INSIDE THIS COURSE

COMMON FOOD ALLERGIES IN CHILDREN

5.35 Contact Hours

Written By: Carolyn O'Reilly-Beck

Objectives

1. Explain the prevalence of food allergies in children and its significance.
2. Identify the most common food triggers of allergies in children.
3. Compare and contrast food allergies and food intolerances.
4. Describe the etiology of an allergic reaction.
5. List the signs and symptoms of an allergic reaction.
6. Define and describe anaphylaxis.
7. List the medications commonly used in treating food allergies in children.
8. Discuss avoidance strategies parents and caretakers can use to protect the food allergic child.
9. Identify educational resources that nurses can provide to parents of children with food allergies.

"When a child is diagnosed with a food allergy, the family's lifestyle changes. They have to prepare their food differently, it affects their ability to go out and eat dinner, and it affects their ability to go to social events. Sometimes patients and families will become very anxious about exposure to the food and developing an allergic reaction. Food allergy has a major impact on quality of life for families so anything we can do to reduce their food allergy is really terrific."

Lynda Schneider, MD, Director of Children's Allergy Program, Children's Hospital, Boston

PREVALENCE

Food allergies in children are gaining more and more attention and for good reason. As a school health provider for over 20 years, I have seen firsthand that food allergies in my own school population have significantly increased over the last several years; in particular peanut and tree nut allergies. There is increasing evidence to substantiate what I and many other health professionals have observed. According to a study released in 2008 by the Centers for Disease Control and Prevention, about an 18% increase in food allergy was seen between 1997 and 2007. The study also noted that the prevalence of peanut allergies among children appears to have tripled between 1997 and 2008 (Branum & Lukacs, 2008).

The Asthma & Allergy Foundation of America (AAFA) reports that allergies have a genetic component. If only one parent has allergies of any type, chances are 1 in 3 that each child will have an allergy. If both parents have allergies, the chances increase to 7 in 10 that their children will have allergies. Dr. Scott Sicherer, in his book, *The Complete Peanut Allergy Handbook*, also states that there is a 7 percent risk, or about ten times higher risk than normal, for developing a peanut allergy if one sibling has a peanut allergy.

COMMON FOOD ALLERGENS IN CHILDREN

About 90% of all food allergies in children are caused by peanuts, milk, wheat, eggs, soy, tree nuts, (walnuts, almonds, cashews, pecans, and pistachios) fish, and shellfish. Peanuts are responsible for 50 % of the total food allergies that children present with and generally produce the most severe reactions. Although childhood allergies to milk, egg, wheat, and soy generally resolve in childhood, they appear to be resolving more slowly than in previous decades, with many children still allergic beyond age 5 years. Allergies to peanuts, tree nuts, fish, or shellfish are generally lifelong allergies (Food Allergy and Anaphylaxis Network. Food Allergy Facts and Statistics for the U.S.).

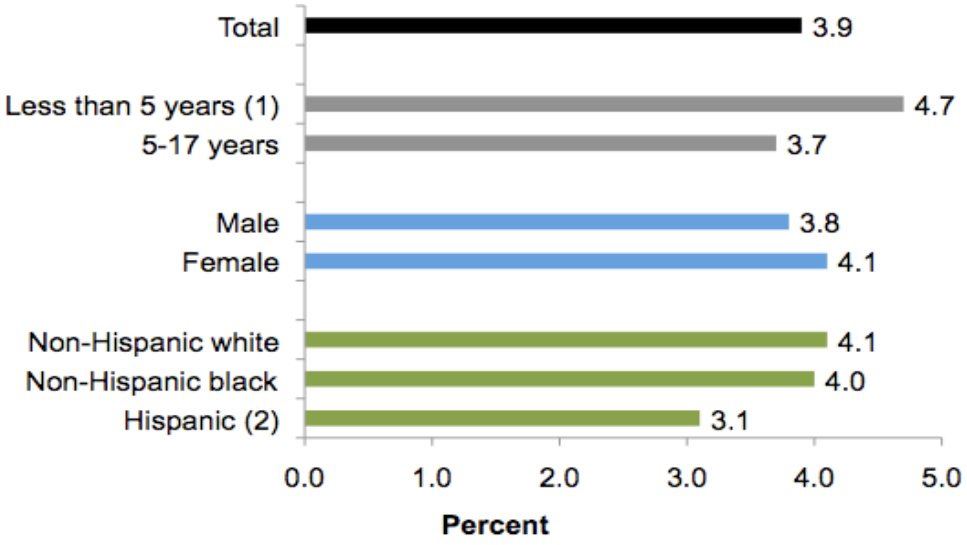
In a 2007 study done by the Center for Disease Control, an estimated 3 million children under age 18 years (3.9%) had a reported food allergy. This means that 4 out of every 100 children were affected. Children under age 5 years had higher rates of reported food allergy compared with children 5 to 17 years of age. Boys and girls had similar rates of food allergy (Branum & Lukacs, 2008).

Food allergy as reported in this study has increased among children of all ages in the United States over the last 10 years and findings are similar to those reported in other countries. There is some difference in reported food allergy according to Hispanic ethnicity, with lower reported rates among Hispanic children

compared with non-Hispanic white and non-Hispanic black children. Hispanic children had lower rates of reported food allergy (3.1 percent) than non-Hispanic white (4.1 percent) or non-Hispanic black children (4 percent). However, reported food allergy does not appear to differ by sex (Branum & Lukacs, 2008).

FIGURE 1

Percentage of children under 18 years who had a reported food or digestive allergy in the past 12 months, by age, sex, and race and ethnicity group: United States 2007



(1) Significantly different from children aged 5-17 years.

(2) Significantly different from non-Hispanic white and non-Hispanic black children.

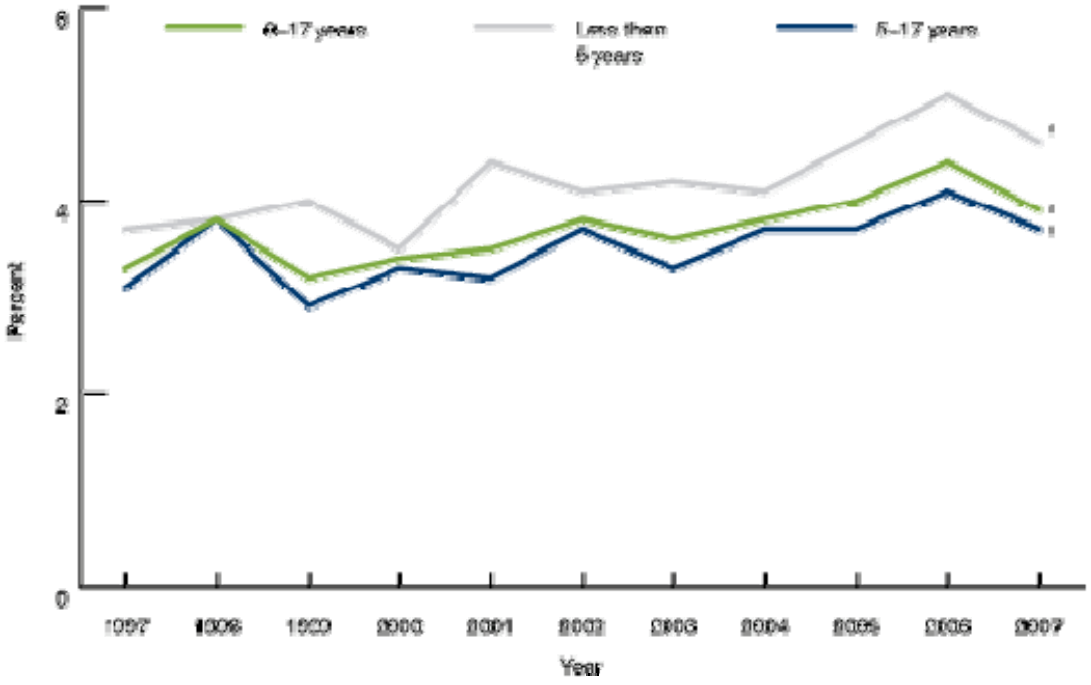
SOURCE: CDC/NCHS, National Health Interview Survey

FOOD ALLERGIES ARE WIDE SPREAD

In the same 2007 study, it was reported that the food allergy rate among all children younger than 18 years was 18% higher than in 1997. During the 10-year period 1997 to 2006, food allergy rates increased significantly among both preschool-aged and older children. Approximately 4.7 percent of children younger than 5 years had a reported food allergy compared to 3.7 percent of children and teens aged 5 to 17 years. Boys and girls had similar rates of food allergy – 3.8 percent for boys and 4.1 percent for girls (Branum & Lukacs, 2008).

FIGURE 2

Percentage of children under age 18 years who had a reported food or digestive allergy in the past 12 months, by age group: United States, 1997-2007



(1) Statistically significant trend.

SOURCE: CDC/NCHS, National Health Interview Survey

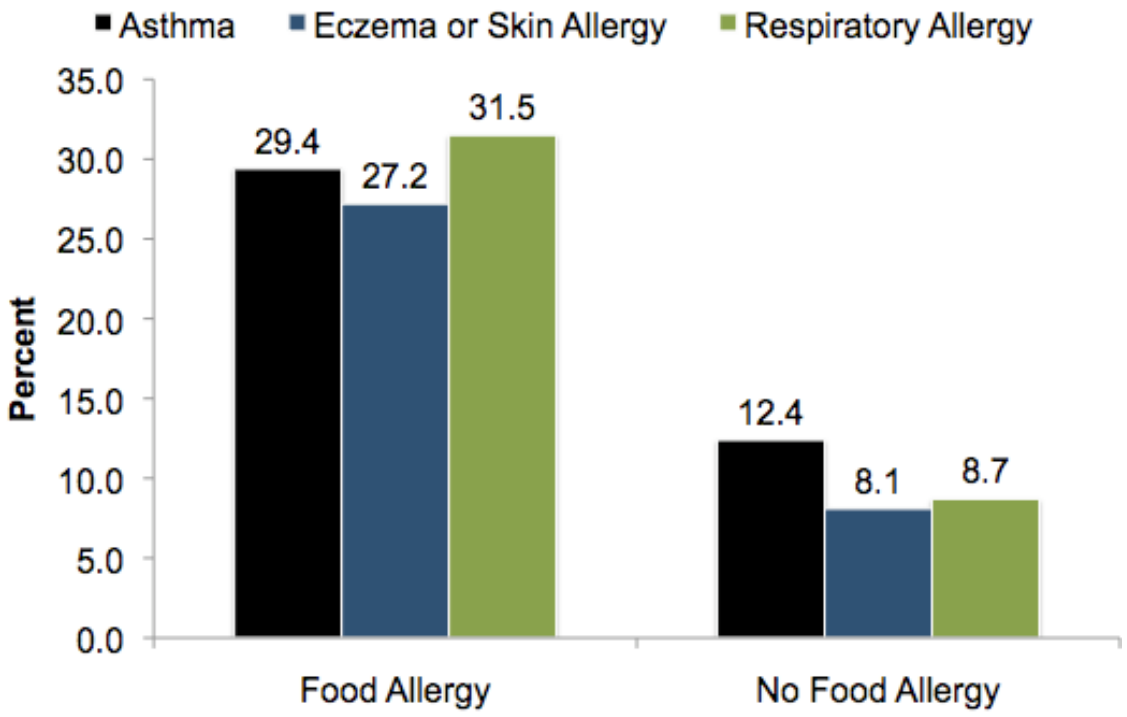
ASSOCIATED CONDITIONS

It was also reported in the 2007 CDC study, 29% of children with food allergy also had reported asthma compared with 12% of children without food allergy. Children with food allergy are two to four times more likely to experience other allergic conditions and asthma than children without food allergy. This is of great importance, as children with coexisting food allergy and asthma may be more likely to experience anaphylactic reactions to foods and be at higher risk of death. Approximately 27% of children with food allergy had reported eczema or skin allergy, compared with 8% of children without food allergy. Over 30% of children with food allergy also had reported respiratory allergy, compared with 9% of children with no food allergy (Branum & Lukacs, 2008).

Further statistics from the CDC show that in 2007, 29% of children with food allergy also had reported asthma compared with 12% of children without food allergy. And approximately 27% of children with food allergy had reported eczema or skin allergy, compared with 8% of children without food allergy (Branum & Lukacs, 2008).

FIGURE 3

Percentage of children under 18 years with asthma or other reported allergic conditions in the previous 12 months, by reported food allergy status: United States, 2007



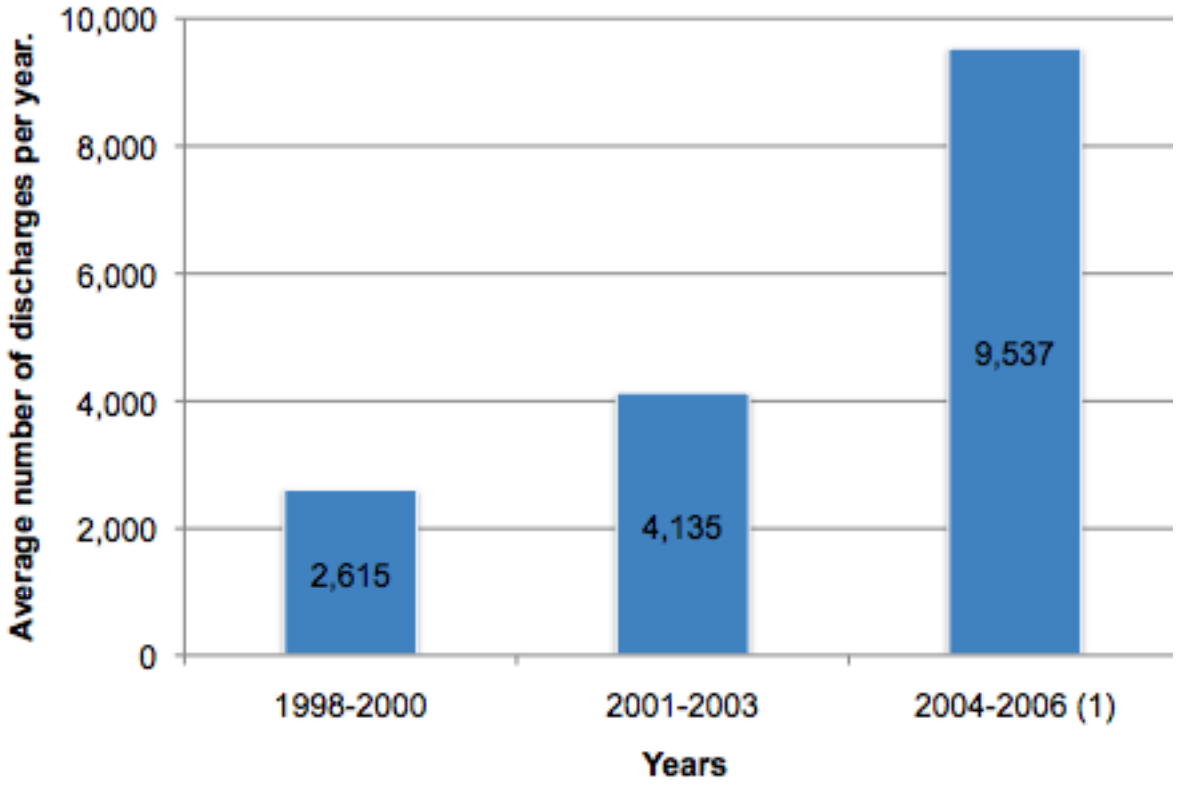
SOURCE: CDC/NCHS, National Health Interview Survey

DIAGNOSES RELATED TO FOOD ALLERGIES AMONG CHILDREN

From 2004 to 2006, there was an average of 9,537 hospital discharges per year with a diagnosis related to food allergy among children 0 to 17 years. Hospitalizations having at least one diagnosis related to food allergy also increased from 1998-2000 through 2004-2006. This finding could be related to increased awareness, reporting, and use of specific medical diagnostic codes for food allergy or could represent a real increase in children who are experiencing food-allergic reactions. Researchers also report that every 3 minutes a food allergy reaction sends someone to the emergency department – that is about 200,000 emergency department visits per year, and every 6 minutes the reaction is one of anaphylaxis (Branum & Lukacs, 2008).

FIGURE 4

Percentage of children under age 18 years who had a reported food or digestive allergy in the past 12 months, by age group: United States, 1997-2007



(1) Statistically significant trend.

SOURCE: CDC/NCHS, National Health Interview Survey

A more recent study done just 3 years after the famous CDC study shows even more significant results. The Food Allergy Initiative (FAI) funded a study by Dr. Ruchi Gupta of Northwestern University Feinberg School of Medicine; Chicago, IL called ***Understanding the Prevalence of Childhood Food Allergy in the United States 2008-2010*** in which she completed a national survey of more than 38,000 families. Dr. Gupta and her colleagues found that 8% (5.9 million) of U.S. children had one or more food allergies. According to this study, approximately 1 in every 13 children in the U.S. has a food allergy—twice as many as the CDC estimate of 1 in 25. Nearly 39% (2.3 million) of these children have a severe, or life-threatening, food allergy. More than 30% (1.7 million) of these children are allergic to more than one food. The data also shows that food allergies do not discriminate—food allergies affect U.S. children in all geographic regions and across all ethnicities.

Researchers in this study used a population-based, cross-sectional survey that was conducted between June 2009 and February 2010 and yielded a final sample size of more than 38,000 households, resulting in the largest prevalence study on food allergy among children.

Major findings of this study included the following:

- 38.7 percent of the children in the survey had a severe or life-threatening allergy.
- 30.4 percent had multiple food allergies.
- Children with food allergies were most commonly allergic to peanuts (25.2 percent), milk (21.1 percent) and shellfish (17.2 percent), followed by tree nuts (13.1 percent), and egg (9.8 percent).
- Severe reactions were most common among children with a tree nut, peanut, shellfish, soy, or fin fish allergy.
- Children aged 14-17 years were most likely to have a severe food allergy. (It is thought that adolescents and young adults may be at an increased risk of having a life-threatening allergic reaction (anaphylaxis) because of inconsistent behaviors in avoiding known triggers).
- Food allergies affect children in all geographic regions. Odds of having a food allergy were also higher for children from geographic regions outside the Midwest.
- Asian and African American children were more likely to have a convincing history of food allergy, but were less likely to receive a formal diagnosis when compared to white children.
- The study also showed that Asian and Black children had higher incidences of having a food allergy compared with White children.
- The odds of having a food allergy were significantly lower among children in households with an annual income of less than $50,000. The study's authors indicated this could be because these children are less likely to have a medical diagnosis.
- Researchers determined the prevalence of common allergens as follows: 2% for peanut, 1.7% for milk, 1.4% for shellfish, 1.0% for tree nuts, 0.8% for egg, 0.5% for fin fish, 0.4% for strawberries, 0.4% for wheat, and 0.4% for soy, all significant increases from previous studies, including the 2007 Center for Disease Control Study.

According to Mary Jane Marchisotto, FAI's Executive Director, "This study confirms what so many families already know: food allergy is a large and growing public health problem." In 2008, the Centers for Disease Control estimated that food allergies affected 1 in 25 children; now it's 1 in 13. That translates into 2 children in every classroom. It is especially disturbing to see how many of these children have multiple food allergies and have already experienced life-threatening reactions. These findings reinforce the need for increased education and awareness of this potentially life-threatening medical condition.

So, what does this all mean? Why have we seen such a significant increase in food allergies in children? The answer is not a simple one. No one really knows why we are seeing such a significant increase. There are, however, several theories suggested as to why this is happening.

One well-known hypothesis for the increase in allergic diseases in westernized countries is the **hygiene hypothesis**. This hypothesis suggests that because of our improved hygiene and vaccinations, our

immune systems are not overburdened with disease or parasites, so instead we develop immunity against benign antigens that we are commonly exposed to, such as food (Leonard, 2010).

Since the immune system causes allergies, it is very possible that our germ-protected manner of living with smaller families, cleanliness, widespread use of antibiotics, vaccination, and other means to protect ourselves from germs, has left our immune system more likely to attack things that are innocent, such as harmless proteins in foods, pollens, and animal dander for example. The hygiene hypothesis also holds that the immune system benefits from early exposure to bacteria (Leonard, 2010).

Other hypotheses for the increase in food allergies involve how we grow and process our food, how and when we introduce foods to infants and toddlers, dietary fat content, reduction in dietary antioxidants, vitamin D insufficiency, and environmental exposures to allergens, such as peanut oil in skin moisturizers, which may favor sensitivity as opposed to tolerance (Leonard, 2010).

Food Allergy or Food Intolerance

The Pathophysiology of a Food Allergy

Immunoglobulin E (IgE) is a type of antibody that is present in minute amounts in the body that plays a major role in allergic diseases. IgE binds to allergens and triggers the release of substances from mast cells that can cause inflammation. When IgE binds to mast cells, the process called a ***cascade of allergic reaction*** can begin (AAFA-IGE's Role in Allergic Asthma).

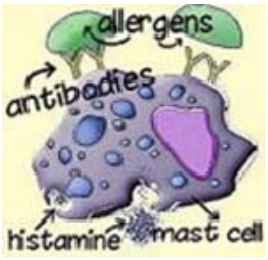
- Allergen exposure: Repeated exposure to a particular allergen can be the first step in developing a reaction to it. Some allergens trigger strong allergic reactions, while others trigger milder reactions.

- T cell action: Allergens induce T cells to activate B cells, which develop into plasma cells that produce and release more antibodies.

The surfaces of mast cells contain special receptors for binding IgE. The IgE antibody fits to this receptor like a "module docking with the mother ship." (AAFA-IGE's Role in Allergic Asthma) This arrangement is such that when two adjacent mast-cell-linked IgE antibodies are in place, the allergen is drawn to both and attaches itself to both, cross-linking the two IgEs. When enough of the IgEs become cross-linked, the mast cell releases histamine and other inflammatory substances, and **the allergic cascade** begins. Histamine, the primary mediator, is a powerful chemical that can affect the respiratory system, gastrointestinal tract, skin, or cardiovascular system. Histamine induces vascular permeability, mucus production, vasodilatation, and airway and intestinal smooth muscle contraction; and affects cardiac function. These actions result in the flushing, hives, edema, bronchoconstriction, abdominal cramping, vomiting, hypotension, and dysrhythmias typically seen in acute allergic reactions and anaphylaxis (Leonard, 2010).

A true food allergy then, is a cell mediated potentially serious immune response to eating specific foods or food additives. Virtually any food can cause an allergic reaction (Leonard 2010). It occurs when the body mistakes an ingredient in food - usually a protein - as harmful and creates a defense system (antibodies) to fight it, as stated earlier.

As a result of this response, food allergy symptoms occur. The allergy symptoms an individual presents with depend on where the histamine is released in the body. For example, if histamine is released in the ears, nose, and throat, an itchy nose and mouth, or trouble breathing or swallowing can result. If histamine is released in the skin, hives or a rash may develop. If histamine is released in the gastrointestinal tract, the affected child likely will develop stomach pains, cramps, vomiting or diarrhea. Many who experience food allergies develop a combination of symptoms when the food is eaten and digested.



Symptoms of a food allergy can range from mild to severe, and the amount of food necessary to trigger a reaction varies from person to person. Reactions to food can occur with very small amounts of exposure and develop in minutes or up to 2 hours after ingestion. Symptoms can be cutaneous, gastrointestinal, respiratory, circulatory, neurologic, and/or atypical, such as a metallic taste in the mouth. Symptoms of a food allergy may include:

- Rash or hives
- Nausea
- Stomach pain
- Diarrhea
- Itchy skin
- Shortness of breath
- Chest pain
- Swelling of the airways to the lungs
- Anaphylaxis

FOOD INTOLERANCE

Food intolerances are much more common than food allergies. In contrast to a food allergy, a food intolerance is a digestive system response rather than an immune system response. Food intolerances occur when something in a food irritates a person's digestive system or when a person is unable to properly digest or breakdown the food. Intolerance to lactose, which is found in milk and other dairy products, is the most common food intolerance, affecting 10% of all Americans (WebMD). Symptoms of food intolerance may include:

- Nausea
- Stomach pain
- Gas, cramps, or bloating
- Vomiting
- Heartburn
- Diarrhea

Where food allergies can be triggered by even a small amount of the food and occur every time the food is consumed, food intolerances often are dose related. People with food intolerance may not have symptoms unless they eat a large portion of the food or eat the food frequently. For example, a person with

lactose intolerance may be able to drink milk in coffee or a single glass of milk, but becomes sick if he or she drinks several glasses of milk.

Where food allergies can be triggered by even a small amount of the food and occur every time the food is consumed, food intolerances often are dose related. People with food intolerance may not have symptoms unless they eat a large portion of the food or eat the food frequently. For example, a person with lactose intolerance may be able to drink milk in coffee or a single glass of milk, but becomes sick if he or she drinks several glasses of milk.

A food allergy causes an immune system reaction that affects numerous organs in the body. It can cause a range of symptoms. In some cases, an allergic food reaction can be severe or life-threatening. In contrast, food intolerance symptoms are generally less serious and are limited to digestive problems.

Causes of food intolerance may include:

- Absence of an enzyme needed to fully digest a food. Lactose intolerance is a common example.
- Irritable bowel syndrome. This chronic condition can cause cramping, constipation and diarrhea.
- Food poisoning. Toxins such as bacteria in spoiled food can cause severe digestive symptoms.
- Sensitivity to food additives. For example, sulfites used to preserve dried fruit, canned goods and wine can trigger asthma attacks in sensitive people.
- Recurring stress or psychological factors. Sometimes just the thought of a particular food may make you sick. The reason is not fully understood.
- Celiac disease. Celiac disease has some features of a true food allergy because it does involve the immune system. However, symptoms are mostly gastrointestinal, and people with celiac disease are not at risk of anaphylaxis. This chronic digestive condition is triggered by eating gluten, a protein found in wheat and other grains.

Food Allergy Diagnosis and Testing

Unfortunately, there is no standard test used to confirm or rule out a food allergy. Additionally, many things need to be considered before making a diagnosis. After ruling out food intolerances and other health problems, a child’s health care provider may use several steps to find out if the child has an allergy to specific foods. This assessment may include a detailed patient history, the child's food diary, an elimination diet, and possible skin and blood tests.

1. In the initial step, the health care provider will take a comprehensive health history. A careful history of the child's symptoms can help to determine if the child even has allergies.
    - What symptoms does the child have?

- When do they occur?
- Do they happen right after the child is exposed to something or eats a certain food? Most food allergies cause symptoms within minutes to a few hours.
- Do the symptoms occur every time that the child is exposed to something?
- What are the results of the child's elimination diet and food diary?

2. **Food Diary-** Sometimes a health care provider can't make a definitive diagnosis based solely on the child's history. In that case, a parent may be asked to keep diary of the contents of each meal that a child eats and whether the child in face does have any kind of a reaction. This gives more detail from which a parent and the child's healthcare provider can see if there is a consistent pattern in reactions.

3. **Elimination Diet-** The parent may be asked to eliminate suspect foods in the child's diet for a week or two, and then add the food items back into the diet one at a time. This process can help link symptoms to specific foods. However, this isn't a foolproof method for a couple of reasons. Psychological factors as well as physical factors can come into play. For example, if a parent or child think the child is sensitive to a food, a response could be triggered that may not be a true allergic one. If a child had a severe reaction to a food in the past, this method may not be safe. An elimination diet can be undertaken in several ways, depending on the allergist supervising it, but the basic principle is the same: the diet begins with a limited set of foods that are deemed unlikely to cause a reaction. Other foods are added one by one over a period of days or weeks. While the elimination diet can be tedious, it can be an effective way to determine which substances are problematic when skin testing is inconclusive. It can also help diagnose food intolerances, which may cause problematic symptoms but will not show up on an allergy test. A provider can almost always make a diagnosis if the symptoms go away after you remove the food from your diet.

4. **Oral Food Challenge-** During this test, done in the doctor's office, a child will be given small, but increasing amounts of the suspect food. If the child does not have a reaction during this test, a parent may be able to include this food in your diet again. This test is usually done for common foods (such as peanuts) that are easy to eat by accident (because many foods are made with them or processed in factories that also process foods made with nuts). More than 80% of the time, people taking this test do not have a reaction.

If a child's history, diet diary, or elimination diet suggests a specific food allergy is likely, the child's health care provider may then do further testing to confirm the diagnosis. One of these tests is a scratch skin test, during which an extract of the food is placed on the skin of the child's lower arm or back in some cases. The provider will then scratch this portion of the child's skin with a needle and look for swelling or redness, which would be a sign of a local allergic reaction. If the scratch test is positive, it means that there is IgE on the skin's mast cells that are specific to the food being tested. Skin tests are rapid, simple, and relatively safe. Although not always accurate in children under the age of 12 months, it can be done at any age. According to the American Academy of Pediatrics, age is no barrier to skin testing; positive results can be obtained at any age. The test is relatively painless and very quick. To avoid false results, your child will have to stop taking antihistamines if he is currently taking them as treatment for his allergies.

Interestingly enough, it is possible to have a positive skin test to a food allergen. However, without having an allergic reaction to that food. Because of this, a health care provider diagnoses a food allergy only when someone has a positive skin test to a specific allergen and when the history of reactions suggests an allergy to the same food. If additional testing is required, further skin or blood tests may be ordered by the child's physician. The scratch or prick skin test is the most commonly used test to detect allergies.

Another type of allergy test is the intradermal skin test. This is similar to the prick skin test, except that the allergen is injected under the skin. It is more accurate, but may not be as well tolerated as the prick skin test in younger children.

The scratch test is not done if a child is extremely allergic and has had severe anaphylactic reactions in the past because causing an allergic reaction could be dangerous. Skin testing also cannot be done if the child has eczema over a large portion of the body.

In cases where scratch testing is not feasible, a health care provider may use blood tests such as the RAST (radioallergosorbent test) or the ELISA (enzyme-linked immunosorbent assay). These tests measure the presence of food-specific IgE in your blood. As with skin testing, positive tests do not necessarily mean you have a food allergy. A new version of the test, the ImmunoCAP allergy blood test, is supposedly much improved over older versions, although skin testing is usually thought to be more accurate. The main downsides to RAST testing is that it is more expensive than skin testing, and the results can take up to a few weeks to come back, while the results of skin tests are usually known within 15 minutes of the test being performed. However, these blood tests aren't always accurate.

Patient history is the most important diagnostic tool in the evaluation of food allergies. Skin testing and specific IgE testing provide additional information and can be used to monitor the status of food allergies over time or determine if an oral food challenge is appropriate. An oral food challenge is the gold standard for diagnosis of food allergy; however, this test is typically only used when the diagnosis is in question or if it is believed that the food allergy has been outgrown (Leonard, 2010).

ANAPHYLAXIS

By definition, "anaphylaxis is a severe multiorgan system allergic reaction that can be fatal" (Sampson, 2004). Anaphylaxis is a sudden, severe allergic reaction that involves various areas of the body simultaneously or causes difficulty breathing and swelling of the throat and tongue (Leonard, 2010). Anaphylaxis can progress rapidly even without cutaneous symptoms. This type of reaction can occur immediately or up to two hours following allergen exposure. In about a third of anaphylactic reactions, the initial symptoms are followed by a delayed wave of symptoms two to four hours later. This combination of an early phase of symptoms followed by a late phase of symptoms is defined as a biphasic reaction. While the initial symptoms respond to epinephrine, the delayed biphasic response may not respond at all to epinephrine and may not be prevented by steroids. Therefore, it is imperative that following the administration of epinephrine, the child be transported by emergency medical services to the nearest hospital emergency department even if the symptoms appear to have been resolved. Children experiencing anaphylaxis should be observed in a hospital emergency department for a minimum of 4-6 hours after

initial symptoms subside, to observe for a possible biphasic reaction. In the event a biphasic reaction occurs, intensive medical care could then be provided (Massachusetts Department of Public Health, 2002).

Contrary to a commonly held belief, allergic reactions do not automatically get worse each time. However, previous food-induced anaphylaxis does put a patient at risk for future anaphylactic reactions. A number of factors influence reaction severity such as the amount of allergen ingested, how the food was prepared (raw vs. heated), the amount and type of other food ingested, the presence of acute viral illness, the status of an underlying chronic disease, alcohol consumption, and exercise (U.S. Department of Health and Human Services May, 2011).

Risk factors for fatal anaphylaxis include adolescence, a history of asthma, a history of anaphylaxis, delayed or no epinephrine received, cardiopulmonary disease, an upright posture during the reaction (mostly in adults, leading to empty ventricle syndrome), adrenal insufficiency, beta blockade, angiotensin-converting enzyme therapy, and initial misdiagnosis (Leonard, 2010).

Management of Food Allergies

There is no cure for food allergies. Strict avoidance of food allergens and early recognition and management of allergic reactions to food are important measures to prevent serious health consequences. Management consists of education, prevention, and treatment of acute reactions. The mainstays of treatment of acute food-induced allergic reaction are antihistamines and intramuscular epinephrine.

Treatment of Acute Reactions

Antihistamines can be given if symptoms develop or when a known allergen is ingested and symptoms have not yet developed. Evidence shows that oral cetirizine (0.25 mg/kg, maximum of 10 mg) works as fast as diphenhydramine (1.5 mg/kg, maximum of 50 mg); therefore, either can be used, and cetirizine has the added benefit of longer lasting effects (Centers for Disease Control and Prevention).

Epinephrine is used when respiratory or circulatory symptoms are present, or if the reaction is progressing and involves two or more organ systems. Epinephrine is appropriate, for example, if a patient has generalized hives and protracted vomiting, even without respiratory or circulatory symptoms (Centers for Disease Control and Prevention).

Every patient diagnosed with a food allergy is now advised to carry two epinephrine self-injectors because the severity of each reaction cannot be predicted, and in some cases, two doses might be needed. The dose of epinephrine is 0.01 mg/kg; using prepackaged epinephrine, adults receive 0.3 mg epinephrine per dose, and children under 25 kg (55 lbs) receive 0.15 mg epinephrine per dose.

Proper administration technique involves intramuscular injection of epinephrine into the thigh muscle. Studies have shown that injection of epinephrine into the thigh muscle achieves higher peak plasma concentrations than injection into the deltoid muscle, and absorption occurs faster with intramuscular versus subcutaneous administration. (Epinephrine can be injected through clothes if necessary; however, injecting directly against the skin avoids unseen buttons, seams, or zippers (Massachusetts Department of Public Health, 2002).

The Need for Food Allergy Education

A team of researchers from Mount Sinai School of Medicine and four other institutions have found that young children with documented or likely allergies to milk and/or eggs, whose families were instructed on how to avoid these and other foods, still experienced allergic reactions at a rate of almost once per year. Of severe cases, less than a third received epinephrine, a medication used to counter anaphylaxis, a life-threatening allergic condition (Quantum Day, June 2012).

The findings are from an ongoing Consortium of Food Allergy Research (CoFAR) study that has been following more than 500 children with food allergies since infancy. The results of the three-year study appear online in the June 25 issue of *Pediatrics*.

Nearly 72 percent of the participants experienced a reaction, with 1,171 allergic reactions in total. Allergic reactions were attributed to such factors as a lack of close supervision, misreading ingredient labels, cross-contamination, or errors in food preparation. Participating families had been given written and verbal food avoidance instruction, and written prescriptions for self-injectable epinephrine, beforehand.

"This study reinforces the importance of educating parents and other caregivers of children with food allergy about avoiding allergenic foods and using epinephrine to treat severe food-allergic reactions," according to Scott Sicherer, MD, Professor of Pediatrics and Chief of the Division of Allergy and Immunology at Mount Sinai School of Medicine. He goes on to say, "We must work harder to thoroughly educate parents about the details of avoidance and when and how to correctly use epinephrine to manage this life-threatening condition. This underscores the need to educate everyone who is responsible for the child, including grandparents, older siblings and teachers."

Strategies for Parents and Caretakers

Raising a child with food allergies is challenging. Parents must ensure strict food avoidance, understand food labeling and be on a constant alert to implement an emergency medical plan at any moment. These are just some of the challenges parents of children with food allergies deal with every day. With time, support and education, parents become skilled and are well prepared to keep their children safe. Perhaps

the greatest challenge parents face is finding the balance between what is safe and what is normal when meeting the needs of their children. The balance works well until it is time to share the care of that child with others. (Massachusetts Department of Education, 2002).

It is at this time that patients who have food allergies (and their caretakers) must be aware of the risks for hidden allergens or cross-contact at every meal, and frequently special provisions must be made for these individuals. Food allergies have a profound effect on quality of life, and support groups and food allergy organizations (such as the Food Allergy and Anaphylaxis Network, or FAAN) might be useful. School, camp, restaurants, entertainment events, birthday parties, air travel, and vacationing can be stressful situations for food-allergic individuals. General nutritional health should be assessed periodically, and patients should be monitored for psychological issues such as anxiety and depression as well as food phobias and eating disorders. Food-allergic individuals and their caretakers must be aware of hidden allergens and cross-contact at every meal and be prepared to treat if an allergen is accidentally ingested (Leonard, 2010).

A few common sense approaches that nurses can suggest parents take may also help to reduce the possibility of a child having an allergic reaction:

1. Strict avoidance of offending allergen!

2. Read all food labels!

   - The Food Allergen Labeling and Consumer Protection Act (FALCPA) of 2004 was passed to ensure that individuals, particularly parents of children with food allergies and others providing food to those children, could easily and accurately identify food ingredients that may cause allergic reactions. (U.S. Food and Drug Administration. Food allergen labeling and consumer protection act of 2004 (public law 108-282, title II). According to the FALCPA, the major eight allergens must be declared in simple terms, either in the ingredient list or via a separate allergen statement. However, FALCPA does not regulate the use of precautionary or advisory labeling.

   - Advisory/precautionary labeling (e.g., “may contain”, “in a facility that also processes”) is voluntary. The terms do not reflect specific risks and random products tested for allergens have shown a range of results from none to amounts that can cause reactions. It is important however, to treat advisory labeling on a particular food with caution and with the potential for causing an allergic reaction and should not be consumed by the food allergic child. For example, if the label reads “processed in a facility that also processes peanuts and tree nuts, the nut allergic child should not eat the food. Better to be safe than sorry!

   - Additionally, parents and caretakers need to be reminded to check food labels regularly as it is not uncommon for manufacturers to change ingredients periodically.

3. When in doubt, don’t eat it!

- At restaurants and social gatherings, you're always taking a risk that you might eat a food you're allergic to. Many people don't understand the seriousness of an allergic food reaction and may not realize that a tiny amount of a food can cause a severe reaction in some people. If you have any suspicion at all that a food may contain something you're allergic to, steer clear.

- Be careful at restaurants! Be certain your server or chef is aware that your child absolutely can't eat the food they are allergic to, and you need to be completely certain that the meal you order doesn't contain it. Also, make sure food isn't prepared on surfaces or in pans that contained any of the food your child is allergic to. Don't be reluctant to make your needs known. Restaurant staff members are usually more than happy to help when they clearly understand your request.

4. Involve caregivers.

    - If your child has a food allergy, it is important to make sure any caregiver to understand how important it is for your child to avoid the allergy-causing food and that they know what to do in an emergency. It is also important to let caregivers know what steps they can take to prevent a reaction in the first place, such as careful hand-washing, and cleaning any surfaces that might have come in contact with the allergy-causing food.

    - Notify key people that your child has a food allergy. Talk with child care providers, school personnel, parents of your child's friends and other adults who regularly interact with your child. Emphasize that an allergic reaction can be life-threatening and requires immediate action. Make sure that your child also knows to ask for help right away if he or she reacts to food.

5. If your child has already had a severe reaction, have him or her wear a medical alert bracelet or necklace that lets others know that you have a food allergy in case you have a reaction and you're unable to communicate.

6. Write an action plan. The plan should describe how to care for your child when he or she has an allergic reaction to food. Provide a copy of the plan to your child's school nurse and others who care for and supervise your child.

7. It is advisable to redo allergy testing about every year for milk, egg, soy, and wheat allergies, and every 2 to 3 years for peanuts, tree nuts, fish, and crustacean shellfish, which children are less likely to outgrow.

8. Always have have two doses of an epinephrine auto-injector available at all times (home, school, camp, etc.), such as the EpiPen, EpiPen Jr (Twinject 0.30mg or Twinject 0.15mg auto-injectors, depending on what is available in your area).

FOOD ALLERGIES IN SCHOOL

Food allergies are a particular concern in the school environment. Studies show that 16%–18% of children with food allergies have had allergic reactions to accidental ingestion of food allergens while in school. Approximately 20-25% of epinephrine administrations in schools involve individuals whose allergy was unknown at the time of the reaction (Sicherer, Furlong, DeSimone & Sampson, 2011). School personnel need to be ready to effectively manage students with known food allergies and should also be adequately prepared to respond effectively to emergency needs of students who are not known to have food allergies but who exhibit allergy-related signs and symptoms.

HOW THIS CAN BE ACCOMPLISHED

Some states and school districts have taken matters into their own hands and have published proactive guidelines for managing life-threatening reactions at school which can be used as models for developing similar guidelines in other school districts or schools. These guidelines outline the roles and responsibilities of specific individuals – from the school administrator to the school custodian and bus drivers – in a detailed checklist format. Also included are templates for composing letters to classmates, families and parents, detailing how to respond to a student with life-threatening food allergies. Two examples of such published guidelines are:

- *Managing Life Threatening Food Allergies in Schools* (Massachusetts Department of Education)
- *Guidelines and Practices: Managing Food Allergies in Elementary School Children* (Ann Arbor, Michigan Public Schools)

Additionally, many states including my own (Massachusetts) have enacted laws mandating that a child's epinephrine be available to the student at all times. Allergy Management and Epi-pen Administration training sessions are held annually for non-licensed personnel, under the direction of the school nurse in many states as well. I have included an excerpt from the Massachusetts law in Appendix C regarding this issue.

The concept of safe management for food allergic children in school begins with the school nurse and is reflected in the standards of practice developed by The National Association of School Nurses (Massachusetts Department of Health, 2002). It is under her direction that a comprehensive and detailed plan be put in place to effectively meet the health needs of these students. A sample Epi-pen Administration Care Plan can be found in Appendix A.

It is also important to keep in mind when drawing up an emergency health plan for a child that food allergy reactions can happen in multiple locations throughout the school, and are not limited just to the cafeteria. Care must be exercised regarding bake sales, classroom parties, and snacks outside of the cafeteria (Massachusetts Department of Public Health, 2002). This same care must extend to field trips as well.

Key Items for a Food Allergic Emergency Plan

- A complete list of foods to which child is allergic.
- The possible symptoms of the child's allergic reaction.
- Doctor's orders regarding treatment that should be administered to the child, and under what circumstances. This would include any medication to be used in the child's treatment plan.
- Parental permission for administering epinephrine and/or other allergy medications
- Contact information for emergency medical services (i.e., 911), child's allergist/physician, and parent.
- A current picture of the child.
- Allergy test results and any history of child's allergic reactions.
- At least one epinephrine auto□injector as prescribed. It is wise to check expirations dates regularly and replace units as needed.
- Other additional medications depending on child's circumstances.
- Communicate with appropriate school personnel-principal, teacher, specialists, substitutes, paraprofessionals.
- Formulate allergy and epi-pen administration training sessions-noting what staff members are trained in epi-pen administration.

Parents are faced with the reality that if their child has a severe food allergy the child is at greatest risk for a life threatening and potentially fatal allergic reaction at school. The only way to provide a safe and healthy learning environment for these children is for schools to partner with parents, tap into their knowledge and expertise, and develop a comprehensive approach that will ensure the safety and health of each and every child with food allergies (Massachusetts Department of Public Health, 2002).

Using this all inclusive approach, schools are in a perfect position to help parents and their children make this necessary transition of moving from the safety of their home environment to the outside world; with the ultimate goal, making the child feel they are safe in a world outside of their own home.

FOOD ALLERGY RESOURCES FOR PARENTS

After doing an extensive internet search, I found numerous books available for parents and children as well as many internet sites dealing with various topics related to food allergies. I have included a sampling of books and websites that I found as resources for nurses to share with parents of food allergic children who request further information. There is also a comprehensive resource list available from the Food and Nutrition Information Center's (FNIC) Web site at: www.nal.usda.gov/fnic/pubs/bibs/allergy.pdf. Many of the following books came from this comprehensive listing.

FOOD ALLERGY BOOKS

1. *Flourishing with Food Allergies: Social, Emotional and Practical Guidance for Families with Young Children*
    - A. Anderson
    - Southbury, CT: Papoose Publishing, 2008. 360 pp.
    - ISBN: 0615187048
    - Description: This book includes stories from parents and guidance from medical professionals along with the latest research about food allergies. It includes discussions on shopping with food allergies in mind and advice on coping with food allergies at birthday parties, school and other venues. Suggestions are outlined for avoiding risky foods and re-thinking diet as well as creating a stress-free, safe-haven at home.
2. *How to Manage Your Child's Life-Threatening Food Allergies: Practical Tips for Every Day Life*
    - Linda Marienhoff Coss
    - Lake Forest, CA: Plumtree Press, 2004. 208 pp.
    - NAL Call Number: RJ386.5.C675 2004
    - ISBN: 0970278519
    - Description: This book provides step-by-step information to create a safe and enjoyable home, school and social environment for a child with food allergies. Topics covered include preparing for and treating allergic reactions, purchasing and cooking food, teaching others about food allergies, parenting issues, creating a safe school and day care environment, having a social life, dining in restaurants and traveling.
3. *Understanding and Managing Your Child's Food Allergies*
    - Scott H. Sicherer
    - Baltimore, MD: The Johns Hopkins University Press, 2006. 336 pp.
    - ISBN: 0801884926
    - Description: This resource provides "emotional support and practical advice from a parent who's been there." The book describes why children develop food allergy, the symptoms of food allergy (affecting the skin, the gastrointestinal tract, and the respiratory system) and the role of food allergy in behavioral problems and developmental disabilities.

4. *Flourishing with Food Allergies: Social, Emotional and Practical Guidance for Families with Young Children*
    - A. Anderson
    - Southbury, CT: Papoose Publishing, 2008. 360 pp.
    - ISBN: 0615187048
    - Description: This book includes stories from parents and guidance from medical professionals along with the latest research about food allergies. It includes discussions on shopping with food allergies in mind and advice on coping with food allergies at birthday parties, school and other venues. Suggestions are outlined for avoiding risky foods and re-thinking diet as well as creating a stress-free, safe-haven at home.

CHILDREN'S FOOD ALLERGY BOOKS

1. *Cody the Allergic Cow: A Children's Story of Milk Allergies*
    - Nicole Smith
    - Jungle Communications, 2004. 26 pp.
    - ISBN: 1586280511
    - Description: This book teaches children and their friends, teachers and others to understand allergies to milk products.
2. *A Day at the Playground with Food Allergies*
    - Tracie Schrand
    - Llumina Kids, 2006. 26 pp.
    - ISBN: 1595266062
    - Description: This illustrated book offers young children some simple steps to avoid food allergens in a public place. Topics covered include sharing food, toys and hand washing.
3. *Taking Food Allergies to School*
    - Ellen Weiner
    - Valley Park, MO: JayJo Books, 1999. 32pp.
    - ISBN: 1891383051
    - Description: Written for children, this book includes topics such as sharing lunches, special parties and events and allergy-free snacks. A quiz for kids on food allergies and Ten Tips for Teachers (or parents) are provided.
4. *Allie the Allergic Elephant: A Children's Story of Peanut Allergies*
    - Nicole Smith
    - Colorado Springs, CO: Allergic Child Publishing Group, 2006. 22 pp.
    - ISBN: 1586280538
    - Description: Allie the Allergic Elephant helps children learn about food allergies and how to be a good friend when you can't share snacks. Allie explains peanut

allergies in a way that parents, teachers and children themselves can talk about allergies and understand them better.

5. *Mommy, Is this Safe to Eat? A Guide for Preschoolers Allergic to Peanuts and Tree Nuts*
   - Christina Black
   - R3C Creations, LLC, 2006. 25pp.
   - ISBN: 1598723871
   - Description: This picture book teaches preschoolers with food allergies to always ask if a food is safe to eat.
6. *The Bugabees: Friends with Food Allergies*
   - Amy Recob
   - Minneapolis, MN: Beaver's Pond Press, 2009. 32 pp.
   - ISBN: 1592982794
   - Description: This book tells the story of eight friends with eight different food allergies: peanuts, tree nuts, fish, shellfish, milk, soy, eggs and wheat. Additional activities and talking points are included for parents and teachers.

WEB RESOURCES

1. Allergens
   - FoodSafety.gov, a cross-agency portal to food safety information from the U.S. Department of Agriculture and the U.S Department of Health and Human Services
   - Web site: http://www.foodsafety.gov/poisoning/causes/allergens/
   - Description: This cross-agency food safety site allows consumers to sign up for allergy alerts and has a link to a video on the differences between food allergies and intolerances.
2. Anaphylaxis
   - American Academy of Family Physicians
   - Web site: http://familydoctor.org/online/famdocen/home/common/allergies/basics/809.html
   - Description: This resource discusses anaphylaxis and what you need to know to prevent and treat it.
3. Food Allergies
   - Asthma and Allergy Foundation of America
   - Web site: http://www.aafa.org/display.cfm?id=9&sub=20
   - Description: This Web site provides information on specific food allergies as well as a concise explanation of food allergies and related health issues.
4. The Food Allergy and Anaphylaxis Network
   - Web sites: http://www.foodallergy.org/

- http://www.foodallergy.org/section/espanol (Spanish)
- Description: FAAN offers many resources to parents and educators. This site offers management tips for the major food allergies as well as articles on other hot allergy issues. FAAN is the world's largest nonprofit organization providing patients information about food allergy and educational resources to schools, health professionals, restaurants, pharmaceutical companies and the food industry.

5. Food Allergy Initiative
   - Web site: http://www.faiusa.org
   - Description: "The Food Allergy Initiative (FAI) is a 501 (c) (3) non-profit organization that raises funds toward the effective treatment and cure for food allergies." This organization's Web site includes information about food allergies and related issues, living with food allergies, information for food service providers, updates on research and public policy and facts sheets and press releases for media coverage.
6. Food Allergy Research and Resource Program
   - University of Nebraska-Lincoln
   - Web site: http://www.farrp.org
   - Description: This site contains allergen research, analysis, research, training opportunities and a workshop series. It also houses Allergen Online, www.allergenonline.com, a peer reviewed allergen list and sequence searchable database intended for identifying proteins that may present a potential risk of allergenic cross-reactivity.
7. Mayo Foundation for Medical Education and Research
   - Web site: http://www.mayoclinic.com/health/food-allergy/DS00082
   - Description: This resource provides an overview of the signs and symptoms, causes and risk factors of food allergies. Information is also provided on when to seek medical advice, screening and diagnosis, treatment and prevention.
8. National Institute of Allergy and Infectious Disease, NIH, DHHS
   - Web site: http://www.niaid.nih.gov/topics/foodallergy/pages/default.aspx
   - Description: This Web site includes quick facts, food allergy basics, news and events related to food allergies. Also included is a section on new research and a PDF report of the National Institute of Health Expert Panel on Food Allergy Research.
9. Kids with Food Allergies
   - Web site: www.kidswithfoodallergies.org
   - Description: "Kids with Food Allergies is a national nonprofit food allergy support group dedicated to fostering optimal health, nutrition, and well-being of children with food allergies…" This organization's web site includes recipes, resources, and allergy alerts for kids with food allergies, their parents and other family members.

CONCLUSION

Current research supports that food allergies in children are on the rise. More and more children are being diagnosed with food allergies in the United States every year. The only way to prevent possible fatal reactions is to avoid the offending food allergen(s), recognize symptoms quickly, and to know about food allergy treatments and when to use them appropriately. The key to the safety and well-being of food allergic children is in developing a collaborative partnership among the school, families, and medical personnel to provide a safe and healthy environment that enables parents and their children with food allergies to make the transition from the safety of their homes into the child's expanding world. Additionally, we need to teach food allergic children responsible behavior and encourage healthy decision making from an early age. Food allergies cannot be cured but by implementing key prevention strategies, food allergies can be managed successfully.

REFERENCES

1. Branum A, Lukacs S. Food allergy among U.S. children: Trends in prevalence and hospitalizations. National Center for Health Statistics Data Brief. http://www.cdc.gov/nchs/data/databriefs/db10.htm. Accessed 2008.

2. Gupta RS, Springston, MR, Warrier BS, Rajesh K, Pongracic J, Holl JL. The prevalence, severity, and distribution of childhood food allergy in the United States. *J Pediatr*. 2011; 128.doi: 10.1542/peds. 2011-0204.

3. Centers for Disease Control and Prevention. Food allergy in schools. http://www.cdc.gov/healthyyouth/foodallergies/.

4. Sampson HA. Update on food allergy. *J Allergy Clin Immunol*. 2004; 113(5): 805-19.

5. U.S. Food and Drug Administration. Food allergen labeling and consumer protection act of 2004 (public law 108-282, title II). http://www.fda.gov/food/labelingnutrition/FoodAllergensLabeling/GuidanceComplianceRegulatoryInformation/ucm106187.htm.

6. Sampson HA. Anaphylaxis and emergency treatment. *J Pediatr*. 2004; 111: 1601–1608.

7. U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition. Food allergies: What you need to know. http://www.cfsan.fda.gov/~dms/ffalrgn.html. Accessed 2008.

8. Johnson RF, Peebles SR. Anaphylactic shock: Pathophysiology, recognition, and treatment. *Semin Respir Crit Care Med*. 2004; 25 (6): 695-703.

9. U.S. Department of Health and Human Services, National Institute of Allergy and Infectious Diseases. *Guidelines for the diagnosis and management of food allergy in the united states-summary for patients, families and caregivers*. 2011; 7699 (11) 3-30.

10. 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*. 2011: 128(4): 560-565.

11. McIntre CL, Sheetz AH, Carroll CR, Young MC. Administration of epinephrine for life-threatening allergic reactions in school settings. *J Pediatr*. 2005; 116(5): 1134-1140.

12. Sicherer SH. Epidemiology of food allergy. *J Allergy Clin Immunol*. 2011; 127: 594-602.

13. Quantum Day: Studying the causes of food allergies in children. http://quantumday.com/2012/06/studying-causes-of-food-allergies-in.html.

14. Leonard SA. Food allergy: what you need to know. http://www.medscape.com/viewarticle/732184. Accessed November 2010.

15. Sicherer SH, Mahr T. Management of fool allergy in the school setting. *J Pediatr*. 2010; 126; 1232: 1232-1239.

16. Young MC, Munoz-Furlong A, Sicherer SH. Management of food allergies in schools: A perspective for allergists. *J Allergy Clin Immunol*. 2009; 175-183.

17. Massachusetts Department of Education, Managing Life Threatening Food Allergies in Schools. http://www.doe.mass.edu/cnp/allergy.pdf. Accessed 2002.

18. Sicherer SH, Malloy T. *The Complete Peanut Allergy Book*. New York, NY: Berkley Publishing Group; 2005.

19. Is it a food allergy or intolerance? http://www.webmd.com/allergies/foods-allergy-intolerance. Accessed 2005.

APPENDIX A

SAMPLE INDIVIDUALIZED EPINEPHRINE EMERGENCY ACTION PLAN:

Students Name : _____ DOB : ____/__/____ Teacher/Grade : _____

ALLERGY TO : _____

ASTHMATIC? Yes* : _____ No : _____ * High Risk for severe reaction.

SIGNS OF AN ALLERGIC REACTION: (Highlight or circle symptoms appropriate to child)

Systems	Symptoms
MOUTH	Itching & Swelling of the lips, tongue or mouth.
THROAT	Itching and / or a sense of tightness in the throat; hoarseness, hacking cough.
SKIN	Hives, itchy rash, and/or swelling about the face or extremities.
GUT	Nausea, abdominal cramps, vomiting and/or diarrhea.
LUNG*	Shortness of breath, repetitive coughing, and/or wheezing.
HEART*	Thready pulse, passing-out.

The severity of symptoms can quickly change.

****All above symptoms can potentially progress to a life-threatening situation.***

1. If an allergic reaction is suspected, give:

Epinephrine: _____ 0.3mg Epi-Pen IM **or**

_____ 0.15mg Epi-pen Junior IM

Antihistamine _____ Benadryl _____ (Dosage) PO Immediately.

2. Call Emergency Medical Services: 9-1-1

3. Call School Nurse if not present.

4. Call Parent/Guardian: _____ _____ _____

(Home) (Work) (Cell)

Call Parent/Guardian: _____ _____ _____

(Home) (Work) (Cell)

and/or or additional emergency contacts (listed on reverse side of this form)

5. **Possible side effects of Epi-Pen: Palpitations, tachycardia (rapid heart beat), sweating, nausea, vomiting, breathing difficulties, pale skin color, dizziness, weakness, tremor, headache, anxiety, apprehension, and nervousness.**

6. **Stay with child until emergency help arrives – position child on left side.**

DO NOT HESITATE TO ADMINISTER MEDICATION OR CALL EMERGENCY MEDICAL SERVICES, EVEN IF PARENTS CANNOT BE REACHED!

Physician Signature: _____ Date: / /

**** All students must be transported to the hospital by**

Emergency Medical Services (EMS) after receiving Epi-pen**

ADDITIONAL EMERGENCY CONTACTS:

1. **Name:** _____

   Relationship: **Phone:**

2. **Name:** _____

   Relationship: **Phone:**

3. **Name:** _____

   Relationship: _____ **Phone:** _____

TRAINED STAFF MEMBERS:

1. **Name:** _____ **Room:** _____

2. **Name:** _____ **Room:** _____

3. **Name:** _____ **Room:** _____

EPIPEN AND EPIPEN JR. DIRECTIONS

1. Pull off gray activation cap.

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

3. Swing and jab firmly into outer thigh until Auto-Injector
4. Mechanism functions. Hold in place and count to 10.
5. The EpiPen unit should then be removed and discarded.
6. Massage the injection area for 10 seconds.

I give permission for the school nurse (or appropriately trained school personnel) to administer Epi-Pen and share information as deemed necessary for my child's health and safety.

Parent/Guardian Signature: _____ Date: / /

Nurse Signature: _____ Date: / /

Epi-Pen Location(s):	Expiration Date(s):

APPENDIX B

READING FOOD LABELS

Knowing how to read a food label will help to avoid food allergy problems caused by ingredients in foods. The following are label terms for common foods. The lists are available at the **Food Allergy Network Website** and the site should be contacted for current lists as they are updated frequently.

1. Terms that indicate the presence of cow's MILK:

   - Artificial butter flavor
   - Butter, butter fat, butter oil
   - Buttermilk
   - Casein
   - Caseinates (ammonium, calcium, magnesium, potassium, sodium)
   - Cheese
   - Cream
   - Cottage cheese
   - Curds
   - Custard
   - Ghee
   - Half & Half®
   - Hydrolysates (casein, milk protein, protein, whey, whey protein)
   - Lactalbumin, lactalbumin phosphate
   - Lactoglobulin
   - Lactose
   - Lactulose
   - Milk (derivative, powder, protein, solids, malted, condensed, evaporated, dry, whole, low-fat, non-fat, skimmed and goat's milk)
   - Nougat
   - Pudding
   - Rennet casein
   - Sour cream, sour cream solids
   - Sour milk solids
   - Whey (in all forms, including sweet, delactosed, protein concentrate)
   - Yogurt
   - The letter "D" on the front label of a product indicates the product may contain cow's milk protein

2. Terms that MAY indicate presence of MILK protein:
    - Chocolate
    - High protein flour
    - Luncheon meat, hot dogs, sausages
    - Margarine
    - Natural and artificial flavoring: Simplesse®
3. Terms that indicate the presence of EGG protein:
    - Albumin Macaroni
    - Egg (white, yolk, dried, powdered, solids)
    - Mayonnaise
    - Egg substitutes Meringue
    - Egg Nog Ovalbumin
    - Globulin Ovomucin
    - Livetin Ovomucoid
    - Lysozyme (used in Europe) Simplesse®
    - Surimi
4. Terms that indicate the presence of PEANUT protein:
    - Beer nuts, Nu-Nuts®, Mixed nuts
    - Cold pressed, expelled, or extruded nut pieces
    - Peanut oil
    - Peanuts
    - Ground nuts
    - Peanut butter
    - Peanut flour
    - Monkey nuts
5. Terms that MAY indicate the presence of PEANUT protein:
    - African, Chinese, Indonesian, hydrolyzed vegetable protein
    - Thai and Vietnamese dishes
    - Baked goods
    - Marzipan candy
    - Natural and artificial flavoring chocolate (candies, candy bars)
    - Egg rolls
    - Nougat
    - Hydrolyzed plant protein

- Sunflower seeds

6. Terms that indicate the presence of SOYBEAN protein:

   - Edamame
   - Soy sauce
   - Hydrolyzed soy protein
   - Soybean (granules, curds)
   - Miso
   - Tamari
   - Shoyu sauce
   - Tempeh
   - Soy (albumin, flour, grits, milk, nuts, sprouts)
   - Textured vegetable protein (TVP)
   - Soy Protein (concentrate, isolate)
   - Tofu

7. Terms that MAY indicate the presence of SOYBEAN protein:

   - Hydrolyzed protein
   - Vegetable gum
   - Natural and artificial flavoring
   - Vegetable starch
   - Vegetable broth

8. Terms that indicate the presence of WHEAT protein:

   - Bran
   - Gluten
   - Bread crumbs
   - Seitan
   - Bulgur
   - Semolina
   - Cereal extract
   - Spelt
   - Couscous
   - Vital gluten
   - Cracker meal
   - Wheat (bran, germ, gluten, malt, starch)

- Durum, durum flour
- Whole wheat berries
- Farina
- Whole wheat flour
- Flour (all purpose, enriched graham, high gluten, high protein, pastry, soft wheat)

9. Terms that MAY indicate the presence of WHEAT protein:

- Gelatinized starch
- Modified starch
- Soy sauce
- Natural and artificial flavoring
- Starch
- Vegetable gum
- Hydrolyzed vegetable protein
- Vegetable starch
- Modified food starch

10. Terms that indicate the presence of SHELLFISH protein:

- Abalone
- Mussels
- Clams (cherrystone, littleneck, pismo, quahog)
- Oysters
- Cockle (periwinkle, sea urchin)
- Prawns
- Crab
- Scallops
- Crawfish (crayfish, ecrevisse)
- Shrimp (crevette)
- Mollusks
- Snails (escargot)
- Lobster (langouste, langoustine)
- Octopus, squid (calamari)
- Scampi

11. Terms that MAY indicate the presence of SHELLFISH:

- Bouillabaisse

- Fish stock
- Natural and artificial flavoring
- Seafood flavoring (such as crab or clam extract)
- Surimi

12. Terms that indicate the presence of CORN protein:

- Baking powder
- Corn syrup solids
- Corn, maize
- Cornmeal
- Corn alcohol
- Grits, hominy
- Corn flour
- Cornstarch
- Corn sweetener
- Food starch
- Modified food starch
- Vegetable gum
- Vegetable starch

APPENDIX C

MASSACHUSETTS LAW

Regulations Governing the Administration of Epinephrine by Auto Injector to Students with Diagnosed Life-Threatening Allergic Conditions

In 1996, recognizing the need for prompt response to an anaphylactic emergency, the Massachusetts Department of Public Health amended the regulations governing the Administration of Prescription Medications in Public and Private Schools (105 CMR 210.000) to include a section on administration of epinephrine (see Appendix K, 105 CMR 210.000). *"Epinephrine is the first medication that should be used in the emergency management of a child having a potentially life-threatening allergic reaction. There are no contraindications for use of epinephrine for a life-threatening allergic reaction"* (Position Statement: AAAAI Board of Directors. Anaphylaxis in Schools and Other Child-Care Settings. *J. Allergyclin. Immunol*. 1998: 102:173-6).

The amended regulations state, "A school or school district may register with the Department for the limited purpose of permitting properly trained school personnel to administer epinephrine by auto injector in a life-threatening situation, when a school nurse is not immediately available…" provided certain conditions are met, as outlined in the regulations.

Corexcel
Linking Learning to Performance

CE EXAM

COMMON FOOD ALLERGIES IN CHILDREN

Circle the correct answer below:

1. Which of the following allergens is the most commonly seen in children?

   A. Milk

   B. Eggs

   C. Wheat

   D. Peanuts

2. Although many parents feel their child has a food allergy, according to the most current research, only about 3% of all children have a true food allergy.

   A. True

   B. False

3. A food intolerance is different from a food allergy in the following way(s):

   A. It involves the digestive/GI system

   B. It is generally less serious a reaction

   C. It is more common than a food allergy

   D. All of the above

4. All of the following are symptoms of a food intolerance except:

   A. Immune system involvement

   B. Vomiting

   C. Diarrhea

   D. Stomachache

5. Symptoms of a food allergy may include:

   A. Hives

   B. Airway swelling

   C. Anaphylaxis

   D. All of the above

6. In an allergic reaction, antibodies to the offending allergen attach themselves to:

   A. Mast cells

   B. T-cells

   C. Neurons

   D. None of the above

7. The best treatment for food allergies is:

   A. Weekly allergy injections

   B. Drink increased of amounts of fluids to dilute the allergen

   C. Prevent exposure to the allergen

   D. Take prescribed medication to prevent an allergic reaction

8. One hypothesis that researchers have used to explain the rise in childhood food allergies is called the **Hygiene Hypothesis.**

   A. True

   B. False

9. Food allergies tend to run in families and have a strong genetic component.

   A. True

   B. False

10. Although an allergy to peanuts can be serious or even fatal in some cases, children often outgrow this allergy.

    A. True

    B. False

11. Sometimes a food intolerance can be mistaken for a food allergy.
    A. True
    B. False
12. Celiac Disease is an example of:
    A. Food allergy
    B. Food intolerance
    C. Neither
    D. Both
13. Anaphylaxis:
    A. Is a non life-threatening event and not to be concerned about
    B. Should not be treated with any medication
    C. Is a reaction to a food intolerance
    D. Is a potentially life threatening medical condition
14. A child with food allergies can be kept safe by doing all except:
    A. Cleaning tables with a household cleaner to remove allergens
    B. Designate an allergy free zone in your home
    C. Identify children with food allergies
    D. Save time by not reading labels on foods that you have served before to a child with food allergies
15. In the 2007 Center for Disease Control Study, it was shown that:
    A. 3 million children under the age of 18 had reported food allergy
    B. Hispanic children had lower rates of reported food allergy
    C. Food allergy does not appear to differ by sex
    D. All of the above

16. Dr. Gupta's study in 2010 reported that children aged 14-17 years are most likely to have a severe food allergy and/or life-threatening allergic reaction. It is thought that this is because:

    A. An adolescent's inconsistent behavior in avoiding known triggers is well documented

    B. An adolescent's immune system is not fully mature at this time

    C. Children in this age group tend to develop hypersensitivities to many things including foods during this stage

    D. None of the above

17. Children with food allergy as stated in the CDC 2007 study are two to four times more likely to experience other allergic conditions and asthma than children without food allergy. This is of great importance as children with coexisting food allergy and asthma may:

    A. Be more likely to experience anaphylactic reactions to foods and be at higher risk of death.

    B. Need to use their inhaler two to four times as much as usual

    C. Be less likely to experience severe allergic reactions to foods because of regular use of an inhaler

    D. None of the above

18. The Food Allergen Labeling and Consumer Protection Act (FALCPA) of 2004 was passed to ensure that individuals, particularly parents of children with food allergies and others providing food to those children, could easily and accurately identify food ingredients that may cause allergic reactions.

    A. True

    B. False

19. Prompt administration of epinephrine (adrenaline) is not crucial but recommended to successfully treating anaphylactic reactions.

    A. True

    B. False

20. Dr. Gupta and her colleagues found that approximately ___ in every ___ children in the U.S. has a food allergy—twice as many as the CDC estimate of 1 in 25.

    A. 1 in 4

    B. 1 in 10

    C. 1 in 11

    D. 1 in 13

21. When IgE binds to mast cells, the process called _____ can begin.

    A. Allergic Cascade

    B. Anaphylaxis

    C. Food intolerance

    D. None of the above

22. When a child has been given epinephrine in the school setting it is important to remember to:

    A. Observe the child in the clinic for at least 2 hours before transporting the child

    B. Call the child's parents

    C. Call an ambulance immediately after administration

    D. Call the school physician for further orders

23. Some states have laws governing the availability of epinephrine to the student while in the school setting.

    A. True

    B. False

24. Commonly used medications used in the treatment of allergic reactions include:

    A. Diphenhydramine

    B. Epinephrine

    C. Cetirizine

    D. All of the above

25. Epinephrine is used when respiratory or circulatory symptoms are present, or if the reaction is progressing and involves 2 or more organ systems.

    A. True

    B. False

26. In cases where scratch testing is not feasible, a health care provider may use blood tests such as the RAST (radioallergosorbent test) or the ELISA (enzyme-linked immunosorbent assay).

    A. True

    B. False

27. A number of factors influence the severity of an allergic reaction including:

    A. Amount of allergen ingested,

    B. Whether the subject was exercising

    C. Status of an underlying chronic disease

    D. All of the above

28. Antihistamines can be given if symptoms develop or when a known allergen is ingested and symptoms have not yet developed.

    A. True

    B. False

29. A health care provider diagnoses a food allergy only when someone has a positive skin test to a specific allergen or when the history of reactions suggests an allergy to the same food.

    A. True

    B. False

30. A(n) _____is the gold standard for diagnosis of food allergy.

    A. Oral food challenge

    B. RAST (radioallergosorbent test) blood test

    C. Scratch Test

    D. Elimination diet

31. Presence of marzipan on the ingredient label of a food may indicate that there is_____ in the product.

    A. Milk protein

    B. Peanut protein

    C. Wheat protein

    D. Soybean protein

    E.

32. Studies show that _____ of children with food allergies have had allergic reactions to accidental ingestion of food allergens while in school.

    A. 10% - 15%

    B. 16% - 18%

    C. 20%

    D. 25%

33. _____ is the world's largest nonprofit organization providing patients information about food allergy and educational resources to schools, health professionals, restaurants, pharmaceutical companies and the food industry.

    A. The Food Allergy Initiative

    B. The Food Allergy and Anaphylaxis Network

    C. The Asthma and Allergy Foundation

    D. Mayo Foundation for Medical Education and Research

Corexcel
Linking Learning to Performance

EVALUATION

COMMON FOOD ALLERGIES IN CHILDREN

Your opinion is important to us. Please let us know what you thought of this course by answering the following questions by circling the response that best represents your opinion.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
COURSE OBJECTIVES						
1.	The activity was valuable in helping me achieve the stated learning objectives.	5	4	3	2	1
COURSE CONTENT						
2.	The content was up to date.	5	4	3	2	1
3.	The number of credit hours was appropriate for the content.	5	4	3	2	1
TEACHING/LEARNING METHODS						
4.	The teaching/learning methods were effective in helping me learn.	5	4	3	2	1
5.	The material was clearly explained.	5	4	3	2	1
6.	The answers to the post-test were appropriately covered in the activity.	5	4	3	2	1
OVERALL ACTIVITY						
7.	The material was relevant to my professional development.	5	4	3	2	1
8.	Overall, I am pleased with this activity and would recommend it to others.	5	4	3	2	1
OBJECTIVITY AND COMMERCIAL BIAS						
9.	The content was presented objectively and free of commercial bias.	5	4	3	2	1

Continued on next page…

If you feel the content was presented with commercial bias or not presented objectively, please explain why:

Cite one new piece of information you learned from this activity:

Please provide suggestions for other topics you would like to see.

Please add any additional comments or suggestions:

How did you hear about this educational activity? (please circle one or more)

a) Returning customer

b) Employer

c) Friend

d) Search engine

e) Online directory

f) Email

g) Mailing

h) Other: _____

i) With my signature I confirm that I am the person who completed this independent educational activity by reading the material and completing this self evaluation.

Signature _____ Date:_____

201 Webster Building
3411 Silverside Road
Wilmington, DE 19810
888-658-6641
learn@corexcel.com
www.corexcel.com

How To Get Your Continuing Education Credit

First, congratulations on your purchase of this self-study packet. We hope that you enjoy the program and that it meets your educational needs.

In order to receive a certificate with contact hours you must read the information, complete the registration form (next page), evaluation form and the posttest. You may mail or fax the forms to Corexcel. Send to Corexcel, 201 Webster Building, 3411 Silverside Road, Wilmington, Delaware 19810 or fax them to 302-477-9744. If you decide to fax and pay with a check, please note on the registration form when the check will be mailed. We will mail you the certificate within a week after we receive your paperwork and payment as long as you achieve a 70% or better on the test. If you would like the certificate overnighted please send a check for $15 more with your registration, evaluation and test. Thank you for ordering this self-study packet and if you have any questions, you may contact our office at 1-888-658-6641.

To receive ANCC continuing education credit for this learning packet the completed evaluation form must be submitted to Corexcel no later than November 1, 2015.

Corexcel is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation.

Corexcel has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET).

Accreditation refers to recognition of continuing nursing education only and does not imply Commission on Accreditation approval or endorsement of any commercial product.

Diabetes Educators: The National Certification Board for Diabetes Educators (NCBDE) has recently announced that ANCC Accredited and Approved Providers have been approved by the NCBDE as providers of continuing education. Individuals seeking re-certification from the NCDBE can use continuing education contact hours received through attendance at an activity provided by an Accredited or Approved Provider of ANCC to meet the continuing education requirements for re-certification established by the NCDBE.

Take Common Food Allergies in Children Online

201 Webster Building
3411 Silverside Road
Wilmington, DE 19810
888-658-6641
learn@corexcel.com
www.corexcel.com

WRITTEN PROGRAM REGISTRATION FORM

Date: _____

Name & Title: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

License No. (Required for Florida): _____

Email: _____

Employer: _____

(W): _____ **(H):** _____ **(F):** _____

Have you registered with us before? _____ **Yes** _____ **No**

Course #:	Title:	Amount:
CX0081	Common Food Allergies In Children	35.00
	Shipping and Handling:	8.95
	Total:	$ 43.95

Paying By: _____ **Check** _____ **Credit Card** _____ **Money Order** _____ **Cash**

Credit Card Number: _____ **Exp. Date:** _____

Cardholders Name: _____ **Sec. Code:** _____