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Food Allergies

Introduction

Research provided by the Centers for Disease Control and Prevention (CDC) indicates a 50 percent increase in the number of individuals with food allergies since the late 1990s. Research presented by the CDC also indicates the prevalence of food allergies among Americans is on the rise. Thus, health care professionals should possess insight into food allergies to best serve patients. This course reviews concepts central to food allergy care, while highlighting information that can be used to effectively prevent, manage, and treat an allergic reaction to food.

Section 1: Food Allergies

This section of the course will review concepts central to food allergy care. The information found within this section of the course was derived from materials provided by the National Institute of Allergy and Infectious Diseases (NIAID) unless, otherwise, specified (National Institute of Allergy and Infectious Diseases [NIAID], 2022).

What is a food allergy?

A food allergy may refer to a potentially serious response to consuming certain foods or food additives.

How do food allergies develop?

Food allergies develop when an individual consumes or comes in contact with an allergen, and the immune system makes an antibody called immunoglobulin E (IgE); IgE then circulates through the blood and attaches to immune cells called mast cells and basophils; this initial exposure does not cause an allergic reaction - however, subsequent contact with the same allergen may allow previously created IgE antibodies to recognize it; this recognition then launches an immune response that can result in a severe allergic reaction (note: mast cells may refer to cells that control specific types of immune responses; basophils may refer to a type of white blood cell that work closely with the immune system to defend the body from allergens, pathogens, and parasites).

Health care professionals should note that some people make IgE against a certain food without developing an allergy, and others may develop only a mild allergy compared to those who experience severe reactions.

What are the most common food allergens?

The major food allergens include: milk, egg, peanut, soy, tree nuts, wheat, shellfish, fish, and sesame. Specific information regarding the most common food allergens may be found below. The information found below was derived from materials provided by Food Allergy Research and Education (FARE) (Food Allergy Research and Education [FARE], 2022).

- **Milk** - an allergy to cow's milk is the most common food allergy in infants and young children. When an individual with a milk allergy is exposed to milk, proteins in the milk bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Approximately 70% of children with cow milk allergy tolerate baked milk. Baked milk may refer to milk that was extensively heated. Young children who are allergic to fresh milk but can eat baked milk without reacting may be more likely to outgrow their milk allergy at an earlier age than young children who react to baked milk. Health care professionals should note that most children eventually outgrow their allergy to milk - however, milk allergy is among the most common food allergies in adults.
- **Egg** - a hen's egg allergy is among the most common food allergies in infants and young children. When an individual with an egg allergy is exposed to an egg, proteins in the egg bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Approximately 70% of children with egg allergy tolerate baked egg. Baked egg may refer to an egg that was heated/cooked (note: heating an egg disrupts the protein responsible for egg allergy; the safe and regular ingestion of baked egg foods can lead to tolerance or resolution of an egg allergy over time). Health care professionals should note that most children eventually outgrow their allergy to egg, although some individuals remain allergic to egg throughout their lives.
- **Peanut** - a peanut allergy is the most common food allergy in children under age 18 and the third-most common food allergy in adults. When an individual with a

peanut allergy is exposed to peanuts, proteins in the peanut bind to specific IgE antibodies made by the individual's immune system; subsequent exposure to peanut protein, typically by oral ingestion, triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note the following: peanuts are not the same as tree nuts (e.g., almonds, cashews, pistachios, walnuts, pecans); peanuts are legumes; other examples of legumes include: beans, peas, lentils, and soybeans; having a peanut allergy does not mean an individual will have a greater chance of being allergic to another legume - however, allergy to lupine, another legume commonly used in vegan cooking, can occur in patients with a peanut allergy. Health care professionals should also note the following: a peanut allergy is typically lifelong; only about 20 percent of children with a peanut allergy outgrow it over time.

- **Soy** - soy allergy is more common in infants and young children when compared to older children. When an individual with a soy allergy is exposed to soy, proteins in the soy bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note the following: soybeans are a member of the legume family, which includes peanuts; it is rare for peanut allergic patients to react to soy; individuals with a soy allergy may be more likely to be allergic or sensitized to major allergens including: peanuts, tree nuts, egg, milk, and sesame.

- **Tree nuts** - tree nut allergies are among the most common food allergies in both children and adults. The most commonly reported tree nut allergies include: walnut, almond, hazelnut, pecan, cashew, and pistachio. When an individual with an allergy to a particular tree nut is exposed to that tree nut, proteins in the nut bind to specific IgE antibodies made by the individual's immune system; this binding triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note the following: in the U.S., plain-language labeling on packaged foods is required for 18 different tree nuts; these tree nuts are not the same as peanut (only 40% of children with tree nut allergies have an allergy to peanut); tree nuts are also different from seed allergens such as sesame, sunflower, poppy and mustard, which do not grow on trees. Health care professionals should also note that most children who are allergic to one or more tree nuts do not outgrow their tree nut allergy.

- **Wheat** - a wheat allergy is most often reported in young children. When an individual with a wheat allergy is exposed to wheat, proteins in the wheat bind to specific IgE antibodies made by the individual's immune system; this binding triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note the following: a wheat allergy may be confused with Celiac disease; Celiac disease may refer to an autoimmune disease that may result in inflammation and damage to the lining of the small intestine; symptoms of Celiac disease may include: diarrhea, constipation, weight loss, abdominal pain, and bloating. Health care professionals should also note that most children outgrow their wheat allergy by age 12 - however, some individuals remain allergic to wheat throughout their lives.

- **Shellfish** - shellfish allergies are the most common food allergies in children and adults. When an individual with an allergy to a particular shellfish is exposed to that shellfish, proteins in the shellfish bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. There are two groups of shellfish: crustaceans (such as shrimp, prawns, crab, and lobster) and mollusks/bivalves (such as clams, mussels, oysters, scallops, octopus, squid, abalone, and snail). An allergy to crustaceans is more common than an allergy to mollusks (note: shrimp is the most common shellfish allergen for both children and adults). Health care professionals should note that finned fish and shellfish are not closely related; being allergic to one does not always mean that an individual must avoid both. Health care professionals should also note that shellfish allergies are typically lifelong.

- **Fish** - finned fish is one of the most common food allergies in the U.S. Most individuals with a fish allergy are allergic to salmon, tuna, catfish, and cod. When an individual with an allergy to a particular fish is exposed to that fish, proteins in the fish bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note that fish allergies are typically lifelong.

- **Sesame** - sesame is the ninth most common food allergy among children and adults in the U.S. Research suggests that the prevalence of sesame allergy has increased significantly worldwide over the past two decades. When an individual

with an allergy to sesame is exposed to sesame, proteins in the sesame bind to specific IgE antibodies made by the individual's immune system; this triggers the individual's immune defenses, leading to reaction symptoms that can be mild or very severe. Health care professionals should note that starting January 1, 2023, sesame will become the ninth major allergen that must be labeled in plain language on packaged foods in the U.S.

What are the most common symptoms of an allergic reaction to food?

The most common symptoms of an allergic reaction to food may be found below. Health care professionals should note the following: the symptoms of food allergies typically appear within minutes or up to two hours after an individual ingests the food to which he or she is allergic; ingestion is the primary cause of severe allergic reactions - however, in some cases, skin contact or breathing in a food protein (e.g., steam from cooking food) can cause symptoms; trace amounts of a food allergen may cause an allergic reaction in some individuals with food allergies.

- Hives
- Flushed skin or rash
- Tingling or itchy sensation in the mouth
- Face, tongue, or lip swelling
- Vomiting and/or diarrhea
- Abdominal cramps
- Coughing or wheezing
- Dizziness and/or lightheadedness
- Swelling of the throat and vocal cords
- Difficulty breathing
- Drop in blood pressure
- Loss of consciousness

Can an allergic reaction to food be life-threatening?

Most symptoms from food allergies are mild and limited to skin or digestive discomfort - however, some may progress to anaphylaxis.

Anaphylaxis may refer to a severe, life-threatening allergic reaction. Anaphylaxis may lead to constricted airways in the lungs; breathing difficulties; wheezing; feeling lightheaded or faint; confusion and/or anxiety; severe lowering of blood pressure and shock, often referred to as anaphylactic shock; loss of consciousness; and suffocation by swelling of the throat and larynx.

An anaphylactic reaction can occur as a single reaction that occurs immediately after exposure to the food allergen and gets better, with or without treatment, within the first minutes to hours; or a single long-lasting reaction that continues for hours or days following the initial reaction; or two reactions, with the second reaction occurring eight to 72 hours after the first reaction.

Health care professionals should note the following: symptoms of anaphylaxis may start out as relatively mild but, if not treated promptly, they can become life-threatening in a short amount of time; recognizing early symptoms of anaphylaxis and prompt injection of the medication epinephrine and other medical care or intervention can help prevent life-threatening consequences; it is important to understand that a mild allergic reaction does not always mean the allergy is mild; any allergic reaction has potential to lead to anaphylaxis; health care professionals should counsel patients with a food allergy to always monitor symptoms and seek medical care if anaphylaxis symptoms occur (e.g., breathing difficulties; wheezing) (note: the term epinephrine injection may refer to a medication used for the emergency treatment of severe allergic reactions [including anaphylaxis] to insect bites or stings, medicines, foods, or other substances).

Can antihistamines stop anaphylaxis?

No, oral antihistamines (e.g., diphenhydramine [Benadryl]) cannot treat or stop anaphylaxis.

Health care professionals should provide patients with food allergies the following information: oral antihistamines can help relieve some mild symptoms from an allergic reaction, such as an itchy mouth or hives - however, they cannot stop the life-threatening symptoms of anaphylaxis.

How are food allergies diagnosed?

A food allergy is diagnosed by a health care professional using the tests found below.

- **Oral food challenge** - during an oral food challenge a patient eats small amounts of food in gradually increasing amounts to determine the potential for a food allergy. An oral food challenge should only be conducted under the direct supervision of a health care professional.
- **Allergy skin-prick test** - during an allergy skin-prick test a lancet is used to prick the skin under a drop of allergen extract; if a patient is allergic to the allergen, a raised red bump will appear at the site of the prick after about 15 minutes.
- **Allergy blood test** - an allergy blood test measures the level of IgE that is specific to a particular food or a protein within the food; individuals who have a food allergy make more IgE than normal.

How might a child describe an allergic reaction to food?

It is important for a health care professional and parent to understand how a child might describe an allergic reaction to food. Examples of how a child might describe an allergic reaction to food may be found below. The information found below was derived from materials provided by FARE (FARE, 2019).

- This food is making me feel bad.
- This food is making me feel weird.
- This food is making me feel sick.
- This food is making me sick.
- This food is making me itchy.
- This food is bad.
- This food is too spicy.
- My tongue is hot [or burning].
- It feels like something's poking my tongue.
- My tongue is tingling [or burning].
- My mouth is tingling [or burning].

- My tongue itches.
- My mouth itches.
- My tongue feels like there is hair on it.
- My mouth feels funny.
- There's something stuck in my throat.
- My tongue feels full.
- My tongue feels heavy.
- My lips feel tight.
- My throat feels thick.
- It feels like a bump is on the back of my tongue.
- It feels like a bump is on the back of my throat.

How can individuals use food labels to help prevent allergic reactions to food?

- Reading food labels is one of the best ways to help prevent allergic reactions to food.
- Individuals should read food labels before they purchase food, after purchasing food, and before they cook or eat.
- The Food Allergy Labeling and Consumer Protection Act (FALCPA) requires that food labels show, in plain English, when a major food allergen or any ingredient that contains protein from a major food allergen is added as an ingredient in the labeled product. The U.S. Food and Drug Administration (FDA) considers the following foods major food allergens: milk, wheat, egg, peanut, tree nuts, fish, crustacean shellfish, soy, and sesame. (note: the FDA enforces FALCPA in the labeling of foods). Health care professionals should note the following: FALCPA does not apply to fresh meats, fresh fruits, and fresh vegetables; restaurant foods that are placed in a wrapper or carry out box for an individual customer order are exempt; highly refined oils (even if they are derived from a major allergen, such as peanut or tree nut) are also exempt from FALCPA requirements.

Can individuals report adverse food reactions and food labeling concerns to the FDA?

Yes, an individual can report adverse food reactions and food labeling concerns to the FDA. Individuals and manufacturers can submit reports detailing product reactions or other complaints to an FDA Consumer Complaint Coordinator for the state where the food was purchased. Individuals can also call 1-888-SAFEFOOD.

How can individuals with food allergies avoid cross-contact?

- Cross-contact may refer to a food allergy incident that occurs when one food comes into contact with another food and their proteins mix. Specific information regarding cross-contact may be found below. The information found below was derived from materials provided by FARE (FARE, 2020).
- When cross-contact occurs each food contains a small amount of another food; often the amounts are small, and cannot be seen; cross-contact can lead to an allergic reaction.
- Cross-contact is not the same as cross-contamination. Cross-contamination, as it relates to food, may refer to the physical movement or transfer of bacteria or other infectious agents from one piece of food to another piece of food.
- With cross-contamination, cooking the food will lower the chance of a person getting sick; this is not the same with food allergies and cross-contact; cooking food does not remove an allergen from the food.
- Examples of direct cross-contact include the following: removing the cheese from a cheeseburger to make it into a hamburger; removing shrimp from a salad; removing shellfish from pasta; scraping peanut butter off a piece of bread and using it to make a different sandwich.
- Examples of indirect cross-contact include the following: using the same spatula that flipped a cheeseburger to flip a hamburger; not washing the hands after handling shrimp and then making a salad; wiping off, but not properly cleaning a knife used to spread peanut butter before using it to spread jelly.
- Strategies that may be used to avoid cross-contact can be found below:

- Do not mix one type of food with another type of food (e.g., fish and pasta).
- Wash the hands with soap and water when preparing food; water alone will not remove an allergen.
- Use utensils, cutting boards, and pans that have been thoroughly washed with soap and water.
- Scrub down counters and tables with soap and water after making meals.
- Use separate utensils and dishes for making and serving safe foods.
- Cook the allergy-safe foods first, and then keep them separate.
- Do not share food or drinks.
- Do not share utensils.

What are the common conditions associated with food allergies?

- **Oral allergy syndrome** - oral allergy syndrome may refer to a syndrome characterized by allergic reactions to certain raw fruits and vegetables (e.g., apples, cherries, kiwis, celery, tomatoes, melons, and bananas). Oral allergy syndrome typically occurs in people with hay fever, or cold-like symptoms caused by allergies. The syndrome is most likely to occur in those allergic to birch, grass and ragweed pollen because some of the protein allergens in these types of pollen are similar in structure to the proteins of certain fruits. Health care professionals should note that those with oral allergy syndrome generally do not experience life-threatening reactions, but they can experience a rash, itching, swelling, and sneezing if they eat or even just hold certain raw fruits and vegetables.
- **Eosinophilic esophagitis (EoE)** - eosinophilic esophagitis (EoE) may refer to a chronic disease that is characterized by immune cells called eosinophils building up in the esophagus. Symptoms of EoE include the following: nausea, vomiting, heartburn, and abdominal pain after eating. Health care professionals should note the following: in older children and adults, EoE can cause more severe symptoms, such as difficulty swallowing solid food, or solid food getting stuck in the esophagus and requiring removal by a physician; In infants, EoE may be associated with failure to thrive and/or survive.

Section 1 Summary

A food allergy may refer to a potentially serious response to consuming certain foods or food additives. Food allergies develop when an individual consumes or comes in contact with an allergen, and the immune system makes IgE. The major food allergens include: milk, egg, peanut, soy, tree nuts, wheat, shellfish, fish, and sesame. An allergic reaction to food can lead to anaphylaxis. Symptoms of anaphylaxis may start out as relatively mild but, if not treated promptly, they can become life-threatening in a short amount of time. Health care professionals should work to identify patients with food allergies to prevent anaphylaxis, and, ultimately, optimize patient care.

Section 1 Key Concepts

- The major food allergens include: milk, egg, peanut, soy, tree nuts, wheat, shellfish, fish, and sesame.
- The symptoms of food allergies typically appear from within minutes or up to two hours after an individual ingests the food to which he or she is allergic; ingestion is the primary cause of severe allergic reactions.
- Most symptoms from food allergies are mild and limited to skin or digestive discomfort - however, some may progress to anaphylaxis.
- Oral antihistamines (e.g., diphenhydramine [Benadryl]) cannot treat or stop anaphylaxis.
- Cross-contact can lead to an allergic reaction.

Section 1 Key Terms

Food allergy - a potentially serious response to consuming certain foods or food additives

Mast cells - cells that control specific types of immune responses

Basophils - a type of white blood cell that works closely with the immune system to defend the body from allergens, pathogens, and parasites

Baked milk - milk that was extensively heated

Baked egg - an egg that was heated/cooked

Celiac disease - an autoimmune disease that may result in inflammation and damage to the lining of the small intestine

Anaphylaxis - a severe, life-threatening allergic reaction

Epinephrine injection - a medication used for the emergency treatment of severe allergic reactions (including anaphylaxis) to insect bites or stings, medicines, foods, or other substances

Cross-contact - a food allergy incident that occurs when one food comes into contact with another food and their proteins mix

Cross-contamination (as it relates to food) - the physical movement or transfer of bacteria or other infectious agents from one piece of food to another piece of food

Oral allergy syndrome - a syndrome characterized by allergic reactions to certain raw fruits and vegetables

Eosinophilic esophagitis (EoE) - a chronic disease that is characterized by immune cells called eosinophils building up in the esophagus

Section 1 Personal Reflection Question

Why is it important for health care professionals to identify patients with food allergies?

Section 2: Prevention, Management, and Treatment

This section of the course will focus on the prevention, management, and treatment of food allergies. The information presented in this section is divided into the most common food allergies (e.g., milk, egg, peanut, soy, tree nuts, wheat, shellfish, fish, and sesame). The information found within this section of the course was derived from materials provided by FARE unless, otherwise, specified (FARE, 2022).

Milk

- Individuals with a milk allergy should avoid cow's milk and cow's milk-containing food products.

- Milk is one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package; ingredients are listed on the package in order of their prevalence in the product; individuals avoiding baked milk should make sure milk (or a milk-containing product) is listed as the third ingredient or later in the list; individuals should always read food labels to prevent an allergic reaction.
- Individuals with a milk allergy should avoid foods that contain milk or any of the following ingredients: butter, butter fat, butter oil, butter acid, butter ester(s), buttermilk, casein, casein hydrolysate, caseinates (in all forms), cheese, cottage cheese, cream, curds, custard, ghee, half-and-half, sour cream, sour cream solids, sour milk solids, tagatose, and whey in all forms (note: tagatose may refer to a flavor enhancer that is often used as a low carbohydrate sweetener).
- Products with man-made casein or whey ingredients are not safe for individuals with a milk allergy because they still contain milk protein.
- Health care professionals should note the following: for kosher dairy products with a “D” or the word “dairy” following the circled K or U on a product label means the product contains or is contaminated with milk protein; individuals with a milk allergy should avoid such products.
- Cow milk allergy varies from person to person, and allergic reactions can be unpredictable; symptoms of a milk allergy reaction can range from mild, such as hives, to severe, such as anaphylaxis; individuals with a milk allergy should keep an epinephrine injection device with them at all times; epinephrine is the first-line treatment for anaphylaxis related to a milk allergy (note: antihistamines should only be used as a secondary treatment; giving antihistamines instead of epinephrine may place patients at significantly increased risk for a life-threatening allergic reaction). Specific information regarding the use of epinephrine to treat anaphylaxis may be found below.
    - IM epinephrine should be given immediately to treat anaphylaxis. Delays in giving epinephrine to patients can result in rapid decline and death within 30 to 60 minutes.
    - Epinephrine acts immediately, but it may be necessary to give repeat doses.

- Health care professionals should observe patients for four to six hours or longer after the administration of epinephrine, and oversee any further necessary treatment.
- Before leaving emergency medical care, health care professionals should provide patients with the following: an epinephrine auto-injector or a prescription for two doses and training on how to use the auto-injector; a follow-up appointment or an appointment with a clinical specialist such as an allergist/immunologist; information on where to get medical identification jewelry or an anaphylaxis wallet card that alerts others to a food allergy; education about allergen avoidance, recognizing the symptoms of anaphylaxis, and giving IM epinephrine; an anaphylaxis emergency action plan.
- Health care professionals should provide the following information to patients: always carry an epinephrine auto-injector; make sure the color of the liquid within the injector remains clear (discard if not clear), and know when an epinephrine auto-injector expires (usually after one year); instruct family and friends on how to use the auto-injector.

Egg

- Individuals with an egg allergy should avoid eggs and egg-containing food products.
- Egg is one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package; individuals should always read food labels to prevent an allergic reaction.
- The whites of an egg contain the proteins that most commonly cause allergic reactions to egg; an individual with an egg allergy must avoid eggs completely (both the egg white and the egg yolk); even if an individual is allergic to egg yolk proteins, it is impossible to separate the egg white completely from the yolk; cross-contact will always be a concern.
- Individuals with an egg allergy should avoid foods that contain egg or any of the following ingredients: egg (dried, powdered, solids, white, yolk), eggnog,

apovitellin, avidin globulin, lysozyme, mayonnaise, meringue (meringue powder), ovalbumin, ovomucoid, ovomucin, ovovitellin, surimi, and vitellin.

- Symptoms of an egg allergy reaction can range from mild, such as hives, to severe, such as anaphylaxis; allergic reactions can be unpredictable, and even very small amounts of egg can lead to an allergic reaction; individuals with an egg allergy should keep an epinephrine injection device with them at all times; epinephrine is the first-line treatment for anaphylaxis related to an egg allergy.

Peanut

- Individuals with a peanut allergy should avoid peanut and peanut products.
- Peanut is one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package; individuals should always read food labels to prevent an allergic reaction.
- Individuals with a peanut allergy should avoid foods that contain peanut or any of the following ingredients: peanut butter, peanut flour, peanut protein hydrolysate, peanut oil, cold-pressed peanut oil, expelled peanut oil, extruded peanut oil, artificial nuts, beer nuts, ground nuts, lupin or lupine, which is becoming a common flour substitute in gluten-free food, mandelonas (peanuts soaked in almond flavoring), mixed nuts, monkey nuts, nut meat or nut meal, and nut pieces.
- Health care professionals should note that peanuts and tree nuts often touch one another during manufacturing and serving processes, and may cause an allergic reaction due to cross-contact.
- Peanuts can cause potentially life-threatening anaphylaxis; epinephrine is the first-line treatment for anaphylaxis related to a peanut allergy.
- Palforzia may be used to treat an allergic reaction from peanuts. Specific information regarding Palforzia may be found below. The information found below was derived from materials provided by the U.S. Food and Drug Administration (FDA) (U.S. Food and Drug Administration [FDA], 2020).
    - Palforzia is an oral immunotherapy indicated for the mitigation of allergic reactions, including anaphylaxis, that may occur with accidental exposure

to peanut; Palforzia is approved for use in patients with a confirmed diagnosis of peanut allergy; initial dose escalation may be administered to patients aged four through 17 years; maintenance may be continued in patients 4 years of age and older.

- Palforzia should be used in conjunction with a peanut-avoidant diet.
- Palforzia is contraindicated in patients with uncontrolled asthma, or with a history of eosinophilic esophagitis and other eosinophilic gastrointestinal disease.
- Palforzia may lead to life-threatening anaphylaxis; Palforzia is available only through a restricted program under a Risk Evaluation and Mitigation Strategy (REMS) called the Palforzia REMS because of the risk of anaphylaxis; only prescribers, health care settings, pharmacies, and patients certified and enrolled in the REMS Program can prescribe, receive, dispense, or administer Palforzia.
- Anaphylaxis was reported during all phases of Palforzia dosing, including maintenance and in subjects who have undergone recommended dose escalation and dose modification procedures.
- Health care professionals should initiate Palforzia treatment in a patient who had severe or life-threatening anaphylaxis within the previous 60 days; Palforzia may not be suitable for patients with certain medical conditions that may reduce the ability to survive anaphylaxis, including but not limited to markedly compromised lung function, severe mast cell disorder, or cardiovascular disease; Palforzia may not be suitable for patients taking medications that can inhibit or potentiate the effects of epinephrine.
- All escalation doses must be administered under observation in a certified health care setting.
- Patients may be more likely to experience allergic reactions following Palforzia administration in the presence of cofactors such as exercise, hot water exposure, intercurrent illness (e.g., viral infection), or fasting; other potential cofactors may include menstruation, sleep deprivation, nonsteroidal anti-inflammatory drug use, or uncontrolled asthma; patients should be proactively counseled about the potential for the

increased risk of anaphylaxis in the presence of these cofactors; if possible, health care professionals should adjust the time of dosing to avoid cofactors; if it is not possible to avoid cofactors, consider withholding Palforzia temporarily.

- Adverse reactions associated with Palforzia include the following: abdominal pain, vomiting, nausea, oral pruritus, oral paresthesia, throat irritation, cough, rhinorrhea, sneezing, throat tightness, wheezing, dyspnea, pruritus, urticaria, anaphylactic reaction, and ear pruritus.

Soy

- Individuals with a soy allergy should avoid soy and soy products.
- Soy is one of the major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate "Contains" statement on the package; this makes it easy to see if soy is present in a food item (note: soy lecithin, although not exempt from FALCPA, is tolerated in most soy-allergic patients and is not typically avoided on a soy-elimination diet).
- Individuals with a soy allergy should avoid foods that contain soy or any of the following ingredients: soy albumin, soy cheese, soy fiber, soy flour, soy grits, soy ice cream, soy milk, soy nuts, soy sprouts, soy yogurt , soy protein, soy sauce, soya, soybean, soybean cold-pressed, expelled or extruded soy oil, edamame, miso, natto, okara, shoyu, tamari, tempeh, and tofu.
- Allergic reactions to soy are typically mild, but may lead to anaphylaxis; epinephrine is the first-line treatment for anaphylaxis related to a soy allergy.

Tree Nuts

- Individuals with a soy allergy should avoid tree nuts and tree nut products.
- Tree nuts are one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate "Contains" statement on the package; for tree nuts, the specific variety must also be identified on the package.

- Individuals with a tree nut allergy should avoid foods that contain tree nuts or any of the following ingredients: almond, artificial nuts, beechnut, black walnut hull extract (flavoring), brazil nut, butternut, cashew, chestnut, chinquapin nut, coconut, filbert/hazelnut, gianduja (a chocolate-nut mixture), ginkgo nut, hickory nut, litchi/lichee/lychee nut, macadamia nut, marzipan/almond paste, nangai nut, natural nut extract, nut butters (e.g., cashew butter), nut distillates/alcoholic extracts, nut meal, nut meat, nut milk (e.g., almond milk, cashew milk), nut oils (e.g., walnut oil, almond oil), nut paste (e.g., almond paste), nut pieces, pecan, pili nut, pine nut (also referred to as Indian, pignoli, pigñolia, pignon, piñon, and pinyon nut), pistachio, praline, shea nut, walnut, and walnut hull extract (flavoring).
- Health care professionals should note that tree nut proteins can be found in surprising places, such as: cereals, crackers, cookies, candy, chocolates, energy bars, flavored coffee, frozen desserts, marinades, barbeque sauces, and mortadella.
- Health care professionals should note that bakeries, ice cream shops, coffee shops, and some restaurants are considered high risk for people with a tree nut allergy; even if an individual with a tree nut allergy orders a tree nut-free dish, there is high risk of cross-contact.
- Health care professionals should note the following: coconut, the seed of a drupaceous fruit, has typically not been restricted in the diets of people with a tree nut allergy - however, the FDA identifies coconut as a tree nut.
- Tree nuts can lead to potentially life-threatening anaphylaxis; epinephrine is the first-line treatment for anaphylaxis related to a tree nut allergy.

Wheat

- Individuals with a wheat allergy should avoid wheat and wheat products.
- Wheat is one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package.
- Individuals with a wheat allergy should avoid foods that contain wheat or any of the following ingredients: wheat (bran, durum, germ, gluten, grass, malt, sprouts, and starch), wheat bran hydrolysate, wheat germ oil, wheat grass,

wheat protein isolate, whole wheat berries, bread crumbs, bulgur, cereal extract, club wheat, couscous, cracker meal, durum, einkorn, emmer, farina, farro, flour, freekeh, hydrolyzed wheat protein, pasta, seitan, semolina, spelt, sprouted wheat, triticale, and vital wheat gluten.

- Health care professionals should note the following: buckwheat is not related to wheat and is considered safe to eat; buckwheat may refer to a flowering plant in the knotweed family Polygonaceae that is cultivated for its grain-like seeds.
- Symptoms of a wheat allergy reaction can range from mild, such as hives, to severe, such as anaphylaxis; epinephrine is the first-line treatment for anaphylaxis related to a wheat allergy.

Shellfish

- Individuals with a shellfish allergy should avoid shellfish and shellfish products.
- Crustacean shellfish are one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package; for crustacean shellfish, the specific variety must also be identified on the package such as crab or shrimp; mollusks are not required to be labeled in the U.S. at this time and may be unexpectedly present in a food item.
- Individuals with a shellfish allergy should avoid foods that contain shellfish or any of the following ingredients: shrimp, prawns, lobster, barnacle, crab crawfish, and krill.
- Shellfish can lead to potentially life-threatening anaphylaxis; even very small amounts of shellfish can lead to anaphylaxis; individuals with a shellfish allergy should keep an epinephrine injection device with them at all times; epinephrine is the first-line treatment for anaphylaxis related to a shellfish allergy.

Fish

- Individuals with a fish allergy should avoid fish and fish products.
- Finned fish is one of the nine major allergens that must be listed in plain language on packaged foods sold in the U.S., as required by federal law, either within the ingredient list or in a separate “Contains” statement on the package.

- Fish that may lead to an allergic reaction include the following: anchovies, bass, catfish, cod, flounder, grouper, haddock, hake, halibut, herring, mahi mahi, perch, pike, pollock, salmon, scrod, sole, snapper, swordfish, tilapia, trout, and tuna.
- Due to the high risk for cross-contact, individuals with a fish allergy should avoid seafood restaurants.
- Health care professionals should note the following: carrageenan, or "Irish moss," is not fish; carrageenan is a red marine algae used as an emulsifier, stabilizer, and thickener in many products, such as dairy foods; it is safe for most people with food allergies.
- Health care professionals should note the following: a fish allergy is sometimes confused with an iodine allergy because fish is known to contain the element iodine - however, iodine is not what triggers the reaction in people who are allergic to fish; individuals with a fish allergy do not need to worry about cross-reactions with iodine or radiocontrast material, which can contain iodine and is used in some radiographic medical procedures.
- Fish can lead to potentially life-threatening anaphylaxis; individuals with a fish allergy should keep an epinephrine injection device with them at all times; epinephrine is the first-line treatment for anaphylaxis related to a fish allergy.

Sesame

- Individuals with a sesame allergy should avoid sesame and sesame products.
- Individuals with a sesame allergy should avoid foods that contain sesame or any of the following ingredients: sesame seed, sesame oil, sesame flour, sesame paste, sesame salt, sesamol, sesamum indicum, sesemolina, benne, benne seed, benniseed, gingelly, gingelly oil, gomasio (sesame salt), halvah, sim sim, tahini, tahina, tehina, and til.
- Health care professionals should note that in non-food items, the scientific name for sesame, sesamum indicum, may be on the label.
- Symptoms of a sesame allergy reaction can range from mild, such as hives, to severe, such as anaphylaxis; epinephrine is the first-line treatment for anaphylaxis related to a sesame allergy.

Section 2 Summary

Food allergies vary from person to person, and allergic reactions can be unpredictable. Symptoms of an allergic reaction to food can range from mild, such as hives, to severe, such as anaphylaxis. Individuals with a food allergy should keep an epinephrine injection device with them at all times; epinephrine is the first-line treatment for anaphylaxis. Health care professionals should provide food allergy education to patients so they may safely and effectively prevent, manage, and treat allergic reactions to food.

Section 2 Key Concepts

- Individuals should always read food labels to prevent an allergic reaction.
- Epinephrine is the first-line treatment for anaphylaxis.
- IM epinephrine should be given immediately to treat anaphylaxis.
- Palforzia may be used to treat an allergic reaction from peanut.

Section 2 Key Terms

Tagatose - a flavor enhancer that is often used as a low carbohydrate sweetener

Buckwheat - a flowering plant in the knotweed family Polygonaceae that is cultivated for its grain-like seeds

Carrageenan - a red marine algae used as an emulsifier, stabilizer, and thickener in many products, such as dairy foods

Section 2 Personal Reflection Question

How can health care professionals educate patients about food allergy prevention, management, and treatment?

Conclusion

An allergic reaction to food can threaten a patient's life. Therefore, health care professionals should identify patients with food allergies to optimize patient care.

Health care professionals should also provide food allergy education to patients so they may safely and effectively prevent, manage, and treat allergic reactions to food.

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