

Needs assessment for an infant and toddler food allergy curriculum for pediatric residents

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ABSTRACT

Background: The prevalence of pediatric food allergies is increasing. Although pediatric residents are frontline providers for children with food allergies, little is known about pediatric residents' educational experiences and comfort with infant and toddler food allergy.

Methods: An anonymous online needs assessment survey was created and distributed to 64 residents in one residency program. The survey explored residents' knowledge sources, experience, and comfort in diagnosing, treating, and counseling patients with regard to food allergy and anaphylaxis.

Results: Fifty-one pediatric residents (79.7%) completed the survey. Pediatric residents who had formal engagement with allergy-trained clinicians had 8.27 times the odds (odds ratio 8.27 [95% confidence interval, 1.16–59.01]; $p = 0.035$) of feeling comfortable in treating infant and toddler anaphylaxis compared with those who did not feel comfortable.

Conclusion: These findings suggest that a standardized pediatric residency curriculum, in partnership with pediatric allergists, may present enhanced educational opportunities for pediatric residents.

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The prevalence of food allergy (FA) is increasing in the United States,¹ and it is estimated that 8%–10% of all children and 6% of children between 0 and 2 years of age have an FA.^{2,3} Recent publications highlighted clinical practice deficits, including the inappropriate treatment of anaphylaxis⁴ and the lack of implementation of peanut feeding guidelines by primary care clinicians.⁵ Although pediatric residents are frontline providers for infants (ages < 12 months) and toddlers (ages 12–35 months) with FA, currently, the Accreditation Council for Graduate Medical Education does not require an allergy curriculum as part of pediatric residency training. To our

knowledge, only one previous study explored pediatric residents' comfort and knowledge with regard to the FA topic of maternal diet and infant FA.⁶ We set out to explore the educational needs, attitudes, and satisfaction of the pediatric residents at MassGeneral Hospital for Children (MGHfC) in Boston, Massachusetts. Our main objective was to investigate the sources of information that pediatric residents use to gain knowledge about infant and/or toddler FAs and their comfort in evaluating, diagnosing, treating, managing, and counseling patients and their families with regard to infant and/or toddler FAs and anaphylaxis.

METHODS

A needs assessment survey was developed by pediatric clinicians, including a pediatric resident (M.Y.), a pediatric allergist (M.P.) as well as a pediatric clinician (A.F.) and a Ph.D. educator (K.D.), who both have training and experience in survey design and implementation and expertise in medical education scholarship. The survey instrument consisted of 12 questions that explored the following topics: FA training before residency, resources used for information, comfort in evaluating and managing FA, comfort in diagnosing and treating anaphylaxis, comfort in counseling families about a variety of FA topics, satisfaction with current resident training opportunities (if present), and the level of postgraduate training. Likert scales were used to determine pediatric residents' comfort level with various infant and/or toddler FA topics with the following response options: very comfortable, comfortable, uncomfortable, and very uncomfortable.

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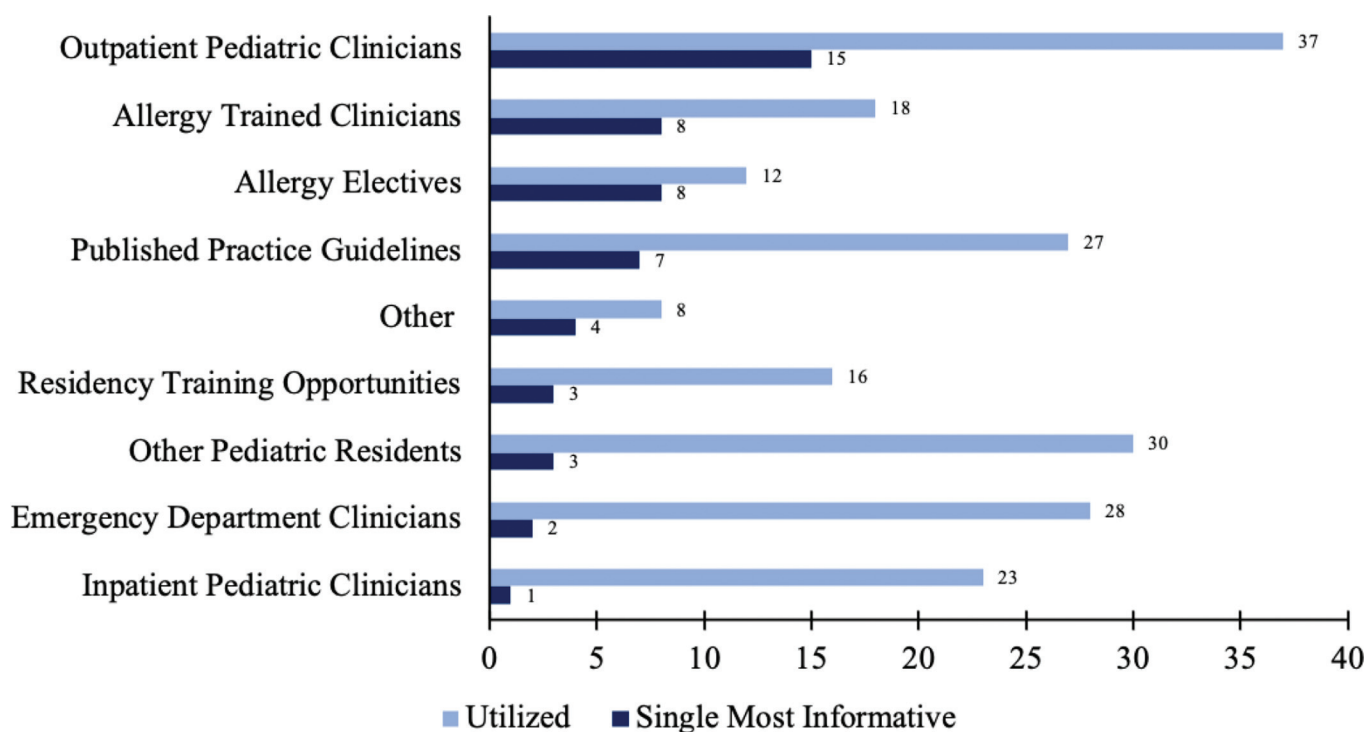


Figure 1. Infant and toddler food allergy and anaphylaxis resources used by the pediatric residents.

fortable. A yes-no structure was used to determine previous training and the sources of information they used for infant and toddler FAs. By using best practices in the survey design, cognitive interviewing was performed with a panel of pediatric clinicians to ensure face validity, and the survey was updated iteratively to incorporate recommended changes. The final survey instrument was deemed to meaningfully cover the appropriate topics, to be easy to understand, and to be of manageable length.

Study data were collected and managed by using the REDCap electronic data capture tools hosted at MassGeneral Brigham.⁷ REDCap is a secure, web-based application designed to support data capture for research studies.⁷ A survey link and three follow-up e-mails were sent to the population of 64 pediatric and pediatric internal medicine residents at MGHfC in August 2020, and the participants had 3 weeks to participate. The study was deemed to be exempt by the MassGeneral Brigham Human Research Office. Results are presented by using descriptive and inferential statistics. Analyses were conducted in Stata/IC Version 16.1 (StataCorp, College Station, TX), and two-sided $p < 0.05$ were considered statistically significant. M.C. Young contributed to the conception and design of the study, acquisition of data, interpretation of data, drafting of manuscript, and revision of the manuscript. I.R. Roy contributed to the conception and design of the study, and to the analysis and interpretation of the data. A.S. Frey-Vogel and K. Dzara contributed to the

conception and design of study and revision of the manuscript. M. Pistiner contributed to the conception and design of the study, acquisition of the data, interpretation of the data, drafting of the manuscript, and revision of the manuscript. All the authors reviewed and approved this manuscript.

RESULTS

A total of 51 pediatric residents completed the needs assessment survey, which represented a 79.7% response rate, and a 100.0% completion rate. A total of 37.3% of the respondents (19) were in their first postgraduate year (PGY-1), 29.4% (15) were in PGY-2, 27.4% (14) were in PGY-3, and 5.9% (3) were in PGY-4. Before residency entry, only 5.9% of the pediatric residents received formal training with regard to infant and/or toddler FAs. During residency, 31.4% (16) received lectures, workshops, or simulations, and 70.6% (36) reported feeling dissatisfied with the current resident training opportunities on this topic.

The most reported sources for information with regard to infant and/or toddler FAs and anaphylaxis included outpatient pediatric clinicians (*i.e.*, community pediatricians) (72.5% [37]), other pediatric residents (58.8% [30]), and emergency department clinicians (52.9% [28]). However, when asked about their single most informative resource, outpatient pediatric clinicians (29.4% [15]), allergy electives (15.7% [8]), and allergy-trained clinicians (*i.e.*, staff allergists) (15.7% [8]) were reported in that order

Table 1 Associations between formal engagement with allergy-trained clinicians and comfort with infant and toddler FA evaluation, management, diagnosis, and treatment

Outcome Variable	Unadjusted Univariate Logistic Regression			Adjusted Multivariate Logistic Regression*		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Comfort in evaluating infant and/or toddler FA: engagement with allergy						
Yes	7.64	1.74–33.58	0.007	5.13	0.85–30.95	0.075
No	1.00	Ref		1.00	Ref	
Comfort in managing infant and/or toddler FA: engagement with allergy						
Yes	4.83	0.84–27.93	0.078	2.12	0.25–17.78	0.487
No	1.00	Ref		1.00	Ref	
Comfort in diagnosing infant and/or toddler anaphylaxis: engagement with allergy						
Yes	2.53	0.68–9.39	0.166	1.23	0.26–5.91	0.795
No	1.00	Ref		1.00	Ref	
Comfort in treating infant and/or toddler anaphylaxis: engagement with allergy						
Yes	7.41	1.46–37.57	0.016	8.27	1.16–59.01	0.035
No	1.00	Ref		1.00	Ref	

FA = Food allergy; OR = odds ratio; CI = confidence interval; Ref = reference.

*Adjusted for years of postgraduate training.

(Fig. 1). The majority of pediatric residents felt uncomfortable with evaluating (76.5% [39]) and managing (86.3% [44]) infant and/or toddler FAs. However, 68.6% of the pediatric residents (35) felt comfortable diagnosing and treating infant and/or toddler anaphylaxis.

When examining factors that may contribute to pediatric residents' clinical comfort, we found a strong association between formal engagement with allergy-trained clinicians, defined as the completion of an allergy elective and/or the utilization of staff allergy-trained clinicians when in need of allergy-related advice, and comfort with treating infant and/or toddler anaphylaxis (Table 1). After adjusting for years of postgraduate training, the pediatric residents who had formal engagement with allergy-trained clinicians had 8.27 times the odds (odds ratio 8.27 [95% confidence interval, 1.16–59.01]; $p = 0.035$) of feeling comfortable with treating infant and/or toddler anaphylaxis compared with pediatric residents who did not feel comfortable.

DISCUSSION

Our study identified several educational deficiencies, including a lack of, and dissatisfaction with, training

opportunities, and a lack of comfort in evaluating, managing, and counseling families about FA topics. However, we also showed that formal engagement with allergy-trained clinicians was strongly associated with increased comfort in treating anaphylaxis. This study demonstrated several gaps with regard to pediatric residents' sources of information and comfort with infant and/or toddler FA and anaphylaxis. Our study found that the majority of the pediatric residents entered residency without training in infant and/or toddler FAs and anaphylaxis. The residents then, in the absence of a standard allergy curriculum, sought information about infant and/or toddler FAs and anaphylaxis from multiple sources, many of whom were not allergists.

When presented with lectures, workshops, and simulation experiences about FAs, the pediatric residents were largely dissatisfied with them. Furthermore, the top three resources used for information about infant and/or toddler FAs and anaphylaxis did not include allergy experiences, despite pediatric residents who reported that two of the top three single most informative resources were allergy electives and allergy-trained clinicians. Overall, these findings suggested that the design and implementation

of a standard curriculum, emphasizing engagement with pediatric allergists and incorporation of educational materials prepared by allergists, *e.g.*, the Food Allergy Primer,⁸ may present improved educational opportunities.

This study was designed to be descriptive; therefore, we did not conduct a power analysis and sample-size calculation prospectively. In addition, the level of postgraduate training was the only demographic variable that we ascertained so to conserve the anonymity of the resident respondents. However, we specifically identified and included the level of postgraduate training as our chief theoretical confounder and believed that, without controlling for this variable, the final odds ratio would not be meaningful. We plan to ascertain additional demographic variables in a future project and consider them for more fully specified logistic regression models.

This analysis illuminated the need for an allergy medicine curriculum that emphasizes engagement with allergy-trained clinicians among pediatric residents at MGHfC. Although not generalizable beyond our setting, we have been successfully funded by The Allergists' Foundation of the American College of Allergy, Asthma & Immunology to expand this needs assessment nationally to determine if the findings at our institution are generalizable to other pediatric residents nationally. Furthermore, this needs assessment purposefully focused on attitudes, satisfaction, and comfort measured through self-report. Future studies might explore the practice locations of outpatient pediatricians because the settings may influence the type of training that pediatric residents receive and also focus on direct measures of residents' clinical proficiency and how pediatric residents apply FA and anaphylaxis knowledge on their own.

This study examined pediatric residents' knowledge sources and comfort in evaluating, diagnosing, treating, managing, and counseling families with regard to infant and/or toddler FAs and anaphylaxis, and adds to the literature in several ways. First, we examined a population of pediatric and pediatric/internal medicine residents, whereas the existing literature has focused on other populations.^{9–11} Second, we explored where pediatric residents seek information about infant and/or toddler FAs and anaphylaxis. These findings support the need for a national needs assessment, which may guide the design and implementation of a standard

pediatric allergy curriculum for all pediatric residency programs.

CONCLUSION

Although pediatric residents are frontline providers for infants and toddlers with FA, they may lack comfort in evaluating, managing, and counseling families about FA topics. Formal engagement with allergy-trained clinicians may improve pediatric residents' comfort in treating allergic conditions.

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