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School nurse perspectives on school policies for food allergy and anaphylaxis

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ABSTRACT

Background: Although school health care professionals are integral to the management of students with food allergy, their views on school food allergy policies have not yet been reported.
Objective: To characterize food allergy policies currently being used in schools and their utility and potential barriers to implementation from the perspective of school health care professionals.
Methods: An electronic survey was disseminated to school nurses at the 2016 National Association of School Nurses meeting and through the Allergy and Asthma Network listserv. Frequencies were calculated to describe participant characteristics and responses. Unadjusted associations were examined using χ^2 tests; adjusted associations were examined using multiple logistic regression models.
Results: A total of 242 completed surveys were included in the analysis. Thirty-two percent of nurses reported an allergic reaction in their school in the past year. Most schools used a variety of policies, including anaphylaxis training for staff (96.7%), stock epinephrine availability (81.7%), designated lunch areas (62.2%), and food guidelines for classrooms (61.8%). Barriers to implementation included financial, time, and attitudinal considerations. Schools with pre-K or kindergarten students had higher odds of having designated lunch areas (adjusted odds ratio [OR], 2.1; 95% confidence interval [CI], 1.0–4.1; $P < .05$). The odds of having emergency epinephrine available were higher in schools with a full-time nurse (OR, 2.6; 95% CI, 1.1–6.3; $P < .05$) and in schools reporting at least 1 severe reaction in the past year (OR, 3.2; 95% CI, 1.2–8.5; $P < .05$).
Conclusion: With one-third of school nurses reporting an allergic reaction in the past year, schools use many strategies to minimize allergen exposures and increase anaphylaxis preparedness. Most school nurses favor these policies and acknowledge barriers to implementation.
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Introduction

IgE-mediated food allergy affects up to 8% of children in the United States.[1] Up to 2 students in every classroom may be affected, and these students are at risk for allergic reactions, including anaphylaxis, during the school day.[2–5] In addition, up to 25% of students may experience their first allergic reaction while at school.[3,4,6] Thus, schools must be prepared to care for students with both known and unknown risk of food allergy.

The safety of students with food allergy while at school is a significant concern among families and school staff. Meals, including breakfast, lunch, and snacks, are a regular part of the school day. Food may also be used as a part of classroom lesson plans, celebrations, and rewards and in school-wide activities, such as fundraisers, bake sales, and concession stands at athletic events. Additional food allergens may be found in common nonfood products, including craft and science materials.[3] Given the variety of ways in which food may be used during the school day, schools can represent high-risk settings for inadvertent exposures.

To promote a safe learning environment for students, schools develop and implement policies to prevent unintentional allergen exposures and respond to any reactions that may occur. Although few evidence-based resources such as the *CDC Voluntary Guidelines for Managing Food Allergies in Schools and Early Care and*

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Education Programs and the online toolkit from the National Association of School Nurses (NASN) are available to assist schools with development of food allergy policies and staff education,[7,8] no standardized food allergy protocols currently exist for schools. Therefore, wide variability in food allergy policies may be seen nationwide.

School nurses are leaders in the development, implementation, and evaluation of school health-related policies[9] and often work with students' health care practitioners to promote student health and safety while at school. Although school nurses play an integral role in school food allergy management, little is known about their perspectives on school food allergy policies. The goal of this study was to describe the policies currently used by schools and to characterize the perceptions of school nurses regarding the effectiveness, need, and barriers to implementation of these policies.

Methods

Survey Development and Dissemination

An initial survey was developed by pediatricians, allergists, survey researchers, and school nurses with the goal of characterizing school policies related to food allergy. The survey domains included school characteristics (size, grade levels, nursing staff); current food allergy policies; acceptability, effectiveness, and feasibility of current policies; and desired food allergy policies. After initial survey development, cognitive interviews were conducted with a subset of school nurses and administrators (n = 5) to refine the survey questions. The final survey tool consisted of 125 multiple-part, multiple-choice, and open-ended response questions with skip logic and required approximately 15 minutes to complete. The final survey was administered electronically. REDCap (Research Electronic Data Capture,[10] Vanderbilt University) was used to administer the online survey, which was hosted at Northwestern University.

Selection of Participants

School nurses and administrators were recruited for participation through the 2016 NASN meeting and the Allergy and Asthma Network listserv. Eligible participants were invited to participate via an e-mail that contained a link to the survey, and consent was implied if they completed the survey through this link. The process of obtaining informed consent followed all applicable requirements. The survey was conducted from June 2016 through October 2016. No identifying information was collected, and all responses were kept confidential on secure servers at Northwestern University. The study was deemed exempt by Northwestern University's Institutional Review Board.

Statistical Analysis

All statistical analyses were performed in Stata 14.0 statistical software (Stata Corp, College Station, Texas). Frequencies were calculated to describe respondent characteristics and responses. To examine the association between report of a particular practice and respondent characteristics, outcomes were dichotomized into 2 categories: yes and no/don't know. Missing responses were coded with no/don't know. Unadjusted associations were examined using χ^2 tests; adjusted associations were examined using multiple logistic regression models that were estimated for each outcome.

Results

Survey Respondents

Of 307 completed surveys, 242 were included in the final analysis. Sixty-five were excluded because of missing data or responses having been provided for a larger system (eg, district instead of school). Most respondents were school nurses (95.9%), worked at a public school (88%), and worked at an elementary and/or middle school (90.9%) (Table 1). School size was most frequently between 500 and 999 students (45.9%). All regions of the United States were represented, with the highest percentage being from the Northeast (33.9%) and Midwest (33.2%). A nurse was reported to be on site 5 days a week in 88% of schools.

Table 1
Demographic Characteristics of Survey Respondents and the Schools They Represent

Characteristic	Finding[a] (N = 242)
Respondent type	
Nurse	232 (95.9)
Administrative staff	3 (1.2)
Other	7 (2.9)
Mean (SD) No. of days a nurse is available at school	4.6 (1.10) (n = 233)
Type of school	
Public	213 (88.0)
Private and other	29 (12.0)
Grades included (not mutually exclusive)	
Any Pre-K or Kindergarten	183 (75.6)
Any elementary (fifth grade or less)	197 (81.4)
Any elementary or middle (less than ninth grade)	220 (90.9)
Region	
Northeast	82 (33.9)
Midwest	80 (33.1)
South	59 (24.4)
West	21 (8.7)
Student population	
0–499	88 (36.4)
500–999	111 (45.9)
1,000–1,999	29 (12.0)
2,000–4,000	14 (5.8)
No. of students with a food allergy reported (n = 234)	
0–14	64 (37.4)
15–29	80 (34.2)
30–44	38 (16.2)
≥45	52 (22.2)
Mean No. of severe allergic reactions to have occurred in the past year reported	
0	165 (68.2)
1	51 (21.1)
>1	26 (10.7)
Common allergens reported:	
Peanut	228 (94.2)
Tree nut	200 (82.6)
Milk	94 (38.8)
Egg	91 (37.6)
Shellfish	81 (33.5)
Fin fish	17 (7.0)
Wheat	49 (20.3)
Soy	28 (11.6)
Other	21 (8.7)

[a]Data are presented as number (percentage) unless otherwise indicated.

All except 2 respondents reported at least 1 student with known food allergy in their school. Peanut was the most frequently reported allergen (94.2%). A total of 31.8% of respondents indicated that at least one severe allergic reaction occurred at their school in the previous academic year, with 34% of these reporting more than one severe reaction.

Food Allergy and Anaphylaxis Policies

Most schools used a variety of policies to mitigate the risk of food allergen exposure, including policies for allergen containment and policies to increase preparedness to manage an allergic reaction (Table 2). The polices most frequently reported to be in place were training of school staff on allergic reactions and anaphylaxis (96.7%) and the use of an epinephrine autoinjector (EAI) (96.7%), training of lunchroom staff about food allergies (88.4%), clear cleaning procedures for the lunchroom (84.3%), availability of emergency (stock)

Table 2
School Policies Related to Food Allergy and Anaphylaxis

School policy	Frequency, no. (%)		
	Yes	No	Unsure
School-wide policies			
Emergency (stock) epinephrine is available	197 (81.7)	43 (17.8)	1 (0.4)
Policy is helpful (if responded "yes")/needed (if responded "no")	194 (98.5)	33 (76.7)	
Where			
Nurse's office	166 (84.3)[a]		
Principal's office	5 (2.5)		
Lunchroom	17 (8.6)		
Specific classroom	3 (1.5)		
Other	45 (22.8)		
Children are able to carry their medications	190 (79.2)	45 (20.0)	2 (0.8)
Policy is helpful/needed	174 (92.6)	20 (41.7)	
There are community food allergy awareness programs and events	122 (50.6)	87 (36.1)	32 (13.3)
Policy is helpful/needed	114 (93.4)	56 (64.4)	
Lunchroom-specific policies			
Designated lunch areas for students with food allergies	150 (62.2)	87 (36.1)	4 (1.7)
Policy is helpful/needed	128 (85.3)	10 (11.5)	
Training of lunchroom staff about food allergies	213 (88.4)	15 (6.2)	13 (5.4)
Policy is helpful/needed	206 (96.7)	8 (53.3)	
School lunch menus with allergen information available	156 (64.5)	63 (26.0)	23 (9.5)
Policy is helpful/needed	145 (95.5)	49 (77.8)	
Food items are labeled with allergen information	75 (31.4)	120 (50.2)	44 (18.4)
Policy is helpful/needed	72 (97.3)	65 (58.1)	
Clear cleaning procedures in the lunchroom	204 (84.3)	13 (5.4)	25 (10.3)
Policy is helpful/needed	195 (96.5)	11 (84.6)	
Classroom-specific policies			
Strict food guidelines in the classroom	149 (61.8)	82 (34.0)	10 (4.2)
Policy is helpful	141 (95.3)	34 (42.5)	
Strict food guidelines for celebrations (holidays and birthdays)	163 (67.6)	68 (28.2)	10 (4.2)
Policy is helpful/needed	149 (92.6)	40 (58.8)	
What are the recommendations			
Food with a clear ingredient label is allowed	80 (49.1)		
No food is allowed	44 (27.0)		
I am not sure	2 (1.2)		
Other	37 (22.7)		
School staff policies			
Allergic reaction/anaphylaxis training for school staff	234 (96.7)	8 (3.3)	0
Policy is helpful/needed	227 (97.4)	6 (85.7)	
How is this training implemented			
Web	161 (66.5)		
In person	34 (14.1)		
Other	12 (5.0)		
Epinephrine autoinjector training for school staff	232 (96.7)	8 (3.3)	0
Policy is helpful/needed	223 (98.2)	6 (75.0)	
Who is trained			
Nurse	213 (88.0)		
Administrator	170 (70.3)		
Athletic trainer	73 (30.2)		
Specific teachers	103 (42.6)		
All teachers	109 (45.0)		
All staff	54 (22.3)		
Other	55 (22.7)		
I don't know	0		
After-school activities policies			
Emergency (stock) epinephrine available for after-school activities	97 (40.6)	122 (51.1)	20 (8.4)
Policy is helpful/needed	90 (92.8)	58 (47.5)	
Specific food policies for after-school activities	71 (29.6)	112 (46.7)	57 (23.8)
Policy is helpful/needed	67 (94.4)	33 (29.5)	
Emergency (stock) epinephrine travels with groups outside of school	67 (28.0)	157 (65.7)	15 (6.3)
Policy is helpful/needed	67 (100.0)	45 (28.9)	
Transportation			
Children take the school bus to/from school	219 (90.9)	20 (8.3)	2 (0.83)
Adult on the bus that is trained on allergic reactions			
Yes	123 (56.4)		
No	46 (21.1)		
Not sure	49 (22.5)		

[a]Stock epinephrine autoinjectors can be stored in multiple locations with a single school.

epinephrine (81.7%), and allowing children to carry their medications (79.2%). In schools where emergency (stock) epinephrine was available, the devices were most commonly stored in the nurse's office (84.3%). Labeling of school lunch items with allergen information (31.4%), specific food policies for after-school activities (29.6%), and having emergency (stock) epinephrine that travels with groups outside school (28.0%) were the policies least frequently reported to be implemented by schools.

Table 3
Barriers to Implementation of School Policies

School policy	Barriers, no. (%) of responders						
	Money	Limited staff	Time	Staff education	Parent resistance	Administration/Staff resistance	Other
School-wide stock epinephrine	17 (39.5)	7 (16.3)	4 (9.3)	7 (16.3)	0	18 (41.9)	19 (44.2)
Children are able to carry their own medications	0	2 (4.2)	0	3 (6.3)	3 (6.3)	5 (10.4)	12 (25.0)
Allergy awareness programs in the community	28 (32.2)	42 (48.3)	61 (70.1)	15 (17.2)	11 (12.6)	24 (27.6)	8 (9.2)
Designated lunch areas for students with food allergies	4 (4.6)	14 (16.1)	8 (9.2)	15 (17.2)	16 (18.4)	21 (24.1)	46 (52.9)
Training of lunchroom staff about food allergy	3 (20.0)	7 (46.7)	7 (46.7)	3 (20.0)	0	3 (20.0)	2 (13.3)
School lunch menus are available with allergen information	14 (22.2)	26 (41.3)	22 (34.9)	15 (23.8)	0	20 (31.8)	18 (28.6)
Food items are labeled with allergen information	29 (24.2)	49 (40.8)	43 (35.8)	29 (24.2)	1 (0.8)	24 (20.0)	31 (25.8)
Clear cleaning procedures in the lunchroom	1 (7.8)	5 (38.5)	4 (30.8)	8 (61.5)	0	7 (53.9)	3 (23.1)
Strict food guidelines in classrooms	3 (3.7)	11 (13.4)	14 (17.1)	20 (20.4)	38 (46.3)	31 (37.8)	18 (22.0)
Strict food guidelines for celebrations (holidays and birthdays)	1 (1.5)	7 (10.3)	8 (11.8)	15 (22.1)	32 (47.1)	30 (44.1)	14 (20.6)
Allergy reaction and anaphylaxis training for staff	1 (12.5)	1 (12.5)	4 (50.0)	5 (62.5)	0	2 (25.0)	2 (25.0)
Epinephrine autoinjector training for staff	0	0	1 (12.5)	3 (37.5)	0	4 (50.0)	2 (25.0)
Emergency (stock) epinephrine is available for after-school activities	39 (32.0)	49 (40.2)	13 (10.7)	27 (22.1)	4 (3.3)	32 (26.3)	37 (30.3)
Specific food policies for after-school activities	24 (21.4)	32 (28.6)	14 (12.5)	26 (23.2)	34 (30.4)	38 (33.9)	29 (25.9)
Emergency (stock) epinephrine travels with groups outside of school	80 (51.0)	45 (28.7)	21 (13.4)	31 (19.8)	2 (1.3)	41 (26.1)	43 (27.4)

Most school nurses thought that the policies enacted in their school were helpful (Table 2). The only policy thought to be helpful by less than 90% of respondents was having designated lunch areas for students with food allergies (85.3%). When a given policy was not in place, many thought that such a policy was needed in their school. The policies most frequently thought to be needed in schools in which they were not in place were training of school staff on allergic reactions and anaphylaxis (85.7%), having clear cleaning procedures in the lunchroom (84.6%), having allergen information available for school lunch menus (77.8%), availability of emergency (stock) epinephrine (76.7%), and training of school staff on use of an EAI (75.0%). Specific food policies for after-school activities (29.5%), having emergency (stock) epinephrine that travels with groups outside school (28.9%), and having designated lunch areas (11.5%) were the policies least often believed to be needed in schools that did not have such policies in place. Financial considerations were frequently reported as a barrier to implementation of policies related to stock epinephrine, whereas limited staff and time were often reported as barriers to policies related to allergen labeling for food items (Table 3). Resistance among parents and/or staff was frequently reported as a barrier for policies and practices related to food allergen containment.

Associations between Policies and School Characteristics

Associations were noted between policies that were in place and the age of the student body. In unadjusted analyses, schools with older students (middle and high school), compared with schools with elementary school students only, more frequently allowed self-carrying of emergency medications (95.6% vs 74.6%, $P < .05$) and had stock epinephrine available for after-school activities (53.3% vs 37.1%, $P < .05$). Adjusted analyses (adjusting for days of nursing presence at school, public vs private school, presence of pre-K– or kindergarten-age students, region, school size category, and number of severe reactions) revealed that schools with younger students (pre-K or kindergarten) were more likely to have designated lunch areas for students with food allergy (adjusted odds ratio [OR], 2.1; 95% confidence interval [CI], 1.0–4.1; $P < .05$) (Table 4).

Adjusted analysis also revealed that schools in the Northeast (OR, 5.4; 95% CI, 1.7–17.4; $P < .01$), schools with a full time nurse (OR, 2.6; 95% CI, 1.1–6.3; $P < .05$), and schools reporting at least one severe reaction in the past year (OR, 3.2; 95% CI, 1.2–8.5; $P < .05$) were more likely to have emergency (stock) epinephrine available (Table 4). Finally, an effect of school type (public vs private) was noted. Public schools were more likely to have students who took a school bus to or from school (OR, 17.4; 95% CI, 5.9–51.9; $P < .01$) (Table 4). These schools were also more likely to have an adult on the bus who was trained in how to use an EAI and/or how to respond to an allergic reaction (OR, 11.3; 95% CI, 3.2–39.3; $P < .05$).

Discussion

To our knowledge, the present study is one of the first to characterize the diversity of food allergy policies used by schools and to describe the perspectives of school health professionals on the utility of these policies. One-third of nurses reported an allergic reaction in their school in the past year. Policies related to training of school staff were nearly always in place or frequently considered to be needed, and more than 80% of respondents reported having stock epinephrine available in their school. Policies related to after-school activities were among those least often in place. Greater variability was seen in the implementation of policies that addressed allergen containment during lunch and in classrooms, which may be in part related to variations in the age of the student body. Most school nurses favored most of the food allergy policies but also acknowledged barriers to implementation, such as limited time and resources.

Most respondents indicated that their school had emergency (stock) epinephrine available and that school staff were provided with training on allergic reactions and anaphylaxis and the use of an EAI. Such preparedness to treat severe allergic reactions is critical because studies have found that allergen restriction in schools is not sufficient to keep all students safe[11,12] and that allergens may still enter the school despite the implementation of food restriction policies.[13] Indeed, nearly one-third of respondents in our study reported at least one severe allergic reaction occurring in their school in the past year, with one-third of those reporting more than one severe reaction. Thus, anaphylaxis preparedness policies and education are as important as policies to prevent unintentional allergen exposures. Other studies have found the need for stock epinephrine availability in schools to address those with known risk for anaphylaxis who have not provided student-specific EAIs as well as to be prepared to treat individuals who are not yet aware of their food allergies.[4,5] Of note, stock epinephrine was much less likely to be available for after-school activities or to travel with groups outside school. Given that up to 19% of anaphylactic reactions during the school day may occur outside the school building or on field trips,[4] promoting the availability of stock EAIs for these situations may be important to consider.

Table 4
Adjusted Odds Ratios (95% Confidence Intervals) of School Policies

	Emergency (stock) epinephrine is available	Children allowed to carry their epinephrine autoinjector	Designated areas for students with food allergy to sit and eat lunch	Emergency (stock) epinephrine is available during after-school activities	Some children take the school bus to or from school	Adult on bus trained in use of epinephrine autoinjector and/or how to respond to an allergic reaction
School type						
Private	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Public	0.8 (0.03–2.6)	1.12 (0.43–2.93)	2.0 (0.9–4.6)	0.4 (0.2–1.0)	17.4 (5.9–51.9)[a]	11.3 (3.2–39.3)[b]
School population						
0–499	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
500–999	1.6 (0.7–2.6)	2.4 (1.2–5.1)[b]	1.9 (1.0–3.6)[b]	0.6 (0.3–1.2)	0.7 (0.2–2.3)	1.6 (0.9–3.0)
1,000–1,999	3.3 (0.7–15.5)	5.7 (1.2–27.4)[b]	1.4 (0.5–3.6)	1.2 (0.5–3.1)	5.1 (0.4–61.1)	1.6 (0.6–4.3)
≥2000	6.8 (0.7–63.9)	5.7 (0.6–51.0)	1.3 (0.4–4.8)	5.7 (1.4–24.0)[b]	0.7 (0.1–8.1)	2.1 (0.6–7.4)
Has pre-K or Kindergarten classes						
No	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Yes	1.3 (0.5–3.3)	0.4 (0.1–1.0)	2.1 (1.0–4.1)[b]	0.6 (0.3–1.1)	1.0 (0.3–3.6)	1.5 (0.8–2.8)
Region						
Midwest	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
Northeast	5.4 (1.7–17.4)[a]	0.5 (0.21–1.1)	1.5 (0.8–3.1)	1.6 (0.8–3.1)	1.7 (0.5–6.2)	1.3 (0.7–2.5)
South	0.4 (0.2–1.1)	0.4 (0.2–1.1)	0.7 (0.3–1.5)	0.9 (0.4–1.9)	1.4 (0.4–5.0)	1.6 (0.8–3.5)
West	0.6 (0.2–2.3)	2.93 (0.34–25.2)	0.7 (0.2–1.9)	1.7 (0.6–4.9)	2.0 (0.3–15.4)	1.1 (0.4–3.2)
Mean No. of severe reactions reported in past year						
0	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
>0	3.2 (1.2–8.5)[a]	1.1 (0.5–2.3)	1.6 (0.9–3.1)	1.4 (0.7–2.5)	0.2 (0.1–0.7)	0.6 (0.3–1.2)
Mean No. of days nurse is available at school						
1–4	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]	1 [Reference]
>4	2.6 (1.1–6.3)[a]	4.7 (0.96–23.4)	1.2 (0.5–2.7)	1.5 (0.6–3.5)	1.5 (0.4–5.5)	0.9 (0.4–2.0)

[a] $P < .01$.
[b] $P < .05$.

In this study, higher rates of stock epinephrine availability were seen in schools with full-time school nurse coverage. Studies have indicated that students in schools with part-time school nurse coverage may not receive adequate school-based health services compared with students in schools with full-time qualified school nurses.[14] The American Academy of Pediatrics Council on School Health has recommended having a full-time qualified school nurse in every school,[15] and full-time school nursing services have been found to be a cost-beneficial investment of public funds, especially given the increasing numbers of students with chronic health conditions, otherwise limited access to health care, and other health management needs.[16] Our results further support the beneficial influence of having full-time nurse presence at schools in promoting the safety of students with food allergy.

Differences in policy implementation were also associated with the age of a school's student body. Such differences may be expected and appropriate because of developmental considerations and differences in the structure of the school day. For example, younger children are likely less able to take steps to avoid allergen exposure or to articulate symptoms of an allergic reaction. Therefore, designation of allergen-free lunch areas is often considered by schools with younger students as a risk mitigation method. In contrast, older students are more independent and developmentally able to practice self-management skills. Designation of allergen-free lunch areas at such ages may therefore not be considered a highly necessary policy. In addition, middle and high school students often change classrooms and teachers throughout the school day, which may dictate a stronger need for policies allowing self-carrying of emergency medications. Factors such as a greater number of school-sponsored extracurricular activities for older students and an increase in risk-taking behaviors and first reactions during adolescence[17,18] may in part explain the increased rate of stock epinephrine availability during after school activities among middle and high schools.

Most respondents in our study thought that most of the food allergy policies described were or would be helpful for promoting the safety of students with food allergy. However, practical limitations, such as limited financial resources, staff, and time, were reported, which may hinder the implementation of desired policies. Resistance among staff or parents was most frequently cited as a barrier for policies related to implementation of food guidelines in the classroom or after school. Parental resistance to specific school policies has been reported previously.[19] Such attitudes may stem in part from the fact that members of the general public often have misconceptions about food allergy and the necessity of strict allergen avoidance for prevention of allergic reactions.[19] Our findings suggest that efforts to educate members of the school community about food allergy and the importance of specific policies may promote the implementation of such policies. In addition, designation of lunch areas for children with food allergy was among the policies least frequently thought to be helpful or needed by parents. One possible explanation for this is that while placing students at separate tables may be effective for limiting allergen exposure, it may also open students up to food allergy–related bullying. Indeed, one study found that 30% of children with food allergy have reported being a victim of such bullying.[20] One possible solution to mitigate the risk of bullying may be to make concurrent efforts to educate peers on the severity and management of food allergy. Future studies examining the effectiveness of specific policies in improving the safety and well-being of students with food allergy while at school may also provide data to both inform policy decisions and assist in advocacy efforts to overcome existing barriers to policy implementation.

Although a few prior studies have examined school food allergy polices, a recent study of the Massachusetts public school system found that more than 90% of schools had peanut-free tables.[11] That number is higher than the rate of designated food allergen–free areas in the lunchroom (55.9%-69.5% across regions in the United States)

reported in the present study. However, that study also reported that peanut-free classrooms were present in 65.6% to 67.4% of schools, which is similar to the rate of classrooms having strict food guidelines in place (61.8%) in the present study. Similarly, few studies have examined how often schools have cases of severe allergic reactions in a given school year. Although approximately one-third of respondents in the present study reported at least one severe allergic reaction in their school in the previous year, a prior national survey of schools reported that 11% had at least one case of anaphylaxis during the 2013–2014 school year.[21] These differing results may be in part attributable to different wording of survey questions in each of the studies (ie, severe reactions versus anaphylactic events).

This study is not without limitations, including the fact that participants were recruited through the 2016 NASN meeting and the Allergy and Asthma Network listserv. This raises the possibility of a self-selection bias in that only individuals with an interest in school policies related to food allergy may have chosen to participate. In addition, a substantial number of surveys were excluded from the final analyses because of missing data or nurses referring to more than one school in their responses, which may have led to additional selection bias. Furthermore, the use of self-reported data is subject to recall bias and possible social desirability bias, and although the survey instrument was refined through expert interview, it was not a standardized, validated survey. Finally, the high mean (SD) number days that schools in the study had nursing coverage (4.6 [1.1] days) suggests that these results may not be generalizable to the broader US population of schools.

In conclusion, schools enact a variety of policies to reduce unintentional food allergen exposures during the school day and to prepare to respond in case of allergic reactions. Specific policies vary according to factors such as the age of the student body and school nurse presence. Most school nurses favor these policies, but policy implementation may be hindered by a lack of time, resources, and/or resistance by parents and staff. Policies related to staff training and availability of stock epinephrine were frequently in place, whereas those related to food restriction guidelines and after-school activities were less often used. With nearly one-third of school nurses reporting a severe allergic reaction in their school in the past year, identification of effective school food allergy policies and their consistent implementation may lead to improved outcomes for students with food allergy.

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