Comparison of School Food Allergy Emergency Plans to the Food Allergy and Anaphylaxis Network's Standard Plan

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ABSTRACT: Eighty-four percent of children with food allergies have a reaction in school, and 25% of first food reactions occur in schools. An evaluation was conducted comparing food allergy emergency plans to the Food Allergy and Anaphylaxis Network's (FAAN) Food Allergy Action Plan. Of the 94 respondents, 60 provided food allergy emergency plans for comparison. Although two-thirds used food allergy plans, only 15% used the current FAAN plan. Plans were missing essential components, including emergency contact information, medication administration instructions, and health history information. School nurses must adhere to current clinical guidelines to provide an accurate resource for personnel in charge of a food allergy reaction in school. Professional associations and state school health agencies must create and market a resource that provides easy, one-stop access to current best-practice guidelines and tool kits.

KEY WORDS: allergic reactions, anaphylaxis, emergency plans, food allergy, school health

INTRODUCTION

There are approximately 6% of children younger than 3 years and 4% of people older than 6 years in the United States with a documented food allergy (Sampson, 2004). Eighty-four percent of children who have food allergies experience allergic reactions while they are attending school. Furthermore, 25% of initial allergic reactions to food occur in school settings (Sicherer, Furlong, DeSimone, & Sampson, 2001). In addition, the number of children with peanut allergies doubled from 1997 to 2002 (Sicherer, Munoz-Furlong, & Sampson, 2003). A food allergy is defined as an abnormal immunologic response to a food protein (Wood, 2003). The most common allergens include milk, egg, soy, wheat, peanuts, tree nuts, fish, and shellfish (Burks, 2003; National Institutes of Health [NIH] 2004). Most children will outgrow soy and wheat allergies by 3 years of age and will outgrow egg and milk allergies by 6 years of age. However, peanut, tree nut, fish, and shellfish allergies are usually lifelong (NIH, 2004; Wood, 2003).

Many specialty organizations and state departments of education have endorsed the Food Allergy and Anaphylaxis Network (FAAN) Food Allergy Emergency Plan as a standard for emergency care plans in schools. The American Academy of Allergy, Asthma, and Immunology (AAAAI, 1998) endorsed a written emergency plan and a prescription for epinephrine for all students with food allergies. The plan should include an identification sheet with the child's name and photograph, specific allergy, warning signs of a reaction, and emergency treatment. The AAAAI also recommends the FAAN as a resource for educational materials, which includes an emergency health form and a Food Allergy Action Plan to be signed by the physician, parent, and school staff. The American Academy of Pediatrics (AAP) recommends that the Food Allergy Action Plan developed by the FAAN should be used in

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schools for children with food allergies (AAP, 2006). The Commonwealth of Massachusetts' Department of Education also uses the Food Allergy Action Plan in its statewide guidelines for managing food allergies in schools (Bouley et al., 2002).

In a 2001 position statement, the National Association of School Nurses (NASN) defined the role of the school nurse in allergy/anaphylaxis management and recognized the need for individual health care plans for students with known food allergies. In 2004, the NASN released an Emergency Care Plan Position Statement for children with special health care needs, which lists general elements of emergency care plans. These elements are included in the FAAN Food Allergy Action Plan. The purpose of this article is to compare and evaluate food allergy emergency plans used by schools in Illinois to the recommended standard plan developed by FAAN.

BACKGROUND

The American College of Allergy, Asthma, and Immunology (ACAAI, 2006) recommends that physician-prescribed treatment protocols should be used to direct treatment of allergic reactions in children. Traditionally, food allergy emergency plans have been developed by school nurses in conjunction with the children, families, physicians, and other health care providers. These plans include symptoms of an allergic reaction, the proper steps to stop this reaction, and whom to contact. The plan should be clear, specific, and easily understood (Wilson, & Bogden, 2005). Fatalities due to a food allergy reaction have been associated with delays in administering injectable epinephrine, failure to follow the established emergency plan, incorrect techniques when administering injectable epinephrine, and failure to call parents (ACAAI, 2006). Food allergy emergency plans are essential in managing a crisis situation, especially when a school nurse is not available.

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Knowing that young children are entering school with potential life-threatening food allergies is frightening to nurses and parents alike (Munoz-Furlong, 2003). Until the child reaches school age, parents can control the child's environment and what the child eats. School-age children make conscious choices of what to eat, whether it is in the lunch line or to accept or reject offers of food from other students. According to the ACAAI (2006), there is an increased risk for unintentional food allergen exposure while attending school. Children require a safe environment and someone to respond when a food reaction occurs at school.

The FAAN was established in 1991 to raise public awareness, provide advocacy and education, and advance research on behalf of people affected by food allergies (FAAN, 2006). FAAN provides resources on their Website for schools, families, and individuals affected by food allergies. The School Food Allergy Program includes a video, an Epipen® trainer, Twinject™ trainer, a poster, a comprehensive binder of information, and standardized forms including the Food Allergy Action Plan (FAAN, 2005b). There is also a Website section for children and adolescents, plus a newsletter for teens. In September 2005, the FAAN received a grant to provide the School Food Allergy Program to all Illinois schools free of charge (FAAN, 2005a). As of February 2007, 1,221 of the 4,963 Illinois elementary, middle, and high schools had requested the free program (D. Copan, personal communication, February 8, 2007).

REVIEW OF THE LITERATURE

Several investigators have conducted studies to determine schools' readiness to enroll children with food allergies. For example, in a study of 101 public elementary schools in Michigan, all schools had at least one child with a food allergy, yet only 16% had written food allergy emergency plans (Rhim & McMorris, 2001). Among 35 day care center directors in Chicago, only 50% reported they were adequately trained to identify and treat an allergic reaction (Bansal, Marsh, Patel, & Tobin, 2005). In a study conducted in Scotland schools, only 58% of school personnel felt that they had sufficient training in how to administer epinephrine and respond to acute allergic reactions (Clegg & Ritchie, 2001). Furthermore, only 35% of the children had plans written by a health professional on how to respond in an emergency situation. Among National Peanut and Tree Nut Allergy Registry members, 84% reported having one reaction in school and 15% reported having two reactions in school (Sicherer et al., 2001). An emergency plan was in place for only 33% of the reactions, and in those cases, it was followed 73% of the time. Treatment delays were attributed to several factors, including failure to recognize allergic reactions, failure to follow emergency plans, inability to administer injectable epinephrine, and delaying treatment by calling parents instead of following emergency plans.

. . . many schools do not have written food allergy emergency plans. Also, school personnel do not feel comfortable with regard to how or when to use epinephrine, even though a delay in response to a food allergy reaction can be fatal.

In summary, the literature has shown that although children are having food allergy reactions at school, many schools do not have written food allergy emergency plans. Also, school personnel do not feel comfortable with regard to how or when to use epinephrine, even though a delay in response to a food allergy reaction can be fatal. There is a need for a clear, standardized food allergy emergency plan, such as the FAAN plan, for school personnel to react appropriately during a reaction.

METHOD

The evaluation proposal was submitted to the University of Illinois Institutional Review Board and was exempted from review. This food plan evaluation was conducted over a 2-month period in early 2006. Attendees at a regional school health issues conference in Illinois were given an invitation to participate. The letter asked attendees willing to participate to complete a short list of descriptive items. The items included whether or not the school had a food allergy plan, whether or not the respondent was a school nurse, grades included in the school, and a box to check if there were no children in the school with food allergies. They were asked to return the list of completed items along with a blank copy of the school's food allergy plans in a stamped, addressed envelope. Respondents were asked not to include identifying information about themselves, parents, and students when returning the emergency plans.

The food allergy plans from the schools were compared to the FAAN Food Allergy Action Plan components (Table 1). Submitted plans that did not match the current FAAN Food Allergy Action Plan were subsequently compared to previously published, outdated versions of the FAAN Food Allergy Action Plan. Descriptive statistics (frequencies) were tabulated to determine how closely the individual plans matched the current FAAN Food Allergy Action Plan components.

FINDINGS

Of 250 conference attendees, 94 (38%) returned the surveys, and 60 of the 94 included blank food allergy emergency plans. Survey respondents represented all grade levels (preschool through 12th grades), and many worked in schools with multiple grade levels. Almost all (98%) respondents had children with food allergies in their schools. Of the 60 returned plans, 9 (15%) were identical to the current FAAN plan and 21 (35%) were prior versions of the current FAAN plan. The remaining 30 plans (50%) were not based on the FAAN plan. Table 1 illustrates the FAAN plan components compared with the those from the returned emergency plans. The most frequently included components were call 911 (90%), listed food allergen (87%), listed physical symptoms of a reaction (87%), parent's name (82%), and parent's signature (80%). Less than half of the returned plans included "food allergy" in the title. Only 23% included which medi-

Table 1. Criteria in Food Allergy and Anaphylaxis Network (FAAN) Plan Compared to Returned Food Allergy Plans (N = 60)

FAAN Plan Criteria	Plans Returned by Illinois School Nurses, *n* (%)
Title includes "food allergy"	29 (48)
Child's picture	34 (57)
Birthday	46 (77)
Teacher's name	39 (65)
Listed food allergen	52 (87)
Does the child have asthma?	36 (60)
Indicate that children with asthma are at higher risk for severe reaction	34 (57)
List of physical symptoms of a reaction	52 (87)
If allergen ingested, but no symptoms, what to do next?	18 (30)
Identify what medication to give, epinephrine or antihistamine for particular symptoms	14 (23)
Indicate that throat symptoms are life threatening	39 (65)
Indicate that lung symptoms are life threatening	41 (68)
Indicate that heart symptoms are life threatening	40 (67)
Statement saying that if the reactions progress, give epinephrine or antihistamine	22 (37)
Lists types of Epipen® and Twinject™ to circle correct dosage	9 (15)
Blank line for medication/dose/route	34 (57)
Asthma inhalers and/or antihistamines cannot be depended on to replace epinephrine in anaphylaxis	11 (18)
Call 911	54 (90)
State to 911 operator that an allergic reaction has been treated and additional epinephrine may be needed	17 (28)
Blank line for provider name	44 (73)
Blank line for provider phone number	39 (65)
Parent's name	49 (82)
Parent's phone number	45 (75)
Emergency contact's name and phone numbers	42 (70)
If parent/guardian cannot be reached, do not hesitate to medicate or take child to medical facility	27 (45)
Parent's signature	48 (80)
Provider's signature	38 (63)
Name of trained staff members to administer epinephrine	34 (57)
Detailed Epipen® instructions with illustration	32 (53)
Detailed Twinject™ instruction with illustration	9 (15)
Take used epinephrine to emergency department	13 (22)
Plan to stay in emergency department for at least 4 hours	14 (23)
Using current FAAN Food Allergy Action Plan	9 (15)
Using outdated versions of the FAAN plan	21 (35)
Returned plans not based on the FAAN plan	30 (50)

cations to administer for particular symptoms. Directions were included for use of the Epipen® (53%) and Twinject™ (15%).

> Of the 60 returned plans, 9 (15%) were identical to the current FAAN plan and 21 (35%) were prior versions of the current FAAN plan. The remaining 30 plans (50%) were not based on the FAAN plan.

Three asthma-related statements are included on the FAAN Food Allergy Action Plan. Sixty percent of the time, the forms identified whether or not a child had asthma. A statement noting that children with asthma are at higher risk for severe food allergy reactions was incorporated 57% of the time. Eighteen percent of the returned plans included a statement saying that asthma inhalers and/or antihistamines cannot be depended on to replace epinephrine in anaphylaxis.

DISCUSSION

Although almost two thirds of the respondents in our sample had food allergy plans available to them, only 15% were consistent with the current FAAN plan. These findings are consistent with a study conducted by Weiss and colleagues in which 74% of school nurses were developing their own training programs for food allergy education (Weiss, Munoz-Furlong, Furlong, & Arbit, 2004). The remaining plans were missing essential components, such as critical emergency contact information, medication administration instructions, and important health history information. For example, only half of the emergency plans indicated children's asthma histories. Children with asthma are at a higher risk for anaphylaxis (Rainbow & Browne, 2002), and symptoms of anaphylaxis may be confused with asthma symptoms. This makes it difficult for nonmedical personnel to differentiate between an asthma attack and anaphylaxis. Furthermore, children with asthma are more likely to have more serious food reactions than children who do not have asthma (Wuthrich & Ballmer-Weber, 2001).

About a third of the returned food allergy emergency plans did not indicate that throat, lung, and heart symptoms are life threatening. The lack of differentiation between fatal and nonfatal reactions makes it difficult to treat a food allergy reaction effectively. Nonmedical personnel should be able to read the plan and identify a serious and/or potentially fatal symptom. In the majority of allergic reactions experienced in schools, teachers are the first responders (Sicherer et al., 2001); therefore, it is critical that teachers and other lay personnel respond appropriately to specifically identified life-threatening symptoms.

Only 57% of the returned plans had designated areas for medications to administer during an allergic reaction, and almost half did not have administration instructions for the Epipen®. Furthermore, 85% of the plans did not include instructions for the Twinject™. The Twinject™ is an epinephrine injector that allows for two epinephrine injections if necessary during a severe allergic reaction but can be complicated to assemble without instruction.

The findings of this study are an initial step in identifying the gaps in food allergy plans in schools. The convenience sample and lack of descriptive characteristics (e.g., education and position of respondents, school characteristics) limit generalizability beyond the sample. Because the participants were recruited from a school health conference, the sample may be biased in favor of professionals who attend educational conferences and may have a vested interest in the topics discussed.

IMPLICATIONS FOR SCHOOL NURSING PRACTICE

The evaluation of the use of the FAAN Food Allergy Action Plan reinforces the findings of Weiss and colleagues (2004) that school nurses were likely not aware of standard, recommended resources. School nurses should review their current food allergy emergency plans to determine if they are consistent with the FAAN plan. School nurses play a critical role in the treatment of food allergy reactions in schools and developing the education program regarding food allergies for school personnel. FAAN created a complete and simple Food Allergy Action Plan reviewed and endorsed by reputable professional organizations. It is unnecessary and risky for school nurses to develop their own plans or to alter the FAAN plan. Adding unnecessary items to an emergency plan or deleting essential items may make using the form and treating the child ineffective and more difficult, especially when followed by nonnurse school employees.

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The dissemination of evidence-based and best-practice protocols and the translation of those protocols into practice are critical issues for school nurses who work independently in an education setting. Nurses at the point of care do not have the time or skills to research best practices and review the evidence for all relevant issues (Melnyk & Fineout-Overholt, 2005; Pravikoff, Tanner, & Pierce, 2005). Unlike nurses who work in acute settings, school nurses cannot rely on the institution to set policies and procedures based on recent research and practice briefs. At the same time, it is imperative that school nurses have access to reviewed and up-to-date resources at the point of care

(Adams & McCarthy, 2007), especially for effective treatment of food allergies, a life-threatening school health issue. Active marketing and promotion of resources provided in a friendly, easy-to-access format is essential to reducing the delay between best-practice protocols and their implementation. National and state school nursing associations and state departments responsible for school health must work together to create easy, one-stop access to up-to-date, peer-reviewed best-practice materials and tool kits for all children with health issues in schools, including those with food allergies (Holleman, Eliens, van Vlient, & van Achterberg, 2006; Weiss et al., 2004).

CONCLUSION

The food allergy emergency plans returned by Illinois school nurses were inadequate in many important areas such as listing a prior history of asthma, identifying fatal symptoms of a food reaction, determining the appropriate medications to give, and detailed instructions for administering epinephrine. Illinois schools need to ensure plans adhere to all the current clinical guidelines. Food allergy emergency plans are essential in giving complete care to children with food allergy reactions. It is imperative that the plans reflect the most current clinical guidelines regarding food allergy reactions. The Food Allergy and Anaphylaxis Network, which has been endorsed by many professional associations, incorporates current guidelines into a complete and accurate emergency plan. Professional associations must partner to ensure schools adopt the Food Allergy Action Plan as a template for their individual school plans. Enacting an easy and effective food allergy emergency plan can limit possible fatal reactions in schools and avoid liability for school districts.

Food allergy emergency plans are essential in giving complete care to children with food allergy reactions. It is imperative that the plans reflect the most current clinical guidelines regarding food allergy reactions.

Acknowledgments. The authors would like to thank all the school nurses who take the time to ensure the safety of children with food allergies and Aidan who inspired this project.

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Food Allergy Action Plan

Place Child's Picture Here

Student's Name:_____ **D.O.B:**_____ **Teacher:**_____

ALLERGY TO:_____

Asthmatic Yes* ☐ No ☐ *Higher risk for severe reaction

◆ STEP 1: TREATMENT ◆

Symptoms:

- If a food allergen has been ingested, but *no symptoms*:
- Mouth Itching, tingling, or swelling of lips, tongue, mouth
- Skin Hives, itchy rash, swelling of the face or extremities
- Gut Nausea, abdominal cramps, vomiting, diarrhea
- Throat† Tightening of throat, hoarseness, hacking cough
- Lung† Shortness of breath, repetitive coughing, wheezing
- Heart† Thready pulse, low blood pressure, fainting, pale, blueness
- Other† _____
- If reaction is progressing (several of the above areas affected), give

The severity of symptoms can quickly change. †Potentially life-threatening.

Give Checked Medication:**

**(To be determined by physician authorizing treatment)

☐ Epinephrine ☐ Antihistamine
☐ Epinephrine ☐ Antihistamine
☐ Epinephrine ☐ Antihistamine
☐ Epinephrine ☐ Antihistamine
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☐ Epinephrine ☐ Antihistamine

DOSAGE

Epinephrine: inject intramuscularly (circle one) EpiPen® EpiPen® Jr. Twinject™ 0.3 mg Twinject™ 0.15 mg (see reverse side for instructions)

Antihistamine: give_____
medication/dose/route

Other: give_____
medication/dose/route

IMPORTANT: Asthma inhalers and/or antihistamines cannot be depended on to replace epinephrine in anaphylaxis.

◆STEP 2: EMERGENCY CALLS ◆

1. Call 911 (or Rescue Squad: _____) . State that an allergic reaction has been treated, and additional epinephrine may be needed.

2. Dr. _____ at _____

3. Emergency contacts:

Name/Relationship	Phone Number(s)	
a. _____	1.)_____	2.) _____
b. _____	1.)_____	2.) _____
c. _____	1.)_____	2.) _____

EVEN IF PARENT/GUARDIAN CANNOT BE REACHED, DO NOT HESITATE TO MEDICATE OR TAKE CHILD TO MEDICAL FACILITY!

Parent/Guardian Signature_____ Date_____

Doctor's Signature_____ Date_____
(Required)

Appendix. Food Allergy and Anaphylaxis Network: Food Allergy Action Plan, November 2006

TRAINED STAFF MEMBERS

1. _____ Room _____

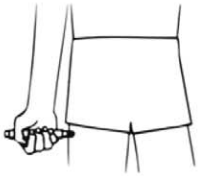
2. _____ Room _____

3. _____ Room _____

EpiPen® and EpiPen® Jr. Directions

- **Pull off gray activation cap.**

- **Hold black tip near outer thigh (always apply to thigh).**



- **Swing and jab firmly into outer thigh until Auto-Injector mechanism functions. Hold in place and count to 10. Remove the EpiPen® unit and massage the injection area for 10 seconds.**

Twinject™ 0.3 mg and Twinject™ 0.15 mg Directions

- **Pull off green end cap, then red end cap.**

- **Put gray cap against outer thigh, press down firmly until needle penetrates. Hold for 10 seconds, then remove.**

<u>SECOND DOSE ADMINISTRATION</u>:
If symptoms don't improve after 10 minutes, administer second dose:

- **Unscrew gray cap and pull syringe from barrel by holding blue collar at needle base.**
- **Slide yellow or orange collar off plunger.**

- **Put needle into thigh through skin, push plunger down all the way, and remove.**

Once EpiPen® or Twinject™ is used, call the Rescue Squad. Take the used unit with you to the Emergency Room. Plan to stay for observation at the Emergency Room for at least 4 hours.

For children with multiple food allergies, consider providing separate Action Plans for different foods.

The Food Allergy & Anaphylaxis Network

***Medication checklist adapted from the Authorization of Emergency Treatment form developed by the Mount Sinai School of Medicine. Used with permission.*

Appendix. Continued