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Food allergy needs assessment, training curriculum, and knowledge assessment for child care

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ABSTRACT

Background: More than half of preschool-aged children are enrolled in child care in the United States. Roughly 8% of children between 3 and 5 years of age have a food allergy. Child care center workers (CCCWs) are important caregivers who frequently encounter food allergies, but little is known about their education and understanding of food allergy and anaphylaxis.

Objectives: To perform a food allergy and anaphylaxis educational needs assessment, provide a training curriculum for CCCWs, and assess the effectiveness of the training curriculum.

Methods: An online educational needs assessment and live training curriculum addressing food allergy recognition, treatment, and food labeling with pretests and posttests were created, and content and face validity were obtained. A needs assessment survey was sent to centers in Dallas and Tarrant counties. The training curriculum was performed at continuing education conferences.

Results: Seventy-three workers responded to the needs assessment, with 46% reporting prior food allergy training. They reported information sources as parents (73%), self (54%), educational curricula (21%), and conferences (19%). Most believed they have a high or moderately high proficiency in food allergy management. Forty-five workers participated in the training curriculum. Total scores improved from 54% correct on the pretest to 83% correct on the posttest ($P < .001$). Categorical subanalysis reveals similar results, with statistically significant improvement in all areas.

Conclusions: CCCWs have diverse educational backgrounds and infrequently experience standardized training about food allergies. There is a significant lack of knowledge regarding food allergies and anaphylaxis. The curriculum was successful at increasing food allergy knowledge among CCCWs.

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Introduction

Food allergy affects approximately 8% of children in the United States.¹ Egg and milk allergies may be persisting longer today than previously observed.^{2,3} Food is the most common cause of anaphylaxis in children, and emergency department (ED) visits for food-induced anaphylaxis are increasing, having doubled between 2001 and 2006 at 1 academic pediatric ED.⁴ The US Peanut and Tree Nut Registry found that most reactions in their sample (64%) occurred in daycare or preschool, and 25% of these were first-time

reactions.⁵ With more than half of preschool-aged children enrolled in child care, child care center workers (CCCWs) are an important group caring for children, and their knowledge regarding caring for children with food allergies is unknown.⁶

There are several unique challenges for managing food allergies in child care centers. Centers often rely on medication provided by parents for allergies, including epinephrine, because entity laws have not been passed in all states. Entity laws enacted in some states for common use epinephrine only apply to schools but may not provide direct guidance or standards for child care centers. Much focus has been given to educating caregivers in the school setting, with well-developed recommendations. Although child caregivers are included in the 2013 guidelines of the Centers for Disease Control and Prevention, most recommendations apply to schools, and much of the information is not applicable to child care centers with fewer resources.⁷ The Australasian Society of Clinical Immunology and Allergy has published guidelines for prevention of food anaphylactic reactions in schools, preschools, and child care

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centers, but the recommendations for child care are again limited and unlikely to be accessed by many US child care centers.⁸ There is a high rate of turnover of CCCWs, and significant educational and experiential variability among these workers.⁹ Progress has also been made in providing resources for pediatricians and parents to teach themselves and to educate other caregivers.^{10,11} However, little work has been performed to systematically provide these same resources to CCCWs.

The only previous study to evaluate child care center food allergy awareness was published in 2005 with the results of follow-up surveys after intervention published in 2006.^{12,13} A telephone survey of 42 child care centers in suburban Chicago found that of the 48% of centers that had epinephrine available (provided by parents), only 55% of CCCWs were trained to recognize a reaction. Even more concerning is that only 24% responded that they would administer epinephrine (EpiPen). The follow-up survey was designed to assess retention from an intervention seminar focusing on when and how to administer epinephrine (EpiPen; Mylan Inc, Canonsburg, Pennsylvania). The initial postseminar assessment revealed that it was effective, with 77% of participants following the steps of intramuscular epinephrine administration correctly. However, at 6- and 12-month follow-up, only 48% and 31% of participants, respectively, were able to perform the steps correctly. A multicenter prospective study specifically evaluated allergic reactions in preschool-aged children.¹⁴ Teachers and school nurses treated only 3.4% and 0.2% of reactions, respectively, whereas parents treated more than half. Among all caregivers in this study, only 29.9% of severe reactions were treated with epinephrine, with reasons for not using epinephrine including failure to recognize a reaction (47.7%), epinephrine unavailable (23.1%), and fear (12.3%).

Although there are limited published data regarding knowledge of food allergies among CCCWs in the United States, these studies suggest that CCCWs are not following recommendations regarding food allergy management, and they may not be equipped to recognize and treat a reaction. Given these concerns and limited data, we sought to ascertain the educational needs of CCCWs in the Dallas–Fort Worth metroplex and provide education covering topics critical to understanding food allergies and anaphylaxis.

Methods

Participation in all stages of the study was voluntary and anonymous. The University of Texas Southwestern Medical Center Institutional Review Board approved the study. The study was deemed to be exempt, and written informed consent was not obtained. Verbal assent was performed at the beginning of each session.

Needs Assessment

A needs assessment survey was developed by a group of pediatric food allergy experts, including nurses, physician assistants, pediatric residents, and pediatric allergists. The survey (eTable 1) consists of 19 questions on demographics and center characteristics, experiences with allergic reactions, preferred learning methods, self-assessment of food allergy knowledge and comfort, and educational needs and interest in learning more about food allergies. A focus group was convened to achieve content and face validity, consisting of 5 CCCWs and directors, a school nurse, and a parent of a child in child care with food allergies. Each question was systematically reviewed with the group in detail. The focus group revealed that the needs assessment was easy to understand and of reasonable length. Most participants were able to complete the survey within 10 minutes.

After minor adjustments were made based on focus group feedback (eg, word changes for better understanding as in cross-contamination from cross-contact and adding the category of

learning from families about food allergy), the survey was modified into an online format using SurveyMonkey. A link to the anonymous online survey was e-mailed to 818 licensed child care centers in Dallas and Tarrant counties, using addresses publicly available from the Texas Department of Family and Protective Services, which licenses child care centers. Centers were excluded if they did not care for children between the ages of 1 and 5 years. By definition, licensed centers in Texas are not family- or home-based child care and, at the time of this survey, cared for 10 or more children. One reminder e-mail was sent to any e-mail address at which no one had completed the survey.

Training Curriculum

On the basis of the results of the needs assessment, an educational curriculum was developed with input from the same experts. They identified topics considered to be important for caregivers to understand food allergies, recognition of the signs and symptoms of an allergic reaction and anaphylaxis, treatment, food-labeling laws, and strategies for avoidance of food allergens. The training curriculum also included a discussion of the use and utility of having a food allergy and anaphylaxis action plan for each child and the rationale for having 2 autoinjectors for each child. A hands-on demonstration of how to use an epinephrine autoinjector was performed at each session, with each participant practicing with the autoinjector trainer. The trainers were also available for each participant to take with them and share with other workers at their center.

The hour-long presentation was piloted with the same focus group, with overwhelmingly positive reviews. The group requested a discussion of the responsibilities of the child care center and those of the parents of a child with food allergies, which was added to the presentation. Once finalized, the educational curriculum was offered by the then pediatric resident with experience in food allergy (B.J.L.) and assisted by a pediatric food allergist (J.A.B.) at regional child care licensing conferences for continuing education credit and completed by 45 CCCWs.

Knowledge Assessment

A knowledge assessment test was developed based on the content of the training session. The test (eTable 2) contains a mix of 18 multiple choice and true or false questions. It was administered anonymously to all participants before and after the training session. The test sought to ascertain the participant's knowledge of food allergy in the following 4 areas: understanding food allergies, recognizing an allergic reaction, treatment of a reaction, and food-labeling laws. The focus group also reviewed the test for content and face validity, and all questions were reviewed as appropriate and understandable. Test results were analyzed using JMP statistical software, version 10.0.0 (SAS Institute Inc, Cary, North Carolina). The mean percentage of correct scores on the pretest and posttest were compared by *t* test for all questions and categorical subgroups. Results were not compared before and after testing for each participant, but data were pooled. The test was also emailed to participants 6 months after the training session; however, no participants completed the follow-up test.

Results

Needs Assessment: Demographics

The survey was completed by 72 centers, for an 8.8% completion rate. An additional 22 participants completed the needs assessment survey on paper at the training sessions. Table 1 lists the demographic information for the 93 respondents to the needs assessment survey. Of these, 70 (76%) worked at a large center, caring for more than 50 children, and half of these (47 of 93) were

Table 1
Characteristics of the Study Population

Characteristic	No. (%) of respondents
Size of child care center (n = 92)	
<20	10 (11)
20–50	12 (13)
50–80	26 (28)
>80	44 (48)
Peanut-free child care center (n = 93)	47 (50.5)
No. of children with a food allergy (n = 89)	
0	6 (7)
1–5	44 (49)
6–10	17 (19)
>10	22 (25)
No food allergy action plan available (n = 86)	23 (27)
Previous training (formal or informal) in food allergy (n = 93)	43 (46)
Experienced a food allergic reaction in the center (n = 93)	33 (36)
Previously administered epinephrine (n = 86)	6 (7)

self-identified as peanut free. Nearly all workers (83 of 89 [93%]) cared for at least 1 child with a food allergy in their center. However, of these, 23 of 86 (27%) reported that none of the children at their center with a food allergy had an emergency or food allergy action plan. Food reactions were relatively common, with 33 of 93 (36%) reporting an allergic reaction to food at their center within the prior year. Of these, only 3 of 33 (9%) administered epinephrine and called 911, whereas nearly all (32 of 33 [97%]) reported calling parents. Antihistamines were given in half of cases (17 of 33). Of all respondents, 6 of 86 (7%) reported ever having used an epinephrine autoinjector.

Needs Assessment: Learning Methods

Although only 46% of respondents reported having prior training regarding food allergies, they identified a variety of sources of information (Fig 1). Most learning was done informally, with the main sources being families of children with food allergies and self-directed learning. When individuals sought information regarding food allergies, they primarily used reputable sources, such as professional publications or formal lectures; academic websites were the least commonly used source. These responses suggest a reliance on print or face-to-face education compared with electronic methods for personal learning, either because of preference or because these are the most available methods. That same trend is again reflected in the methods used to train other CCCW staff members. Handouts and teaching sessions (individual or group) were overwhelmingly preferred over audiovisual materials.

Needs Assessment: Self-rated Proficiency

In a wide variety of topics related to food allergy (Table 2), most respondents (61.1%–96.7%) believed that they had a high or moderately high level of proficiency. The areas in which they felt the least comfortable were the definition of food intolerance, treating an allergic reaction, and using an epinephrine autoinjector, with 61.1% to 64.4% of respondents rating high or moderately high proficiency. They felt most comfortable with hand-washing practices, the definition of food allergy, and caring for a child with food allergies in general, with 83.1% to 96.7% of respondents rating high or moderately high proficiency.

Knowledge Assessment

Overall, and in each subgroup of questions, there was a statistically significant improvement in correct responses from the pretest to the posttest (Table 3). The category with the worst performance on both the pretest and posttest was labeling laws, with only 40% of questions correct initially. Performance in the

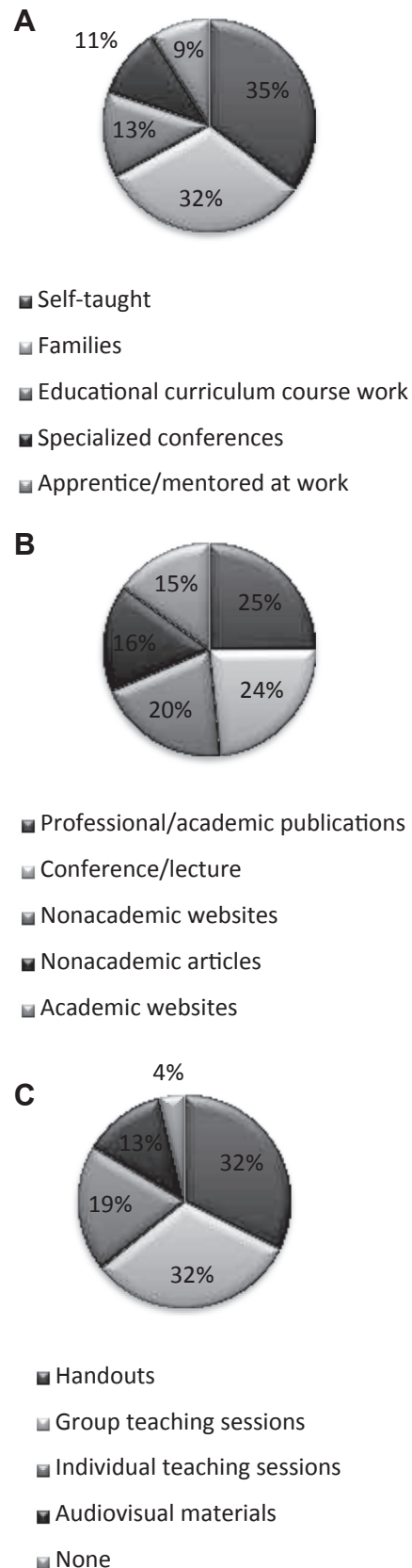


Figure 1. Sources of learning about food allergies. A, How did you learn about management of food allergies (multiple responses allowed)? (n = 91). B, What resources do you use when updating your knowledge base on food allergies (multiple responses allowed)? (n = 75). C, What methods do you use to help you staff members learn about food allergy (multiple responses allowed)? (n = 84).

Table 2
Needs Assessment Survey Responses of Self-rated Proficiency

Topic	High or moderately high, No. (%)	Low or not at all, No. (%)
Understanding the definition of food allergy	78 (85.7)	13 (14.3)
Understanding the definition of food intolerance	56 (62.2)	34 (37.8)
Recognizing signs and symptoms of an allergic reaction	71 (78)	20 (22)
Treating an allergic reaction or anaphylaxis	55 (61.1)	35 (38.9)
Caring for a child with food allergies	74 (83.1)	15 (16.9)
Using an epinephrine autoinjector	58 (64.4)	32 (35.6)
Reading product labels for allergenic contents	65 (73.9)	23 (26.1)
Hand washing for children and staff	88 (96.7)	3 (3.3)

category of understanding food allergy was the best, but only 62.6% of questions were answered correctly on the pretest. The greatest improvement was seen in the treatment category, from 51.1% to 80.6% correct. Overall, scores improved from 54% initially to 83%. The change in percentage correct from pretest to posttest was statistically significant in all areas and overall.

Discussion

The primary goals of this study were to understand the experiences and prior learning methods about food allergies among CCCWs, to assess their knowledge of these topics, and to develop an educational program to meet their needs. CCCWs are a group with diverse educational backgrounds, resources, and continuing education.

Our needs assessment survey was successful at showing the methods CCCWs have used to learn about food allergy, data that have not previously been published. Surprisingly, participants have not routinely used online materials, selecting printed articles and live training sessions instead. However, their prior learning had primarily been informal, often relying on knowledge provided by parents or obtained individually from available sources. The reliance on sources that may be inconsistent and contain misinformation is of significant concern. These responses are similar to the results obtained of an online survey of nannies.¹⁵ Although the nannies predominantly used online resources (general Internet search and foodallergy.org) to learn more about food allergies, their most desired resources included live educational opportunities, such as meeting with a physician and lectures or workshops.

Although this survey was not designed to specifically study allergic reactions to foods in child care centers a few general points were ascertained. Despite nearly all respondents caring for at least 1 child with a food allergy, many did not use food allergy action plans. Thirty-six percent of the respondents had experienced a reaction in the center. The results of 93% having a child with food allergy in their center and 36% having experienced a food allergic reaction in the center are consistent with a survey published in 2001 among schools and preschools (combined data).¹⁶ This survey found 90% with at least 1 child with a food allergy, and 39% experienced reactions. This finding suggests that the sample is fairly representative.

Table 3
Comparison of Pretest and Posttest Results by Question Category

Question category	Pretest, % correct	Posttest, % correct	P value
Understanding food allergy	62.6	85.2	<.001
Recognizing a reaction	62.2	81.1	<.001
Treatment of food allergy	51.1	80.6	.001
Labeling laws	40.0	76.3	<.001
All questions	54.0	83.0	<.001

Caution must be taken in generalizing these results to the entire population of CCCWs, however. There is a significant selection bias, despite being offered to all licensed child care centers in the Dallas–Fort Worth metroplex caring for preschool-aged children. Those who chose to respond to the needs assessment survey may have been more likely to rate themselves as proficient. The e-mails and survey were only offered in English, potentially excluding any non-English speakers. However, the results generally match the self-rated proficiency found in a similar study conducted among school nurses.¹⁷

Although the materials were believed to be easy to use based on focus group feedback, the response rate was low, perhaps representing the busy nature of child care centers, which are often seemingly understaffed. Future studies should attempt to improve the response rate, perhaps by offering incentives. There was not significant attrition throughout the survey with a similar number of respondents to questions at the beginning and end of the survey. This finding supports the focus group conclusion that the needs assessment survey was of an appropriate length.

Despite a self-perceived adequate proficiency in all areas of food allergy as seen in the needs assessment survey, CCCWs lack the knowledge needed to safely care for children with food allergies. The results of self-rated proficiency among CCCWs who participated in this study are similar to other assessments in parents and caregivers. They similarly reported a high level of proficiency despite self-reported anxiety surrounding food allergies that was significant.¹⁸ There was a marked discrepancy in self-rated proficiency and results of the pretest. Overall, participants in the training session did not answer enough questions correctly on the pretest to demonstrate an understanding of food allergy that would allow them to safely care for children with food allergies. Fortunately, after participation in the educational curriculum, CCCWs had a statistically significant improvement in their understanding of food allergies and anaphylaxis. There was not a comparison or control group used in this study, limiting interpretation of the results, and this should be considered for any future studies. Participants did not respond to our follow-up test 6 months after the training session, so it is not known how long the knowledge and skills obtained in the training session will persist. Given the prior reliance on written materials among this population, future attempts at follow-up evaluation should cater to these preferences. The prior study by Patel et al¹³ suggests that repeat training sessions would need to be offered at least annually. With subsequent follow-up training, it would be important to assess retention after repeat sessions.

One limitation of the educational curriculum and knowledge assessment test is again a selection bias. CCCWs attending the continuing education conference could freely choose what sessions to attend, and several different sessions of varying topics were offered concurrently. Those choosing to attend may have self-identified their knowledge of food allergies as deficient, thus leading to a lower pretest score than might be found among a truly random sample of CCCWs.

Despite the use of expert review and focus group feedback to achieve content and face validity, some deficiencies were identified. A question to add to future surveys is whether CCCWs had ever practiced using an epinephrine autoinjector trainer. The only area that participants identified as insufficient in the curriculum was successful strategies that have been used by centers in working with parents of children with food allergies. Further investigation is needed in this area because data are lacking and thus could not be included in the curriculum.

Standardized educational curricula need to be made widely available to CCCWs because they are interested in learning more about food allergy even though they often feel comfortable with food allergies. Knowledge-based assessments administered before and after our educational intervention indicate a need for food

allergy education among CCCWs. There is a benefit to interactive training sessions with an opportunity for question and answer, as well as hands-on demonstration of epinephrine autoinjector use. However, the demands of the CCCWs' schedule, as well as a lack of qualified food allergy trainers, may necessitate the use of methods that have not been the most commonly used by CCCWs in the past. Our novel finding of the use of informal resources to learn about food allergy, including parents and self-directed learning, raises concern for lack of uniformity in the education of CCCWs and highlights the need for a more standardized approach. Further study is needed to validate these results among a broader group of CCCWs and assess retention of information.

Supplementary Data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.anai.2016.03.031>.

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Table 1: Food Allergy Educational Needs Assessment Survey for Child Care Centers

The Food Allergy Center at Children's Medical Center is interested in identifying the needs of child care providers working with children with food allergies regarding information/education and resources on food allergy available. Completing the following questionnaire will take approximately 10–15 minutes. This is an anonymous survey. The aggregated data obtained from this survey will be used to design and disseminate educational materials for people involved in the management of children with food allergies.

1. How many children are in your child care center?
 - ☐ <10
 - ☐ 10–20
 - ☐ 20–50
 - ☐ 50–80
 - ☐ >80
2. What is the zip code of your child care center?
3. Approximately how many children in your center are reported to have a food allergy?
 - ☐ None
 - ☐ 1
 - ☐ 2–5
 - ☐ 6–10
 - ☐ >10
4. How many children in your center with a food allergy have a food allergy action plan?
 - ☐ None
 - ☐ 1
 - ☐ 2–5
 - ☐ 6–10
 - ☐ >10
5. Is your center peanut-free?
 - ☐ Yes ☐ No
6. Have you received any training (formal or informal) in food allergy management?
 - ☐ Yes ☐ No
7. Have you ever had a child have an allergic reaction to food while at your center?
 - ☐ Yes ☐ No
8. If so, what was your response (check all that apply)?
 - ☐ Observe/monitor the child
 - ☐ Administer Benadryl (diphenhydramine)
 - ☐ Administer Tylenol (acetaminophen) or Motrin (ibuprofen)
 - ☐ Administer an EpiPen
 - ☐ Call parents
 - ☐ Call 911
 - ☐ Nothing
9. Have you ever administered an EpiPen before?
 - ☐ Yes ☐ No

10. Below is a list of food allergy related topics and activities. Please check the box that indicates your proficiency level.

	High Proficiency	Moderate Proficiency	Somewhat Low	Very Low Proficiency	Not at all Proficient
Understanding of the definition of food allergy					
Understanding of the definition of food intolerance					
Recognizing signs/symptoms of an allergic reaction					
Treating an allergic reaction or anaphylaxis					
Advising staff on cleaning of areas where food is eaten					
Advising staff on handwashing for children and staff					
Developing guidelines regarding banning specific foods					
Caring for a child with food allergies					
Using an EpiPen					
Reading product labels for potentially allergic contents					

11. How did you learn about management of food allergies? (Check all that apply):

- ☐ Course work as part of an education curriculum
☐ Specialized conferences
☐ Self-taught
☐ Apprentice/mentored at work
☐ Other, please describe _____

12. What resources do you use when updating your knowledge base on food allergies? (Check all that apply):

- ☐ Professional/academic publications
☐ Non-academic articles
☐ Conference/lecture
☐ Internet Academic Web sites only
☐ Other types of Internet Web sites
☐ Other _____

13. If we were to offer training on food allergies for child care centers, please rate your interest in what topics you would like to see included?

	Very Interested	Somewhat Interested	Neutral	Not Very Interested	Not at all Interested
Understanding of the definition of food allergy					
Understanding of the definition of food intolerance					
Recognizing signs/symptoms of an allergic reaction					
Treating an allergic reaction or anaphylaxis					
Advising staff on cleaning of areas where food is eaten					
Advising staff on handwashing for children and staff					
Developing guidelines regarding banning specific foods					
Caring for a child with food allergies					
Using an EpiPen					
Reading product labels for potentially allergic contents					

14. What methods/materials do you use to help your staff members learn about food allergy? (Check all that apply):

- ☐ Hand-outs
☐ Audio-visual materials
☐ Individual teaching sessions
☐ Group Teaching sessions
☐ Other _____
☐ None

15. What topics should be included to help you teach staff about food allergy? (Check all that apply):

- ☐ Definitions and prevalence of food allergy
☐ Adverse reactions to foods
☐ Signs and symptoms of an allergic reaction
☐ Emergency management of food allergic reactions
☐ Food Allergy Action Plans
☐ Cleaning of lunchroom/classrooms where food is eaten
☐ Handwashing for students
☐ Cross-contamination
☐ Food preparation
☐ Other _____

16. If provided with a Food Allergy “Tool Kit” what formats would be most useful and accessible to you? Prioritize with 1 being most useful and 5 less useful.

- _____ Available at regional conferences/Lectures
 _____ Sent to you as video or CD presentations
 _____ Accessible to you via the internet
 _____ Available as professional publications
 _____ Other _____

17. What else could we do to promote education and provide tools for child care centers on food allergy management?

18. How relevant/applicable to your center were the questions in this survey?

- ☐ Very relevant ☐ Moderately ☐ Slightly ☐ Not at all

19. How important to you is the availability of an easy-to-use “tool kit” to help you manage food allergy in your center?

- ☐ Very important ☐ Moderately ☐ Slightly ☐ Not at all

THANK YOU FOR COMPLETING THE SURVEY!

eTable 2: Food Allergy Test

Answers are noted in bold. The question category has been added, but did not appear on the form given to participants.

The Food Allergy Center at Children's Medical Center is interested in assessing the effectiveness of a newly developed education curriculum regarding food allergy and anaphylaxis for child care providers. This is an anonymous survey, and data will be aggregated.

1. What is a food allergy? (*understanding the definition of food allergy*)
 - ☐ **An abnormal response of the immune system after eating a food resulting in symptoms of an allergic reaction**
 - ☐ Behavioral changes after eating a particular food
 - ☐ Runny nose and hyperactivity 10–15 minutes after eating a particular food
 - ☐ An immune system response resulting in an allergic reaction after sitting near the particular food
2. "Food intolerance" is another way of saying "food allergy." (*understanding the definition of food allergy*)
 - ☐ True ☐ **False**
3. What are the common skin symptoms during a food allergic reaction? (*recognizing the signs and symptoms of an allergic reaction*)
 - ☐ Hives
 - ☐ Redness (erythema)
 - ☐ Swelling
 - ☐ **All of the above**
 - ☐ None of the above
4. Food allergy can be severe, but not fatal. (*understanding the definition of food allergy*)
 - ☐ True ☐ **False**
5. What are the 8 most common food allergies? (*understanding the definition of food allergy*)
 - ☐ Milk, egg, wheat, gluten, peanut, tree nuts, fish and banana
 - ☐ Milk, egg, gluten, soy, peanut, tree nuts, fish and sesame seed
 - ☐ **Milk, egg, wheat, soy, peanut, tree nuts, fish and shellfish**
 - ☐ Milk, corn, wheat, soy, peanut, tree nuts, strawberries and shellfish
 - ☐ Corn, egg, sesame seed, soy, peanut, banana, fish and shellfish
6. How quickly after eating a particular food do allergic reactions typically occur? (*recognizing the signs and symptoms of an allergic reaction*)
 - ☐ Immediately
 - ☐ **Within 2 hours**
 - ☐ Between 2 and 12 hours
 - ☐ Between 12 and 24 hours
 - ☐ Greater than 24 hours
7. An anaphylactic reaction can get better after treatment and then come back again an hour or two later. (*treating an allergic reaction or anaphylaxis*)
 - ☐ **True** ☐ False
8. Emergency action plans or food allergy action plans are: (*understanding the definition of food allergy*)
 - ☐ Written instructions detailing what foods a child can safely eat
 - ☐ **Written medical document by a physician detailing a child's food allergies, instructions and medications in the event of reaction**
 - ☐ A written plan outlining medications for seasonal allergies and asthma
 - ☐ Written medical document outlining the foods a child can NOT safely eat
 - ☐ Written medical document outlining the medications and doses a child can safely be given
9. The EpiPen (Mylan Inc, Canonsburg, Pennsylvania) (or Twinject [Shionogi Inc, Florham Park, New Jersey]) should be refrigerated, if possible, when not in use. (*treating an allergic reaction or anaphylaxis*)
 - ☐ True ☐ **False**
10. You may repeat a dose of the EpiPen if allergic symptoms are not improving after 10–15 minutes and EMS has not arrived. (*treating an allergic reaction or anaphylaxis*)
 - ☐ **True** ☐ False
11. An EpiPen may be administered through clothing. (*treating an allergic reaction or anaphylaxis*)
 - ☐ **True** ☐ False

12. Epinephrine (adrenaline) side effects are more severe if a child is given it when he or she is not really having anaphylaxis. *(treating an allergic reaction or anaphylaxis)*
- ☐ True ☒ **False**
13. Antihistamines (like Benadryl [McNeil Consumer & Specialty Pharmaceuticals, Fort Washington, Pennsylvania], Zyrtec [McNeil Consumer & Specialty Pharmaceuticals], Allegra [Chattem, Chattanooga, Tennessee]) reverse wheezing during anaphylaxis. *(treating an allergic reaction or anaphylaxis)*
- ☐ True ☒ **False**
14. In the US, all ingredients in processed foods must be labeled. *(reading product labels for allergenic contents)*
- ☐ True ☒ **False**
15. “May contain” labels are required by law if a product may have had contact with an allergen. *(reading product labels for allergenic contents)*
- ☐ True ☒ **False**
16. According to US labeling laws, food labels must use plain English to say if the food contains “major allergens” such as milk, peanut and eggs. *(reading product labels for allergenic contents)*
- ☐ **True** ☐ False
17. A child who ate a food to which he/she is allergic and now has coughing, a hoarse voice, trouble swallowing should be given an antihistamine, watched closely, and if the problem continues more than 5 minutes or worsens should then receive injected epinephrine. *(treating an allergic reaction or anaphylaxis)*
- ☐ True ☒ **False**
18. Alcohol based hand sanitizers or gels (such as Purell [Gojo Industries, Akron, Ohio]) are useful ways to remove allergens from hands. *(understanding the definition of food allergy)*
- ☐ True ☒ **False**