

## Food allergy prevalence and management at an overnight summer camp



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### ABSTRACT

**Background:** In recent years, increased awareness of food allergy management has focused on the school setting. A lack of awareness and relevant literature prompted evaluation of the camp experience.

**Objective:** To characterize the prevalence of food allergies among children attending an overnight summer camp and to evaluate the knowledge and comfort of camp personnel before and after a training session.

**Methods:** The database for the 2014 season at Flying Horse Farms was reviewed for information pertaining to food allergies and provision of epinephrine and treatment plans. Camp personnel completed surveys regarding food allergy knowledge and comfort. Surveys were redistributed 30 days after the training session.

**Results:** Among 445 campers, 15% reported at least one food allergy, with 8.5% reporting allergy to 1 of the top 8 food allergens. Only 32% of campers with food allergy supplied an epinephrine autoinjector, and 0% provided written treatment plans. Before training, 84% of personnel desired additional information about food allergies. Knowledge of food allergies among personnel was high at baseline but increased after training in regard to epinephrine use for anaphylaxis and postepinephrine management. Staffers who reported feeling very comfortable caring for campers with food allergy increased from 16% to 46% after the training session; comfort in treating a food allergy emergency increased from 2% to 29%.

**Conclusion:** Management of food allergies at overnight summer camps warrants similar education and preparation strategies as those implemented in schools. Camp personnel should receive annual training regarding food allergies and anaphylaxis.

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### Introduction

Food allergies affect approximately 5% to 8% of children and appear to be increasing in prevalence during the past 2 decades.<sup>1–4</sup> Food allergy reactions can range from mild cutaneous symptoms, such as urticaria to anaphylaxis, which is a potentially life-threatening systemic and rapidly progressive reaction.<sup>5,6</sup> Reactions can increase in severity with each subsequent ingestion and can occur with ingestion of trace amounts of food allergen. The management of food allergies requires strict avoidance of food allergens at all times.<sup>5,6</sup> Proper management necessitates verbal or written communication with food handlers and caregivers and immediate access to an epinephrine autoinjector in case of unintentional ingestion.<sup>7</sup>

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Recent efforts have been made to help increase awareness and make school environments safer for children with food allergies. In 2014, the Centers for Disease Control and Prevention published voluntary guidelines aimed at schools and daycare centers to establish educational programs for staff and protocols for mitigating risk for food allergic children.<sup>8</sup> In November 2013, President Obama signed into law the School Access to Emergency Epinephrine Act, which encourages states to adopt laws that require schools to have on hand “stock” epinephrine autoinjectors. As of October 2015, a total of 9 states have adopted legislation that requires and 39 states have legislation that allows schools to stock epinephrine.<sup>9</sup>

Although schools have received much needed attention, children with food allergies remain at risk for unintentional ingestion and potential reactions in any large group setting. Overnight summer camps offer unique challenges that differ from schools given the relatively rapid turnover of campers, extensive physical layout of many campsites, and provision of all meals and sleeping accommodations.<sup>10</sup> To the authors' knowledge, there are no published data on the prevalence of food allergies among children

attending summer camps or the knowledge of camp personnel in the management of food allergies and allergic reactions.

The education and management recommendations provided by the 2014 Centers for Disease Control and Prevention Voluntary Guidelines for Managing Food Allergies in Schools and Early Care and Education Programs provided a framework for our assessment and desire to expand to the camp setting.<sup>8</sup> The primary aim of our study was to assess the prevalence of food allergies and management among campers at an overnight summer camp. Secondary aims included assessment of the knowledge and comfort of camp personnel in the management of food allergies both before and after completion of a didactic training session.

## Methods

In June 2015, an interactive food allergy educational session was conducted by the authors for the camp personnel and administrators at Flying Horse Farms. Flying Horse Farms is a not-for-profit camp located in central Ohio that hosts overnight sessions for children with chronic and complicated medical diseases and special sessions for their siblings.<sup>11</sup> Campers are divided into different ages and medical conditions to attend sessions with their peers. They offer both weeklong and weekend sessions from April through October. There are both full-time staff, who are present for most sessions throughout the summer, and volunteer staff, consisting mainly of physicians and nurses who attend camp during sessions specific to their specialty. Our training session occurred during the mandatory week-long training session for all full-time staff before the start of the 2015 summer sessions.

To characterize the food allergy status of camp attendees, the authors performed a retrospective review of the enrollment database maintained by Flying Horse Farms of all campers during the 2014 season. Data collected included demographic features, number of children with self-reported food allergies, availability of epinephrine autoinjectors, and provision of written food allergy treatment plans.

Camp personnel agreed to participate through oral consent and were asked to complete identical surveys before and 30 days after the training session (eSupplement 1). The initial survey was paper based and collected on the day of training. The follow-up survey was distributed electronically (SurveyMonkey Inc, Palo Alto, California) to all of the camp personnel who were present at the initial session. The camp director distributed the follow-up survey via e-mail communication and provided a reminder 7 days later for those who had not completed the survey. Collected data included demographic information, prior experience with food allergies, and comfort level with management of food allergies. Knowledge questions were also asked regarding food allergy triggers, safe handling techniques, and treatment of an allergic reaction. Survey questions were developed by the authors and were based on evidence-based clinical guidelines, including the Centers for Disease Control and Prevention 2014 voluntary guideline for schools, which focuses on providing education to personnel regarding recognition and treatment of reactions and provision of a safe environment with reduced risk of allergen contact.<sup>6,8</sup> Survey results were exported to an external database with answer choices converted into numerical variables for analysis. Answers from before and after the surveys were analyzed for differences using the Fisher exact test.

The educational session consisted of a 1-hour didactic session reviewing basic food allergy information. This information included discussion of common food allergens, presenting signs and symptoms of an allergic reaction, avoidance strategies, risks of reaction, and recognition and treatment of allergic reactions. After the didactic session, a 30-minute small group breakout session occurred, which allowed for questions and answers with the authors and

hands-on practice with epinephrine autoinjector training devices. The information presented was based on current evidence-based clinical guidelines.<sup>5,6,12,13</sup>

This study was approved by the institutional review board at Nationwide Children's Hospital.

## Results

In 2014, a total of 545 campers registered and attended 1 of the sessions at Flying Horse Farms. Among the 545 campers, 445 (81.7%) were included in the formal analysis because database information was incomplete or missing for 100 children. The demographic data for the campers are presented in Table 1. Of the 445 campers included for analysis, 68 (15.3%) reported at least 1 food allergy, including 38 (8.5%) reporting a food allergy to 1 of the top 8 most common food allergens (cow's milk, egg, wheat, soy, peanuts, tree nuts, fish, or shellfish). The 2 most common food allergens reported were peanut (4.9%) and tree nuts (4.7%) (Table 1). Among other food allergens reported (n = 30), grapefruit was reported the most (n = 7 [23%]). This allergen was reported only in children attending the heart camp. The second most common was gluten (n = 6 [20%]). Other non-top 8 allergens included lactose, fructose, red and blue dyes, and several fruits and vegetables.

Only 22 campers (32.4%) reporting at least 1 food allergy supplied the camp with an epinephrine autoinjector (Table 1). Among children reporting peanut or tree nut allergy, 32 (74%) of 43 supplied an epinephrine autoinjector. Among children reporting milk, egg, wheat, soy, fish, or shellfish allergy, only 25 (51%) of 49 supplied epinephrine. Conversely, 7 campers (1.6%) had self-injectable epinephrine available without any reported history of food or venom allergy. No campers provided a written food allergy treatment plan to the camp administrators or staff. There are 7 separate sessions offered at Flying Horse Farms for different medical conditions. Campers attending the week dedicated to gastrointestinal

**Table 1**  
Demographic Information and Food Allergies Reported by Campers

Characteristic	Finding <sup>a</sup> (N = 445)
Sex	
Female	236 (53)
Male	209 (47)
Age, median (range), y	12.4 (8–19)
Reported food allergy	
Any	68 (15.3)
≥2 Foods	28 (6.3)
Top 8 food allergen	38 (8.5)
Other food allergen	30 (6.7)
Prevalence of top 8 allergens	
Peanut	22 (4.9)
Tree nuts	21 (4.7)
Cow's milk	16 (3.6)
Hen's egg	15 (3.4)
Soy	6 (1.3)
Wheat	4 (0.9)
Fish	4 (0.9)
Shellfish	4 (0.9)
Provision of epinephrine autoinjector	
Any reported allergy	22 (32.4)
Top 8 food allergen	19 (50)
Total No./top 8 food allergen rating (%)	
Sibling (n = 80)	4/3 (3.8)
Heart (n = 70)	10/3 (4.3)
Cancer (n = 65)	3/2 (3.1)
Hematologic (n = 55)	6/2 (3.6)
Pulmonary (n = 55)	18/17 (30.1)
Rheumatologic (n = 55)	8/3 (5.5)
Craniofacial (n = 36)	3/0 (0.0)
Gastrointestinal (n = 23)	13/6 (2.6)

<sup>a</sup>Data are presented as number (percentage) of campers unless otherwise indicated.

conditions reported the highest percentage of food allergies (13 [56.5%] of 23), followed by pulmonary (18 [32.7%] of 55), rheumatology (8 [17%] of 47), cardiology (10 [14.3%] of 70), and hematology or malignant tumors (9 [7.5%] of 120).

The demographic data for the full-time camp personnel who attended the education session are presented in Table 2. Most staff personnel were female (77%), were 18 to 24 years of age (67%), and had completed at least 2 years of college education (70%). Among all staff present for training, 12 (28%) identified a personal or family history of food allergies. Only 19 (44%) of initial survey respondents reported any previous formal education concerning the recognition and treatment of food allergies in children. However, 32 (74%) reported at least one previous training session with epinephrine autoinjectors.

### Knowledge Questions

Forty-three staffers completed initial surveys. Completion rate of the follow-up survey was 56% ( $n = 24$ ). At baseline, 2 (5%) of 43 were able to correctly identify the most common food allergens in children as egg, milk, and peanut, which increased to 6 (27%) of 22 on the follow-up survey ( $P = .008$ ). Initial survey results identified that the camp staff had good basic knowledge of food allergen avoidance and treatment before the educational session (Fig 1). At baseline, 38 (88%) of 43 were able to identify a case vignette of anaphylaxis and recommend epinephrine administration, which increased to 22 (100%) of 22 at follow-up ( $P = .09$ ). At baseline, 32 (74%) of 43 staff members responded that a camper given epinephrine should be observed in the emergency department after administration, which also increased to 22 (100%) of 22 at follow-up ( $P = .009$ ). There were no statistically significant changes in the other knowledge-based questions noted after the survey.

### Comfort Questions

Before the education session, 36 (84%) of personnel thought they needed more information about food allergies, but at follow-up survey, only 3 respondents (13%) reported the same ( $P < .001$ ). Before the education session, 7 (16%) of 43 respondents reported being very comfortable caring for a camper with a food allergy (Fig 2), which increased to 11 (46%) of 24 at the follow-up survey ( $P = .008$ ).

**Table 2**  
Demographic Information for Camp Personnel

Characteristic	No. (%) of Campers on Initial Survey ( $n = 43$ )
Sex	
Female	33 (77)
Male	10 (23)
Age, y	
18–24	29 (67)
25–44	10 (23)
45–65	4 (9)
Highest education level achieved	
High school	9 (21)
Two-year college	10 (23)
Four-year college	20 (47)
Graduate degree	4 (9)
Camp experience (5 years total)	
First year	21 (56)
1–5 years	22 (51)
Role ( $n = 42$ )	
Counselor	13 (31)
Food preparation	11 (26)
Administration	4 (10)
Other	14 (33)
Personal or family history of food allergy	
Yes	12 (28)
No	31 (72)

A similar shift was observed in comfort treating a food allergy emergency (Fig 3), with an increase in those reporting being very comfortable from 1 (2%) of 42 to 7 (29%) of 24 ( $P = .001$ ). Interestingly, comfort in recognition of a food allergy emergency increased in those reporting being very uncomfortable from 5 (12%) of 43 to 8 (33%) of 24 ( $P = .03$ ). The percentage reporting being somewhat or very comfortable recognizing a food allergy emergency remained the same at follow-up (13 [54%] of 24) compared with baseline (18 [42%] of 43) ( $P = .21$ ).

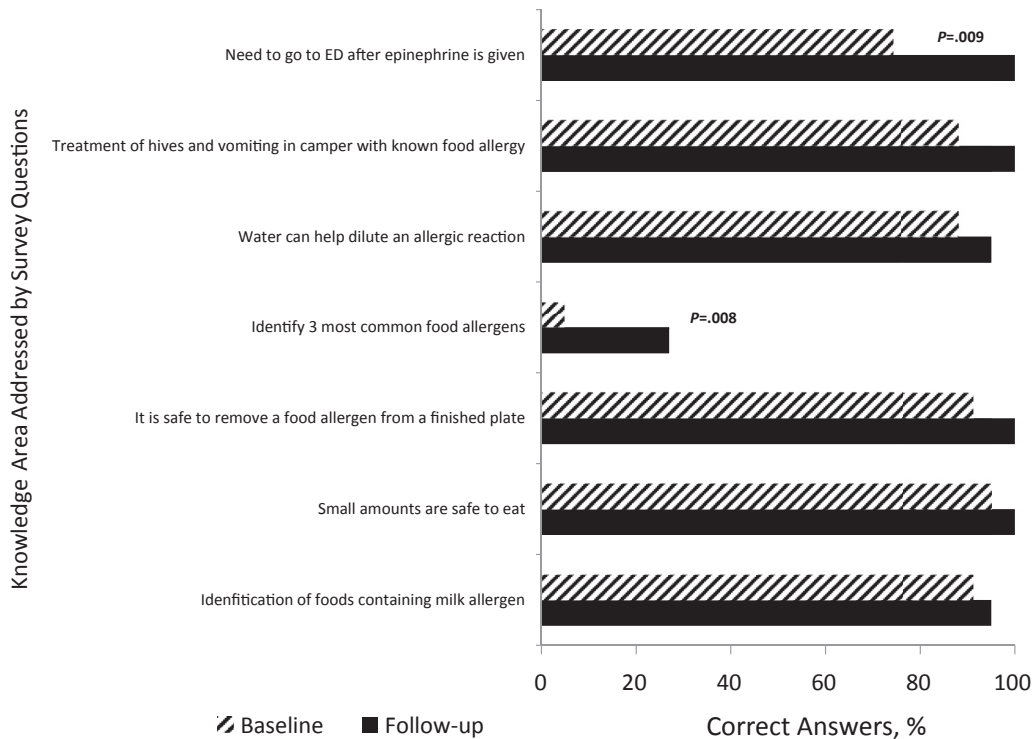
Camp administrators reported zero instances in which use of epinephrine for a food allergy reaction occurred for any of their campers during the 2014 season. However, on follow-up contact after our education session, administrators relayed that one camper had experienced sudden-onset generalized hives and difficulty breathing while eating lunch. The camper had a reported tree nut allergy and the meal contained sesame seeds, which had not previously been a known allergen for this child. Staff responded immediately with administration of epinephrine, and the child was transported to the nearest emergency department. Symptoms resolved within 30 minutes, and the child returned to camp 4 hours later without any sequelae.

### Discussion

To our knowledge, this is the first report of the prevalence of food allergies among children attending an overnight summer camp. The prevalence of any self-reported food allergies among campers in this study (15.3%) is higher than reports from the general population, which generally range from 5% to 8%.<sup>2–4</sup> However, allergies to the most common foods (top 8) were reported in 8.5% of campers in our study, which much more closely approximates previous data. On evaluation of the other reported allergies, it is likely that these were not based on immediate hypersensitivity reactions given the types of allergies reported (ie, grapefruit being most common among campers during heart week, but more likely represented avoidance because of potential adverse effects when taken in conjunction with long-term medications).

Our findings indicate poor preparation for anaphylaxis management, with only one-third of all campers reporting food allergies and half of campers reporting a top 8 food allergy providing their own epinephrine autoinjectors to the camp. Patient history, test results, or food challenges were not available for any camper; thus, previous reactions more consistent with intolerance or non-IgE-mediated allergy could account for the lower rates of epinephrine autoinjector availability. However, peanut and tree nut are more likely to cause IgE-mediated allergy, and in these groups, approximately 25% of campers did not have this potentially life-saving medication available. In addition, only half of campers reporting allergy to milk, egg, wheat, soy, fish, or shellfish provided epinephrine autoinjectors. In addition, other than parental report that their child had a food allergy, there were no written treatment plans provided to camp administrators or personnel for any of the campers.

Given the lack of published data regarding prevalence of food allergies and preparation strategies within summer camps, there are no comparison data to determine whether our findings are consistent with other experiences. However, data obtained from schools indicate similar low rates of epinephrine prescriptions and written treatment plans provided by families for students with food allergies.<sup>14</sup> This finding is particularly alarming given reports of 16% to 18% of children with food allergies experiencing a reaction from unintentional ingestion while at school.<sup>15,16</sup> In addition, prior research by Sicherer et al<sup>17</sup> revealed that unintentional ingestions occurred in 55% of peanut-allergic children (mean of 2 unintentional ingestions per patient) and in 30% of tree nut-allergic children during a median period of 5.5 years.<sup>17</sup> Management of food



**Figure 1.** Food allergy knowledge among camp personnel. ED indicates emergency department.

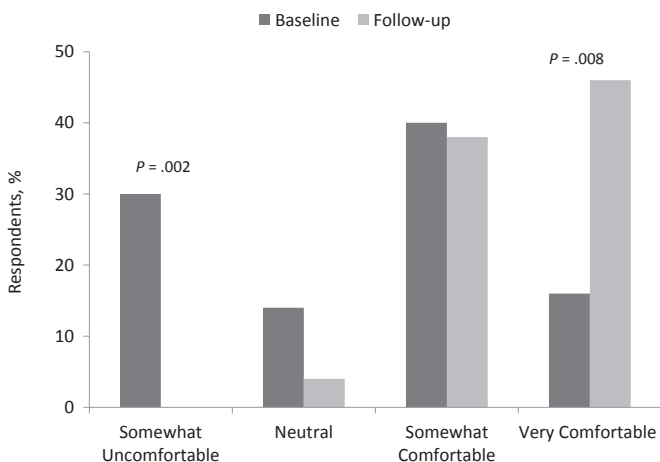
allergies in the school setting includes provision of individual written treatment plans for each student and access to epinephrine autoinjectors at all times, both of which should serve as a bare minimum for summer camps.<sup>7,8,10,18</sup>

Evaluation of the staff at Flying Horse Farms indicated a rather high level of baseline knowledge regarding food allergies, including signs and symptoms of an allergic reaction and first-line treatment with epinephrine for anaphylaxis. However, the comfort level among staffers was universally much lower than their knowledge base. The staffers at Flying Horse Farms are versed in the management of chronic medical conditions and would be expected to have a higher comfort level than peers at other camps. Thus, our findings may overestimate the knowledge and comfort of staffers at other summer camps and may not be applicable to camps at large.

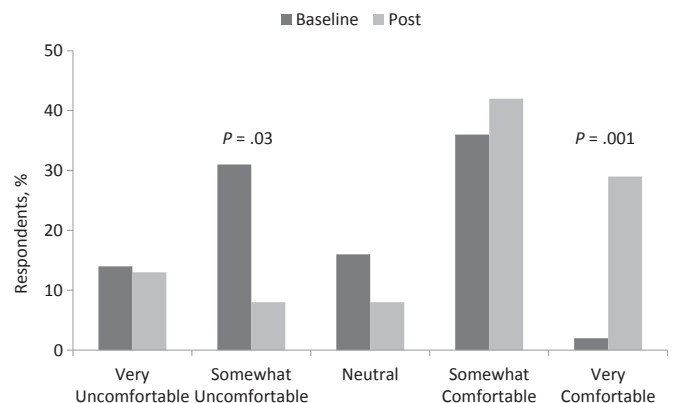
There is an overall lack of studies evaluating the knowledge and comfort of personnel commonly involved in caring for children,

including camp counselors, daycare workers, nannies, and school teachers. A 2015 study evaluated the knowledge and comfort of food allergies among nannies.<sup>19</sup> Similar to our findings in which 11% to 33% of camp personnel were uncomfortable recognizing a food allergy emergency, 36% of nannies replied the same. A similar study with primary school teachers in 2012 found poor knowledge and preparation for food allergy emergencies, with only 10% knowing where epinephrine autoinjectors were stored and 4% knowing how to use properly.<sup>20</sup>

The camp personnel in our study who participated in the postsurvey found higher knowledge and comfort levels measured 30 days after the education session was performed. This finding indicates that minimal structured education (90 minutes total for our training session) for personnel familiar and unfamiliar with food allergies can have a lasting effect on their ability to prevent and handle a food allergy emergency. Similar interventions have



**Figure 2.** Camp personnel comfort level in caring for a child with food allergies.



**Figure 3.** Camp personnel comfort level in treating a food allergy emergency.

been developed and applied with success in a widespread manner among school nurses.<sup>21</sup>

Limitations of our study include the medical complexity of the cohort of children included for analysis. The campers attending Flying Horse Farms are likely to be different than children attending other overnight summer camps given the nature of enrollment at the camp, with most children having a chronic medical condition. Details regarding each camper's medical history were unavailable; thus, any food allergy reported was based solely on parental report to the camp and may not be accurate in each instance. It is unlikely that all reported food allergies represent true IgE-mediated food allergy with the inherent risk of anaphylaxis, especially when taking into account the reported allergens (grapefruit) for some. However, this was accounted for in our analysis by separating out the top 8 food allergens reported by campers, which are recognized as the most likely causes of anaphylaxis. It is possible that other campers also had food allergies that may not have been reported and thus were not included in our sample. Our survey was based on prior studies and expert-based guidelines but was not validated. Thus, the included questions and interpretation of results is subject to discrimination. In addition, postsurvey data may be skewed given the low number of responders and response rate less than 60%, although this is similar to follow-up completion percentage for electronic surveys from other studies.<sup>22</sup>

Future directions should include replication of these data at other summer camps throughout the United States, specifically those not designed for children with medically complex conditions, to more accurately assess the prevalence of food allergies among campers. In addition, the knowledge and comfort level of camp personnel at other sites warrant evaluation to determine whether findings are similar to our study. Lastly, structured food allergy educational sessions should be incorporated into the training of all staff attending summer camps to ensure the application of proper prevention and management strategies.

Although much focus for children with food allergies is centered on prevention and management within the daycare and school settings, summer camps warrant similar attention. Summer camps should adopt structured enrollment criteria for all children reporting food allergies, including provision of their own epinephrine autoinjector and individual written treatment plan. Formal education of all staff at summer camps should occur on an annual basis to ensure proper avoidance strategies and management of food allergy reactions.

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### Supplementary Data

Supplementary data related to this article can be found online at <http://dx.doi.org/10.1016/j.anai.2016.03.013>.

### References

- [1] Sicherer SH, Leung DY. Advances in allergic skin disease, anaphylaxis, and hypersensitivity reactions to foods, drugs, and insects in 2014. *J Allergy Clin Immunol*. 2015;135:357–367.
- [2] Sicherer SH, Sampson HA. Food allergy: epidemiology, pathogenesis, diagnosis, and treatment. *J Allergy Clin Immunol*. 2014;133:291–307.
- [3] Gupta RS, Springston EE, Warrier MR, et al. The prevalence, severity, and distribution of childhood food allergy in the United States. *Pediatrics*. 2011;128:e9–e17.
- [4] Branum AM, Lukacs SL. Food allergy among U.S. children: trends in prevalence and hospitalizations. *NCHS Data Brief*. 2008;10:1–8.
- [5] Sampson HA, Aceves S, Bock SA, et al. Food allergy: a practice parameter update—2014. *J Allergy Clin Immunol*. 2014;134:1016–1025.
- [6] Boyce JA, Assa'ad A, Burks AW, et al. Guidelines for the diagnosis and management of food allergy in the United States: report of the NIAID-sponsored expert panel. *J Allergy Clin Immunol*. 2010;126(6 suppl):S1–S58.
- [7] Sicherer SH, Mahr T. Management of food allergy in the school setting. *Pediatrics*. 2010;126:1232–1239.
- [8] Centers for Disease Control and Prevention. *Voluntary Guidelines for Managing Food Allergies in Schools and Early Care and Education Programs*. Washington, DC: US Dept of Health and Human Services; 2013. [www.cdc.gov/HealthyYouth/foodallergies/pdf/13\\_243135\\_A\\_Food\\_Allergy\\_Web\\_508.pdf](http://www.cdc.gov/HealthyYouth/foodallergies/pdf/13_243135_A_Food_Allergy_Web_508.pdf). Accessed October 12, 2015.
- [9] School Access to Epinephrine. <https://www.foodallergy.org/advocacy/school-access-to-epinephrine>. Accessed October 12, 2015.
- [10] Mudd K, Wood RA. Managing food allergies in schools and camps. *Pediatr Clin North Am*. 2011;58:471–480.
- [11] Flying Horse Farms website. <http://flyinghorsefarms.org>. Accessed October 12, 2015.
- [12] Campbell RL, Li JT, Nicklas RA, Sadosty AT. Emergency department diagnosis and treatment of anaphylaxis: a practice parameter. *Ann Allergy Asthma Immunol*. 2014;113:599–608.
- [13] Sampson HA, Muñoz-Furlong A, Campbell RL, et al. Second symposium on the definition and management of anaphylaxis: summary report—Second National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis Network symposium. *J Allergy Clin Immunol*. 2006;117:391–397.
- [14] Gupta RS, Rivkina V, DeSantiago-Cardenas L, Smith B, Harvey-Gintoft B, Whyte SA. Asthma and food allergy management in Chicago Public Schools. *Pediatrics*. 2014;134:729–736.
- [15] Sicherer SH, Furlong TJ, DeSimone J, Sampson HA. The US Peanut and Tree Nut Allergy Registry: characteristics of reactions in schools and day care. *J Pediatr*. 2001;138:560–565.
- [16] Nowak-Węgrzyn A, Conover-Walker MK, Wood RA. Food-allergic reactions in schools and preschools. *Arch Pediatr Adolesc Med*. 2001;155:790–795.
- [17] Sicherer SH, Burks AW, Sampson HA. Clinical features of acute allergic reactions to peanut and tree nuts in children. *Pediatrics*. 1998;102(1):e6.
- [18] Portnoy JM, Shroba J. Managing food allergies in schools. *Curr Allergy Asthma Rep*. 2014;14:467.
- [19] Greiwe JC, Pazheri F, Schroer B. Nannies' knowledge, attitude, and management of food allergies of children: an online survey. *J Allergy Clin Immunol Pract*. 2015;3:63–67.
- [20] Ercan H, Ozen A, Karatepe H, Berber M, Cengizlier R. Primary school teachers' knowledge about and attitudes toward anaphylaxis. *Pediatr Allergy Immunol*. 2012;23:428–432.
- [21] Wahl A, Stephens H, Ruffo M, Jones AL. The evaluation of a food allergy and epinephrine autoinjector training program for personnel who care for children in schools and community settings. *J Sch Nurs*. 2015;31:91–98.
- [22] Wilson PM, Petticrew M, Calnan M, Nazareth I. Effects of a financial incentive on health researchers' response to an online survey: a randomized controlled trial. *J Med Internet Res*. 2010;12:e13.

**Survey for Camp Personnel**

1. How old are you?
  - 12–18
  - 18–24
  - 25–44
  - 45–65
  - Over 65
2. What is your gender?
  - Male
  - Female
3. What is the highest education level you have completed?
  - Less than high school
  - High school
  - 2 year college
  - 4 year college
  - Graduate degree
4. Do you or anyone in your immediate family (parents, children, siblings) have any food allergies?
  - Yes
  - No
5. Do you feel you need additional information about recognizing and treating food allergies?
  - Yes
  - No
6. What are the key things about food allergies that you feel you need more information? (**Mark all that apply**)
  - Recognizing the signs/symptoms of an allergic reaction
  - Epinephrine (Epipen) administration in emergencies
  - Meal preparation
  - Reading food labels
  - Eating out
  - Travelling
  - Other, please specify:
7. Have you ever conducted your own internet search for information about food allergies?
  - Yes
  - No
8. If Yes, please rate the usefulness of the information you encountered on the internet:
  - Very useful
  - Somewhat useful
  - Neutral
  - Mildly useful
  - Not useful
9. How long have you been volunteering or employed by Flying Horse Farms?
  - 1<sup>st</sup> year
  - 1–5 years
  - 5–10 years
  - 10 years
10. What is your main role at Flying Horse Farms?
  - Counselor
  - Food preparation
  - Janitorial services
  - Administration
  - Other:
11. Have you ever worked at another camp?
  - Yes
  - No
12. Before today, during training for your role at Flying Horse Farms, have you received any formal education on how to recognize and treat food allergies in children?
  - Yes
  - No
13. Have you ever been trained how to administer injectable epinephrine (Epipen)?
  - Yes
  - No
14. Have your employers discussed safe meal preparation for their food allergic children?
  - Yes
  - No
15. When preparing foods, do you always wash your hands after handling allergenic foods?
  - Yes
  - No

16. Please rate your comfort in caring for a child with a food allergy.
- Very comfortable
  - Somewhat uncomfortable
  - Neutral
  - Somewhat comfortable
  - Very comfortable
17. Please rate your comfort in recognizing a food allergy emergency.
- Very uncomfortable
  - Somewhat uncomfortable
  - Neutral
  - Somewhat comfortable
  - Very comfortable
18. Please rate your comfort in treating a food allergy emergency.
- Very uncomfortable
  - Somewhat uncomfortable
  - Neutral
  - Somewhat comfortable
  - Very comfortable
19. Has a food allergy emergency occurred while a child was under your care at this camp?
- Yes
  - No
20. Has a food allergy emergency occurred at camp in a child who was not known to have a food allergy?
- Yes
  - No
21. Which of the following are the 3 most common food allergens in children? (**Mark 3 answers only**)
- Egg\*
  - Wheat
  - Milk\*
  - Peanut\*
  - Tree Nuts
  - Shellfish
  - Citrus fruits
- Strawberry
  - Soy
22. Which of the following items can cause an allergic reaction in a child with a milk allergy?
- Butter
  - Cheese
  - Yogurt
  - Pudding
  - Cake
  - Waffle
  - All of the above\***
  - None of the above
23. A child with a food allergy can safely eat a small amount of the food they are allergic towards.
- True
  - False\***
24. If a child under your care is having an allergic reaction, it is appropriate to serve them water to dilute the allergen and suppress the reaction.
- True
  - False\***
25. During meal preparation, removing an allergen from a finished meal (eg, taking nuts off the plate) is one step to provide a safe meal for a food-allergic child.
- True
  - False\***
26. If a camper with a known food allergy is eating a meal and develops rapid onset hives covering their entire body and starts to vomit, which of the following treatments would you do? (**Mark all that apply**)
- Give Benadryl
  - Give epinephrine\***
  - Have them drink water
  - Call 911\***
27. A food allergy reaction can cause death.
- True\***
  - False
28. Parents of children with food allergies make unreasonable requests of the camp staff.
- True
  - False\***

29. The risk of death due to anaphylaxis is increased by a delay in administering injectable epinephrine (EpiPen) to a child having an anaphylactic reaction.

**True\***

False

30. If epinephrine is administered to any child to treat an allergic reaction, they automatically have to be taken to the nearest emergency department.

**True\***

False

**\*Bolded answers with asterisk denote preferred answer choice.**