



## Food Allergies—What You Need to Know

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It is now accepted that food allergy is a serious public health issue. For individuals who have allergies, their caregivers, and food service providers, being adequately informed may be a life-saving matter. This publication has been prepared to increase awareness about food allergies and thereby aid in decreasing the number of food-related anaphylaxis incidents.

About one in three adults believes that a member of their family has a food allergy. The National Institutes of Health estimates, however, that only about 6–8 percent of children four years of age or under and 3.7 percent of adults in the USA are diagnosed with food allergies. Children in the first years of their lives often have food allergies that are later outgrown. These varying perceptions are commonplace because the term *food allergy* has been used to refer to *all* adverse reactions to food.

### Food sensitivity

Food sensitivity is the correct general term in referring to individualistic adverse reactions to food or food components. Those reactions that involve the immune system, which helps the body resist disease, are called *food allergies*, and those that do not are called *food intolerances*. In reality, true food allergies are only a fraction of all food sensitivities.

### Food allergy

True food allergy is an abnormal response of the immune system to a specific food or food component, usually a protein. All foods or food ingredients have the potential to induce allergy-like reactions in some individuals. There are two categories of true food allergies depending on the nature of the response of the immune system. *Immediate hypersensitivity* involves the formation of allergen-specific immunoglobulin E (IgE) antibodies with symptoms occurring within minutes to about an hour after eating the offending food. Approximately 90 percent of all IgE-mediated food allergies are caused by eight major food allergens. Also called *The Big 8*,

these major food allergens are: peanuts, tree nuts, milk, eggs, soy, fish, crustacean shellfish, and wheat. To date, tree nuts include almond, beechnut, Brazil nut, butternut, cashew, chestnut, chinquapin, coconut, filbert/hazelnut, ginko nut, hickory nut, lichee nut, macadamia/bush nut, pecan, pine nut/pinon, pili nut, pistachio, shea nut, and walnut. This tree nut list may be modified in the future.

“The Big 8” are most likely to result in severe or life-threatening allergic reactions. More than 160 foods have been identified to cause food allergies. Other substances of concern include sesame seeds,



This sticker, for display in restaurants, and other materials illustrated in this publication are available from CTAHR (see Saulo [2008] in References, p. 6).

\*This publication replaces *Food Allergy and Other Food Sensitivities*, FST-12, Dec. 2002, by the same author.

celery, mustard, and buckwheat, because they cause hypersensitivities in some individuals.

The second category of food allergy is *delayed hypersensitivity*, involving the development of non-IgE cells (sensitized T cells), with symptoms occurring 24 hours or longer after the ingestion of the offending food. An example of delayed hypersensitivity is celiac disease occurring in sensitive individuals upon consumption of the grains wheat, rye, barley, triticale, spelt, and kamut. It is estimated that about one in every 133 individuals in the USA is afflicted and must avoid gluten-containing grains. Celiac disease is different from true wheat allergy, which requires complete avoidance of wheat products.

True food allergy symptoms can range from mild discomfort to the potentially life-threatening. The most common involve the gastrointestinal system. They can include vomiting, nausea, cramps, and diarrhea. Skin symptoms can include hives and rashes, while respiratory symptoms can include watery discharge from the nose, difficulty in breathing, and asthma. Other more severe (but rare) symptoms include the rapid onset of anaphylactic shock, which can result in severe itching and hives, excessive perspiration, lowered blood pressure, and even death. These adverse reactions usually start within minutes or a few hours after eating the food. Some food-allergic individuals demonstrate exquisite sensitivity, where trace amounts of the offending food, such as can occur simply from touching or inhaling odors of the food, may produce an allergic reaction. It must be remembered that allergic individuals may react differently to the same allergen on different occasions. Results from a study by researchers from Mount Sinai Medical Center in New York indicated that severely peanut-allergic individuals may be at risk of potentially life-threatening allergic reactions from kissing someone who has recently eaten peanuts. No intervention, such as brushing of the teeth for two minutes, rinsing the mouth, or chewing gum after eating peanuts, could eliminate the allergen from the saliva up to 4.5 hours after ingestion. The study was conducted after a coroner initially reported in 2005 and later reversed his conclusions that a 15-year old girl with peanut allergy died after a kiss from her boyfriend who had snacked on peanut butter.

Researchers estimate that about 30,000 episodes and 100–200 deaths in the USA per year are due to food-induced anaphylaxis occur in adolescents and young adults. About 32–54 percent of all emergency visits for anaphylaxis are due to food allergy, making it the most frequent single cause of these visits.

## Food intolerance

Food sensitivities that occur through non-immunological mechanisms are called food intolerances. There are several types of food intolerances. *Metabolic reactions* result from a defect in the body's ability to handle a substance. One of the most common types of metabolic reaction is lactose intolerance, which occurs when the body cannot metabolize the milk sugar lactose due to absence of the enzyme lactase. Up to 90 percent of some ethnic groups, including Filipinos, Japanese, Jews, Thais, and African Americans, exhibit lactose intolerance. Symptoms associated with lactose intolerance include flatulence, cramping, and frothy diarrhea after consuming milk and dairy products. Reactions in children to milk are usually caused, however, by a true food allergy.

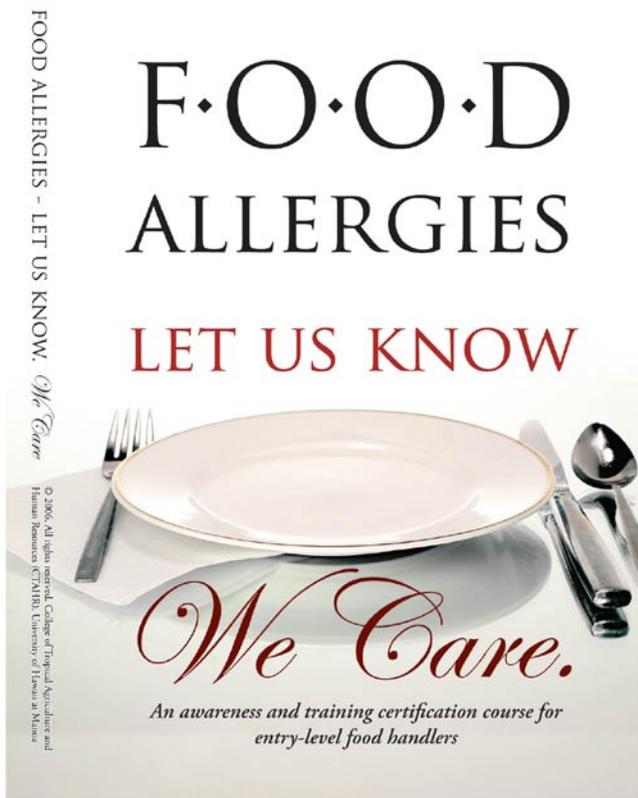
The second type of food intolerance is *anaphylactoid reactions* resulting from the release of mediators, such as histamine, without the involvement of the immune system. The most cited example of anaphylactoid reaction is sensitivity to strawberries. The mechanism involved is still not understood.

The third type of food intolerance is *food idiosyncrasies*, which occur through unknown mechanisms and include psychosomatic illnesses and those not conclusively proven through scientific studies. Food idiosyncrasies are commonly but improperly called food allergies. Examples of idiosyncratic reactions are the roles of sulfites, tartrazine (FD&C Yellow #5), and MSG in asthma; the role of chocolates or aspartame in migraine headaches; and the role of sugar in aggressive behavior.

In a few cases, however, the role of specific foods in idiosyncratic reactions has been scientifically disproven. One case is the alleged role of artificial food colors in hyperkinetic behavior in children, as reported by Dr. Benjamin Feingold in 1975. The other is the role of MSG in MSG Symptom Complex (inappropriately called Chinese Restaurant Syndrome). Neither could be corroborated in carefully controlled clinical challenge studies. Because there are many different types of food idiosyncrasies, symptoms can involve the stomach, intestines, bowel, skin, lungs, blood, and nervous system. Such symptoms could also be related to other medical problems.

## Specific avoidance of foods

Many children have food allergies early in life and outgrow them. Some adults start with none and develop them later in life. There is no cure for food allergies, and



Cover of a 9-minute instructional DVD for food-service workers available from CTAHR

the only way to manage food allergies is strict avoidance of the offending food or food component. But to be successful in specific-avoidance diets, the food-allergic individual or the guardian must carefully read food labels of regulated foods each time the food is consumed. In 1999, the Food and Drug Administration (FDA) disclosed that 25 percent of randomly selected foods in Wisconsin and Minnesota failed to declare peanuts, eggs, or allergens on the labels. Many parents also were unable to identify allergens from reading food labels.

There are problems with specific-avoidance diets. Labeling is imperfect, and there are foods that do not have labels, such as home meals, restaurant foods, party dishes, and takeout foods. Some label terms are unfamiliar to consumers, and some require knowledge of food composition. The extreme practice of indiscriminate avoidance of all forms of the offending food and anything related to it may cause other problems, such as nutritional deficiencies.

### Labeling of major food allergens

To help food-allergic individuals and their guardians to identify and avoid foods containing allergens, the Food Allergen Labeling and Consumer Protection Act (FALCPA) of 2004 (Title II of Public Law 108-282) was enacted into law on August 2, 2004. FALCPA applies to all domestically manufactured and imported packaged foods that are subject to FDA regulation and are labeled on or after January 1, 2006, if the foods contain ingredients that are, or contain, a major food allergen, including flavors, colors, spice blends, and incidental additives. FALCPA requires food manufacturers to label using plain English food products that contain (1) an ingredient that is a major food allergen or (2) a protein from a major food allergen. Labeling may be done in one of two ways:

1. In the ingredients statement, include the name of the food source in parenthesis following the common or usual name of the major food allergen in the ingredients listing, if the name of the food source of the major food allergen is not in the ingredients statement.

*Example:* Vanilla wafers

*Ingredients:* Enriched flour (**wheat** flour, malted barley, niacin, reduced iron, thiamin mononitrate, riboflavin, folic acid), sugar, partially hydrogenated soybean oil, and/or cottonseed oil, high fructose corn syrup, whey (**milk**), **eggs**, vanilla, natural and artificial flavoring, salt, leavening (sodium acid pyrophosphate, monocalcium phosphate), lecithin (**soy**), mono- and diglycerides (emulsifier)

2. In a “contains” statement immediately following or adjacent to the ingredients statement, and at least the same type size used in the ingredients statement, list the name of the food source from which the major food allergen is derived.

*Example:* Vanilla wafers

*Ingredients:* Enriched flour (wheat flour, malted barley, niacin, reduced iron, thiamin mononitrate, riboflavin, folic acid), sugar, partially hydrogenated soybean oil, and/or cottonseed oil, high fructose corn syrup, whey, eggs, vanilla, natural and artificial flavoring, salt, leavening (sodium acid pyrophosphate, monocalcium phosphate), lecithin, mono- and diglycerides (emulsifier)

*Contains* wheat, milk, egg, soy

Some manufacturers prefer to use bold print for the major food allergens. Still others employ both options, listing the major food allergens in the ingredients statement and in a “contains” statement. In addition, FALCPA requires the declaration of the type of tree nut (e.g., almonds, pecans, walnuts); the type of fish (e.g., bass, flounder, cod); and the type of crustacean shellfish (e.g., crab, lobster, shrimp).

The use of advisory statements, such as “may contain” or “produced on shared equipment that processes [allergen]” is not required by the FDA in any circumstance and may not be treated as GMP substitutes. There is currently a widespread use of these advisory statements, which consumers find unclear and confusing, forcing them to have very limited food choices or to take risks. It is further reported that teenagers, the most at-risk group for fatal food-allergy reactions, are taking risks because of unclear labeling. To address this issue of advisory statements, the FDA hosted a public hearing on September 16, 2008, to develop a long-term strategy to help manufacturers use allergen-advisory labeling that is truthful and not misleading, conveys a clear and uniform message, and gives adequate information to food-allergic consumers and their caregivers. No recommendations have been issued as of this writing.

On January 22, 2007, the FDA issued a proposed rule to define and permit the voluntary use of the term “gluten free.” About 1 in 133 people in the United States have celiac disease or celiac sprue which is a delayed hypersensitivity with the symptoms being manifested 24 hours or longer after ingestion of a group of proteins called gluten found in certain grains such as wheat, barley, and rye. Some individuals experience this chronic digestive disease that damages the small intestine and interferes with the absorption of nutrients from food. The FDA held a public meeting on August 19, 2008, to obtain comments from the industry on a gluten-free labeling standard, the gluten-detection analytical methods, and consumer perspective on gluten-free labeling standards. Comments were open until September 19, 2008, after which a final rule may be given by the FDA.

FALCPA is implemented as part of the FDA’s routine regulatory function. Foods with undeclared allergens may be subject to recall. If a food is not properly labeled, it may be considered misbranded and be subject to seizure and removal from commerce. Management may be subject to civil sanctions, criminal penalties, or both.

### **FALCPA exemptions**

Raw agricultural commodities, such as fresh fruits and vegetables, are exempt from FALCPA. Because the processes of refining, bleaching, and deodorizing edible oils remove allergens, highly refined edible oils derived from a major food allergen are also exempt from FALCPA. Thus, persons sensitive to peanuts may consume highly refined peanut oils, although many still avoid the food. Cold-pressed oils, however, would retain the food allergens and must comply with FALCPA.

### **Similar names**

Singular and plural forms and common name derivatives of the same food name are treated by the FDA as the same. For example, soy, soya, soybean, and soybeans are considered the same. Peanut or peanuts are the same and so is walnut or walnuts. Wheat, durum wheat, club wheat, spelt, semolina, Einkorn, emmer, kamut, and triticale are the same.

### **Exemptions from FALCPA**

Exemptions may be granted by the Secretary of Health and Human Services if scientific evidence is provided to demonstrate that the food or ingredient (1) does not cause an allergic reaction that poses a human health risk, including the analytical methods used (*the petition process*) or (2) does not contain an allergenic protein, including the production methods used (*the notification process*). If exemption is granted, the food is not considered a major food allergen and will be exempt from FALCPA.

### **Food allergy risk management**

#### ***By the individual or guardian***

Estimates of food allergies are thought to be higher than actual occurrences because self-diagnosis or diagnosis by parents is common and in many cases inaccurate. It is important to obtain an accurate diagnosis by a medical specialist. Some of the tests performed include clinically supervised challenge tests, skin tests, blood tests, and physical examination.

Food-allergic individuals alter their lifestyles on a continuing basis to avoid the offending food or ingredients. In families where there is a food-allergic individual, the diet is usually designed to meet the needs of the allergic individual. Thus, it is important that for an elimination diet to be effective, it must be easy to follow and meet nutritional needs. A registered dietitian can suggest

alternative foods or ingredients and assist in meal planning. Most importantly, the food-allergic individual or the guardian must carefully read food labels of regulated foods each time the food is consumed. Food companies may also be contacted for specific information about ingredients and their manufacturing processes.

Food-allergic individuals can still enjoy pleasant dining experiences outside the home if they or their guardians remain vigilant in thoroughly inquiring about ingredients and method of preparation of menu items. Restaurants are becoming aware of food allergens as a public health concern. For private parties, it is advisable to offer to bring a dish that can be safely enjoyed.

Food-allergic individuals and their guardians should also have a plan to handle the accidental eating of an allergenic food, since allergic reactions can occasionally be fatal. In every case of fatal food-allergy-induced anaphylaxis, the patient believed that the eaten food was safe. Unlike other allergies, such as to pollen or dander, there are no drugs or shots to delay the symptoms. Allergy shots are not recommended because of the potential risk of inducing serious anaphylactic reactions in severely food-allergic individuals. Those with histories of severe allergic reactions are prescribed to carry syringes with premeasured doses of epinephrine for self-injection. Oral antihistamines may be helpful in treating mild reactions, but the early administration of epinephrine can be life saving. Severely allergic individuals should also wear medical bracelets or necklaces to alert medical personnel of their allergies.

**By the foodservice industry**

FALCPA does not apply to retail or foodservice industries unless they package, label, and offer food for human consumption. Foods placed in a wrapper or containers as part of a consumer’s order (e.g., take-out) are not mandated to carry allergen labeling.

Careful reading of food labels certainly aids in the identification of the offending ingredient, unless the label is incomplete or there are hidden food allergens, such as in substituted or switched ingredients. Ingredient switching is a common cause of allergic reactions: a cheeseburger might be served instead of a plain hamburger to a sensitive individual allergic to milk, or ground peanuts might be substituted for ground walnuts as a flavoring ingredient in a piecrust. Allergic reactions can also be caused by cross-contact of utensils, serving equipment, and cooking vessels, or uninformed and untrained wait

**FOOD ALLERGIES**  
could mean  
**Life or Death**

Eggs Fish Milk Peanuts

**MOST COMMON FOOD ALLERGENS**

Shellfish Soy Beans Tree Nuts Wheats

**TO AVOID FOOD ALLERGY OCCURRENCES:**

- ◆ Find out if any of your diners has a food allergy
- ◆ Establish a clear and open line of communication
- ◆ Avoid hidden food allergens by:
  - ~ Reading all ingredient labels
  - ~ Paying close attention to anything that goes into the food
  - ~ Avoiding cross-contact.

**Take food allergy requests seriously!**

**NOTIFY MANAGEMENT AND CALL 911 IF A GUEST HAS AN ALLERGIC REACTION**

Please Let Us Know  
**Food Allergies?**  
We Care About You

**A poster to inform food-service and restaurant employees about food allergies (also available in a Spanish version)**

staff, leading to the mistaken consumption of allergenic foods by sensitive individuals. To protect the health of food-allergic individuals, it is highly important to inform and educate foodservice cooks and wait staff about “The Big 8” allergen sources and their presence in each food item on the menu. Monitor and separate ingredients, utensils, and equipment at receiving, storage, preparation, product handling, display, and serving. Many foodservice operators resort to dedicated materials to prevent cross-contact. Most importantly, strict sanitation procedures must be documented with kept records, monitored, and validated.

The Food Technology Program of the UH-CTAHR Cooperative Extension Service has developed educational

materials on food allergens for food handlers entitled “Food Allergies: Let us Know. We Care.” The materials include a 9-minute DVD with an accompanying instructional manual that may be used for education and training of foodservice staff. The manual features appendixes that are helpful in identifying hidden food allergens in ingredients and foods. Also included is a poster that serves as a quick reference guide of what to do when a food allergy attack is encountered. A 1½-inch sticker is included for use in encouraging food-allergic individuals to let management know of their allergies before being seated in a restaurant. The sticker may also be used on menus or enlarged for stand-up displays or on entrance doors. These materials may be downloaded at no charge from <http://www.ctahr.hawaii.edu/aurora/foodallergy.asp>.

### ***By the food processing industry***

Existing regulations and accepted practices already protect consumers from food allergens, including the Good Manufacturing Practice (GMP), labeling laws, and prerequisite programs to food safety. To manage food allergens effectively in a processing plant, processors must have in place a Food Allergen Control Program under a HACCP team. A Food Allergen Control Program should consist of identification and recordkeeping of all potential allergens in ingredients and products, separation in storage and throughout processing, production control and scheduling, monitoring of shared equipment, cleaning and sanitizing, vendor certification program (only approved suppliers are used), avoiding rework, production identification, recalls, and education and training of staff and management. Food processors must also ensure that the allergen labeling they use, including any advisory statements, is clear, truthful, and not misleading.

Processors may ask vendors to pre-label supplies containing allergens and give accompanying specification sheets. Processors may color-tag supplies with the allergen name or use icons for colorblind persons or color codes specific to the allergen. All ingredients and products containing allergens must be separated and segregated at all stages of handling and storage.

Prevent cross-contact by maintaining negative pressure in ingredient mixing areas and processing allergen-containing products last. Dedicate and designate utensils using colors also specific to the allergen. Avoid rework. If rework is unavoidable, control all processes, products, and rework like products only. Label immediately and review all labeling procedures to insure that correct labels are used.

Review cleaning and sanitizing procedures to ensure that no carryover of allergens occurs. This is done by testing for residual allergens. To date, there are commercially available test kits using enzyme-linked immunosorbent assay (elisa) and ATP bioluminescence technologies to detect the presence of residual allergens (proteins) such as peanut, egg, milk, almond, hazelnut, soy flour, gliadin, and gluten. Some of these tests may also be used to verify efficacy of cleaning procedures.

### **Resources**

(All websites accessed September 15, 2008.)

- FAAN. Frequently asked questions. <http://www.foodallergy.org/questions.html>. FARRP. Frequently asked question. <http://www.farrp.org/articles/allerFAQ.html>.
- FDA/CFSAN. February 2007. Food allergies, What you need to know. <http://www.cfsan.fda.gov/~dms/ffalrgn.html>.
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