.3%	6.7%	0%	
*Answers considered correct in each scenario				

eFigure 4. Pediatric resident survey results. IgE, immunoglobulin E; NIH, National Institutes of Health.