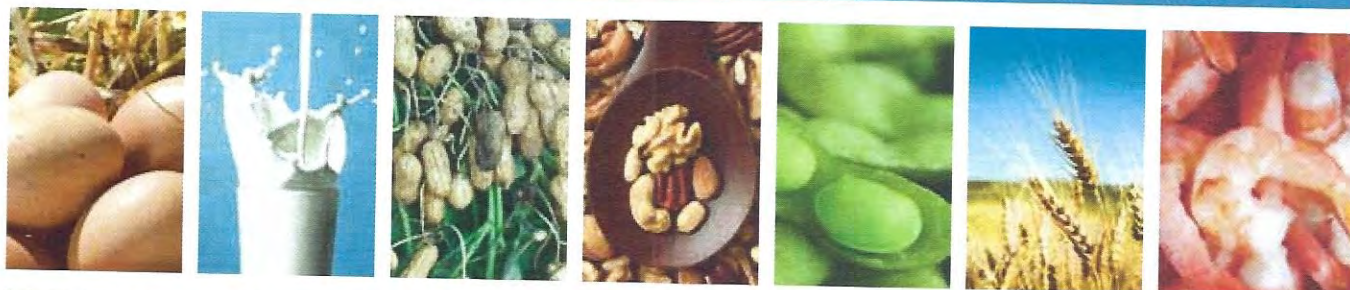


NIAID

Guidelines for the Diagnosis and Management of Food Allergy in the United States

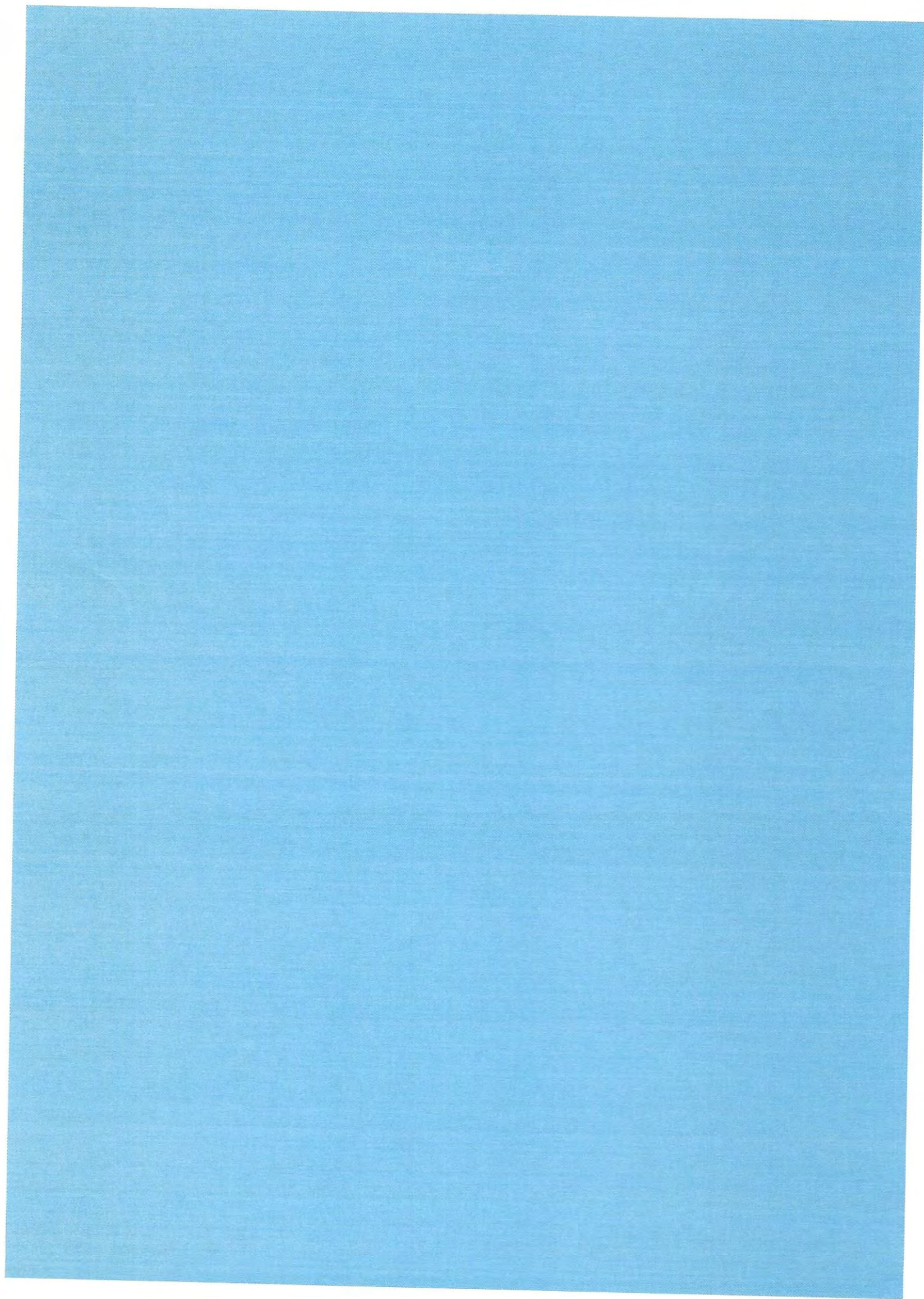


Summary for Patients, Families, and Caregivers

National Institute of Allergy and Infectious Diseases



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health



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Introduction

Most of us eat without a thought that something so essential to life might also harm us. But for people who are allergic to one or more foods, every mouthful can be a worry. Although allergic reactions to food can be mild, they also may be severe, leading to a life-threatening allergic reaction called **anaphylaxis**.

The *Guidelines for the Diagnosis and Management of Food Allergy in the United States: Report of the NIAID-Sponsored Expert Panel* were written to provide healthcare professionals with the most up-to-date clinical advice on how to care for their patients with food allergy.

How were the Guidelines developed?

The Guidelines are the culmination of a 2-year effort in which the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, worked with 34 professional organizations, federal agencies, and patient advocacy groups. A panel of experts from a variety of clinical backgrounds developed the Guidelines based on a review and evaluation of recent scientific publications about food allergy.

The Guidelines are intended to help U.S. healthcare professionals make appropriate decisions about patient care; however, it is vital that patients, families, and caregivers understand what the Guidelines say about managing food allergy.

What else you should know: The Guidelines are not an official regulatory document of any government agency. They are intended as a resource to guide clinical practice and to help develop educational materials for patients, their families and caregivers, and the public. They do not override your doctor's responsibility to make decisions appropriate to your circumstances.

If you want to read more about how the Guidelines were developed, visit NIAID's food allergy guidelines Web site at <http://www.niaid.nih.gov/topics/foodallergy/clinical>.

What do the Guidelines tell your doctor?

The Guidelines include definitions of food allergy and related disorders, recommendations on how to diagnose and manage food allergy, and ways to diagnose and manage severe and life-threatening allergic reactions to food.

What does this booklet tell you?

This booklet summarizes the most important information from the Guidelines and provides a starting point for patient-doctor conversations about food allergy. We hope that this information will empower patients, families, and caregivers with the knowledge they need to manage the disorder and, in turn, experience a better quality of life.

There are 43 guidelines, and each includes the word “recommends” or “suggests.” These words convey the strength of the guideline, defined as follows:

- **Recommend** is used when the expert panel strongly recommended for or against a particular course of action.
- **Suggest** is used when the expert panel recommended weakly for or against a particular course of action. The reason for this was usually the lack of strong evidence to support a recommendation.

What the Guidelines do not do

The Guidelines do not discuss celiac disease because there are existing clinical guidelines for celiac disease. The Guidelines also do not address the management of people with food allergy outside of clinical care settings (for example, in schools and restaurants) or the related public health policy issues (for example, laws about food processing or food handling).

Food Allergy, Prevalence, and Associated Disorders

What is food allergy?

A food allergy is an adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food.

Food allergens are the parts of food or ingredients within food (usually proteins) that are recognized by immune cells. When an immune cell binds to a food allergen, a reaction occurs that causes the symptoms of food allergy.

What else you should know: Most food allergens cause reactions even after they have been cooked or digested. Some allergens, most often from fruits and vegetables, cause allergic reactions only when eaten raw. Food oils, such as soy, corn, peanut, and sesame, may or may not be allergenic (causing allergy), depending on how they are processed.

“Allergy” and “allergic disease” refer to conditions that involve changes to your immune system. These immune system changes fall into two categories:

- **Immunoglobulin E (IgE) mediated**—the symptoms are the result of interaction between the allergen and a type of antibody known as IgE, which is thought to play a major role in allergic reactions
- **Non-IgE-mediated**—the symptoms are the result of interaction of the allergen with the immune system, but the interaction does not involve an IgE antibody

If you are sensitized to a food allergen, it means that your body has made a specific IgE (sIgE) antibody to that food allergen, but you may or may not have symptoms of food allergy.

If you can consistently tolerate a food that once caused you to have an allergic reaction, you have outgrown the food allergy.

Food intolerances are adverse health effects caused by foods. They do not involve the immune system. For example, if you are lactose intolerant, you are missing the enzyme that breaks down lactose, a sugar found in milk.

How common is food allergy?

A 2007 survey conducted by the Centers for Disease Control and Prevention estimated that food allergy affects 5 percent of children under the age of 5 and 4 percent of children aged 5 to 17 years and adults in the United States.

There are eight major food allergens in the United States—milk, egg, peanut, tree nuts, soy, wheat, fish, and crustacean shellfish.

Prevalence rates in the United States for some of these food allergens are provided below:

- Peanut: 0.6 percent
- Tree nuts: 0.4–0.5 percent
- Fish: 0.2 percent in children and 0.5 percent in adults
- Crustacean shellfish (crab, crayfish, lobster, shrimp): 0.5 percent in children and 2.5 percent in adults
- All seafood: 0.6 percent in children and 2.8 percent in adults
- Milk and egg: no reliable data available from U.S. studies, but based on data obtained outside the United States, this rate is likely to be 1–2 percent for young children

Can food allergy be outgrown?

Most children eventually outgrow milk, egg, soy, and wheat allergy. Fewer children outgrow peanut and tree nuts allergy. Outgrowing a childhood allergy may occur as late as the teenage years.

For many children, sIgE antibodies can be detected within the first 2 years of life. A child with a high initial level of sIgE, along with clinical symptoms of food allergy, is less likely to outgrow the allergy. A decrease in sIgE antibodies is often associated with outgrowing the allergy.

Food allergy also can begin in adulthood. Late-developing food allergy tends to persist.

What other conditions can occur with food allergy?

If someone has food allergy, he or she is more likely to have asthma, eczema, eosinophilic esophagitis (EoE), or exercise-induced anaphylaxis.

What are risk factors for severe allergic reactions to foods?

The severity of allergic reactions to foods is based on many different factors, including how much you ate and whether the food was cooked, raw, or processed.

You cannot tell how severe your next allergic reaction will be based on the severity of your previous reactions. No available tests can predict how severe a future allergic reaction will be.

You are more likely to have a severe allergic reaction to food if you also have asthma.

Diagnosis of Food Allergy

When should your healthcare professional suspect food allergy?

Guideline 1 recommends that your healthcare professional should consider the diagnosis of food allergy

- If you are experiencing anaphylaxis, a severe allergic reaction to food that involves more than one body system (for example, skin and respiratory tract and/or gastrointestinal (GI) tract).
- If you are experiencing a combination of symptoms within minutes to hours after eating food and/or after eating a specific food on more than one occasion. See table A for a list of allergic symptoms caused by food.
- If you have been diagnosed with EoE.
- In an infant or child diagnosed with moderate to severe eczema, EoE, enterocolitis, enteropathy, or allergic proctocolitis.

What else you should know: Food-allergic reactions may be IgE-mediated, non-IgE-mediated, or both. Your healthcare professional needs to identify the type of reaction so he or she can select the correct diagnostic test(s).

Milk, egg, and peanut account for the vast majority of IgE-mediated reactions in young children, whereas peanut, tree nuts, and seafood (fish and crustacean shellfish) account for the vast majority of IgE-mediated reactions in teenagers and adults. The symptoms of an IgE-mediated food allergy almost always occur immediately after eating the food. However, an allergic reaction may not occur after exposure if a very small amount of the food is eaten or if the food, such as milk or egg, is extensively heated on the stovetop or baked in the oven.

Reactions that are both IgE-mediated and non-IgE-mediated generally involve the GI tract. Disorders caused by these reactions do not get better quickly and are not closely associated with eating the food. An example of such a disorder is EoE.

TABLE A. Symptoms of allergic reactions caused by food

Affected part of the body	Immediate symptoms	Delayed symptoms
Skin	Redness Itching Hives Measles-like red bumps Swelling beneath the skin	Same as immediate symptoms <i>plus</i> Rash similar to eczema and flushing
Eyes	Itching Tearing Redness Swelling around eyes	Same as immediate symptoms
Upper respiratory	Nasal congestion Itching Runny nose Sneezing Swelling of the voicebox Hoarseness Dry cough	—
Lower respiratory	Cough Chest tightness Shortness of breath Wheezing Visible signs of shortness of breath	Cough Shortness of breath Wheezing
GI (oral)	Swelling of the lips, tongue, or palate Itching in the mouth	—
GI (lower)	Nausea Colicky abdominal pain Reflux Vomiting Diarrhea	Same as immediate symptoms <i>plus</i> Bloody stool, irritability, and food refusal with weight loss (young children)
Cardiovascular	Rapid heartbeat (occasionally slow heartbeat in anaphylaxis) Low blood pressure Dizziness Fainting Loss of consciousness	—
Other	Uterine contractions Sense of "impending doom"	—

GI, gastrointestinal.

How should your healthcare professional diagnose IgE-mediated food allergy?

Your healthcare professional should use a medical history, physical examination, and appropriate tests to diagnose IgE-mediated food allergy.

Medical history and physical examination

Guideline 2 recommends that your healthcare professional use a medical history and physical examination to help in the diagnosis of food allergy; however, these alone are not sufficient to diagnose the disorder.

- A detailed medical history often provides evidence for the type of allergic reaction caused by food and suggests which food(s) may be involved.
- A physical examination may reveal signs that are consistent with an allergic reaction or a disorder that is associated with food allergy.

Your healthcare professional should ask the following questions:

- What are your symptoms?
- What food causes your symptoms, and has this food caused these symptoms more than once?
- How much of the food did you eat when the symptoms occurred?
- Was the food cooked on the stovetop, baked in the oven, or raw?
- How long after you were exposed to the food did your symptoms occur?
- Have you ever eaten the food without these symptoms occurring?
- Were other factors involved, such as exercise, alcohol, or use of aspirin or nonsteroidal anti-inflammatory drugs?
- Have you had these symptoms other than after being exposed to the food?
- What treatment did you receive, and how long did the symptoms last?

Guideline 3 recommends that self-reports of presumed food allergy must be confirmed by a diagnosis from a healthcare professional.

Why this is important: As many as 1 in 3 people think they have food allergy. However, when confirmed by a healthcare professional, only about 1 in 28 people have food allergy (as distinct from food intolerance). Self-reporting of food allergy is unreliable and can lead you to avoid foods unnecessarily. This can affect your nutrition and quality of life.

Tests to identify foods causing your allergic reaction involving IgE

If your healthcare professional suspects that you have an IgE-based food allergy, there are blood and skin tests that can identify the foods that may be causing your reaction. The results of these tests only show that you produce IgE antibodies to food allergens. Blood and skin tests alone cannot be used to diagnose food allergy. You do not have food allergy unless you also have clinical symptoms.

Table B summarizes the value of various tests in identifying allergens and diagnosing food allergy involving IgE.

TABLE B. Tests to identify food allergens and diagnose food allergy involving IgE

Test	Can it identify a food allergen?	Can it diagnose food allergy?
Skin prick/puncture test	Yes	No
Intradermal testing	Yes (but test poses risk of adverse reactions)	No
Total serum IgE	No	No
Allergen-specific IgE in the serum	Yes	No
Atopy patch test	No	No
Combination of skin prick/puncture test, sIgE test, and atopy patch test	Yes (but no advantage over skin prick/puncture test alone)	No
Food elimination diet	Yes	Probably
Oral food challenge	Yes (but test poses risk of adverse reactions)	Yes

Skin prick/puncture test

Guideline 4 recommends that your healthcare professional use a skin prick/puncture test (SPT) to identify the food(s) that may be causing the IgE-mediated food allergy.

With an SPT, your healthcare professional uses a needle to place a tiny amount of food extract just below the surface of the skin on your lower arm or back.

What else you should know:

- SPTs are safe.
- SPTs can identify foods against which you have made IgE antibodies.
- The results of an SPT usually appear within 30 minutes.
- A positive SPT result is a raised bump with redness around it, called a wheal and flare. This occurs when a food allergen reacts with its IgE antibody.
- A positive SPT result does not mean that you are allergic to the food. A positive result shows that you have made IgE antibodies to the food.
- Occasionally, even when the food allergy involves IgE, negative SPT results do occur.

Intradermal test

Guideline 5 recommends that your healthcare professional *not* use intradermal testing to diagnose food allergy.

An intradermal test is performed by injecting a small amount of allergen into the skin.

Why not use it? There is not enough clinical evidence to show that intradermal testing is more useful than an SPT to diagnose food allergy. You also are more likely to have an adverse reaction to an intradermal test, compared with an SPT.

Total serum IgE

Guideline 6 recommends that your healthcare professional *not* make a diagnosis based on the total amount of IgE antibodies in the serum (from a blood sample).

Why not use it? There is not enough clinical evidence to show that measuring total serum IgE levels is sensitive or specific enough to diagnose food allergy.

Allergen-specific IgE in the serum

Guideline 7 recommends that your healthcare professional test for sIgE in the serum (from a blood sample) to identify foods that may be responsible for the food allergy. However, these tests by themselves do not diagnose food allergy.

What else you should know:

- Measuring sIgE levels can be useful in identifying possible food allergens.
- Serum testing can be especially useful if SPTs cannot be done. For example, SPTs cannot be done when you have extensive dermatitis (inflammation of the skin) or when you need to take antihistamines.
- The results of sIgE testing and SPTs do not always match up.
- Undetectable sIgE levels occasionally occur in people with food allergy involving IgE.

Atopy patch test

Guideline 8 suggests that your healthcare professional *not* use an atopy patch test (APT) to assess **noncontact food allergy**.

An APT is performed by placing a sticky patch on the skin of the upper back that releases a small amount of food allergen into the tissues beneath the skin.

Why not use it? There is not enough clinical evidence to show that APTs are useful in determining whether you have noncontact food allergy.

Use of skin prick/puncture tests, sIgE tests, and atopy patch tests in combination

Guideline 9 suggests that your healthcare professional *not* use the combination of SPTs, sIgE tests, and APTs to diagnose food allergy.

Why not use it? There is not enough clinical evidence to show that using SPTs, sIgE tests, and APTs in combination is better than using SPTs or sIgE tests alone.

Food elimination diet

Guideline 10 suggests that your healthcare professional eliminate specific foods from your diet to help diagnose food allergy. Food elimination may identify foods responsible for some non-IgE-mediated and some mixed IgE- and non-IgE-mediated food allergy disorders.

What else you should know: If your symptoms disappear when you eliminate a food from your diet, you may have food allergy. Your healthcare professional should perform additional tests to confirm the diagnosis. For non-IgE-mediated food allergy disorders, your medical history and the results of a food elimination diet may provide a diagnosis.

Oral food challenge test

Guideline 11 recommends that your healthcare professional use the oral food challenge test to diagnose food allergy.

Note: Because an oral food challenge test always carries a risk, it must be performed by a healthcare professional trained in how to conduct this test and at a medical facility that has appropriate medicines and devices to treat potential severe allergic reactions.

An oral food challenge test includes the following steps:

- You are given doses of various foods, some of which are suspected of triggering an allergic reaction.
- Initially, the dose of food is very small, but the amount is gradually increased during the challenge.
- You swallow each dose.
- You are watched to see whether a reaction occurs.

There are three types of oral food challenge tests:

- A double-blind placebo-controlled food challenge (DBPCFC) test is considered the best one. In this test, the patient receives increasing doses of the suspected food allergen or a harmless substance (placebo). Neither the patient nor the healthcare professional knows which one the patient receives.
- A single-blind food challenge is the next best option. In this test, the healthcare professional knows what the patient is receiving, but the patient does not.
- An open-food challenge test may be sufficient to diagnose food allergy under certain circumstances. In this test, both the patient and the healthcare professional know whether a food allergen is received.

If an oral food challenge test results in no symptoms, then food allergy can be ruled out. If the challenge results in symptoms and these symptoms are consistent with your medical history and laboratory tests, then a diagnosis of food allergy is confirmed.

What else you should know: The DBPCFC is the most specific test for diagnosing food allergy, but it can be expensive and inconvenient. Your healthcare professional may consider using a single-blind or open-food challenge as an alternative.

Nonstandardized and unproven tests

Guideline 12 recommends that your healthcare professional avoid using tests not recommended in the Guidelines to diagnose food allergy involving IgE. See the full Guidelines at <http://www.niaid.nih.gov/topics/foodallergy/clinical> for a list of these tests.

How should your healthcare professional diagnose non-IgE-mediated food allergy?

The diagnosis of non-IgE-mediated food allergy can be challenging. A medical history and physical examination alone may not help your doctor distinguish between a food allergy that involves IgE and one that does not.

The following are examples of disorders associated with food allergy that do not involve IgE:

- Eosinophilic GI diseases (EGIDs), but one exception is EoE, which can be a mixture of IgE- and non-IgE-mediated
- **Food protein-induced enterocolitis syndrome (FPIES)**
- Food protein-induced allergic proctocolitis (AP)
- **Allergic contact dermatitis (ACD)**
- **Systemic contact dermatitis**

Table C lists tests that your healthcare professional should use to evaluate food allergy that does not involve IgE.

TABLE C. Tests to diagnose non-IgE-mediated food allergy

Disorder associated with food allergy	Test	Can the test diagnose food allergy?
Eosinophilic esophagitis (an EGID that is a mixture of IgE and non-IgE)	Skin prick/puncture test	No
	sIgE test	No
	Atopy patch test	No
Food protein-induced enterocolitis syndrome	Oral food challenge	Yes
	Food elimination	Yes
Food protein-induced allergic proctocolitis	Oral food challenge	Yes
	Food elimination	Yes
Allergic contact dermatitis	Atopy patch test	Yes
	Food elimination	Yes
Systemic contact dermatitis	Atopy patch test	Yes
	Food elimination	Yes

EGID, eosinophilic gastrointestinal disease; sIgE, specific IgE.

Eosinophilic gastrointestinal diseases

Guideline 13 suggests that your healthcare professional consider using SPTs, sIgE tests, and APTs to identify foods associated with EoE. The role of these tests in the diagnosis of other EGIDs has not been established.

What else you should know: Usually, a healthcare professional makes a diagnosis of an EGID after finding high levels of immune cells called eosinophils in a biopsy from the GI tract. The symptoms of these disorders depend on which part of the GI tract is involved and whether the accumulation of eosinophils is localized or widespread. EoE is one type of EGID.

Food protein-induced enterocolitis syndrome

Guideline 14 recommends that your healthcare professional use a medical history and an oral food challenge test to diagnose FPIES. However, if the patient is an infant or child and the medical history includes episodes of low blood pressure or multiple reactions to the same food, the absence of symptoms while avoiding the food can confirm diagnosis.

What else you should know: FPIES often lasts only a few years. A patient should be retested to confirm that FPIES has been outgrown.

Food protein-induced allergic proctocolitis

Guideline 15 recommends that your healthcare professional use a medical history, the absence of symptoms while avoiding the causative food, and recurrence of symptoms following an oral food challenge to diagnose AP.

What else you should know: AP usually ends between ages 1 and 2 years. A child should be retested to confirm that AP has been outgrown.

Allergic contact dermatitis

Guideline 16 recommends that your healthcare professional use a medical history, the absence of symptoms while avoiding the causative food, and positive APTs to diagnose ACD.

What else you should know: Positive APT reactions indicate the presence of sIgE antibodies, but there must be other clinical signs to support the diagnosis.

Systemic contact dermatitis

Guideline 17 suggests that your healthcare professional use a medical history, the absence of symptoms while avoiding the causative food, and positive APTs to diagnose systemic (whole-body) contact dermatitis.

How should your healthcare professional diagnose contact urticaria?

Contact urticaria is a disease that comes in two forms, one that involves IgE and one that does not.

Guideline 18 suggests that your healthcare professional use a medical history, the absence of symptoms while avoiding the causative food, positive sIgE tests or SPTs, and positive immediate responses to APTs to diagnose contact urticaria caused by food and involving IgE.

Management of Nonacute Allergic Reactions and Prevention of Food Allergy

How should food allergy be managed?

Guidelines 19 through 21 recommend that if you have been diagnosed with IgE-mediated food allergy, non-IgE-mediated food allergy, or food allergy in combination with eczema, asthma, or EoE, you should avoid the allergenic food.

What else you should know: Not eating the allergenic food is currently the safest way to manage food allergy and prevent symptoms. Your healthcare professional should work with you to decide whether certain related foods also should be avoided.

Guideline 22 recommends that if you have eczema, asthma, or EoE and you have not been diagnosed with food allergy, you should not avoid foods that may be allergenic as a way to manage your eczema, asthma, or EoE.

What else you should know: There is no evidence that avoiding allergenic foods reduces the severity of eczema, asthma, or EoE if you do not have food allergy.

Guideline 23 recommends that children diagnosed with food allergy receive nutritional counseling and regular growth monitoring.

Guideline 24 suggests that if you have food allergy, you should receive training on how to understand ingredient lists on food labels and avoid products with warning labels such as “this product may contain trace amounts of allergen” or “made in a facility where allergen-containing products are made.”

What else you should know: The U.S. Food Allergen Labeling and Consumer Protection Act of 2004 requires food labels to list which of the eight major food allergens (milk, egg, peanut, tree nuts, soy, wheat, fish, and crustacean shellfish) are present as ingredients in prepared foods.

However, the law does not require or suggest wording for warning labels, such as “may contain trace amounts of nuts” or “may be prepared in a facility that also uses nuts.” The inclusion of these warning labels is voluntary.

Guideline 25 suggests that individuals with food allergy should receive follow-up testing.

What else you should know: Some children outgrow their food allergies. Follow-up testing can help you and your healthcare professional decide whether it is safe to introduce certain foods into the child's diet.

Are medications available to prevent and treat allergic reactions caused by foods?

Guidelines 26 and 27 state that there are no medications available to prevent IgE- or non-IgE-mediated food allergy.

What else you should know: Drugs are available that may prevent or decrease allergic reactions to foods. However, they have side effects and in some cases can increase your risk of infection.

Guidelines 28 and 29 recommend that your healthcare professional *not* use **allergen-specific immunotherapy** or **immunotherapy with cross-reactive allergens** to treat food allergy involving IgE.

Why not use them? The safety of immunotherapy is uncertain. Early studies of allergen-specific immunotherapy have had promising results, but the therapeutic effect and duration of benefit have not been proven. There has been little study of immunotherapy with **cross-reactive** allergens.

If you would like to participate in clinical trials of immunotherapy, you can find more information at <http://www.clinicaltrials.gov>.

Guideline 30 recommends that you should receive education and information on how to avoid food allergens and how to develop an emergency management plan that is age and culturally appropriate.

What are the recommendations for vaccines for patients with egg allergy?

Several vaccines are made using chicken eggs. These vaccines contain varying amounts of egg protein. Although these egg-based vaccines contain very low amounts of egg protein, people with a medical history of anaphylaxis to egg may be at risk if injected with these vaccines. People without a history of anaphylaxis should talk with their healthcare professional to discuss whether they can safely receive egg-based vaccines.¹

¹ This information differs slightly from the Guidelines and reflects more up-to-date guidance about egg-based vaccines.

The Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) Red Book, and vaccine manufacturer's package inserts (PIs) provide recommendations for giving vaccines to patients with egg allergy (summarized in table D). The recommendations are based on the amount of egg protein in the vaccine and the patient's history of allergic reactions.

TABLE D. 2010 ACIP and AAP Red Book recommendations and PI information for administering vaccines to patients with egg allergy

Vaccine	ACIP	AAP Red Book	PI
Measles, mumps, rubella/measles, mumps, rubella, and varicella	May be used	May be used	May be used with caution
Influenza	Consult a physician	Contraindicated	Contraindicated
Rabies	Use caution	No specific recommendation	May be used with caution
Yellow fever	Contraindicated, but desensitization protocols may be used to give the vaccine if necessary	Contraindicated, but desensitization protocols may be used to give the vaccine if necessary	Skin testing and desensitization protocols provided in the PI

AAP, American Academy of Pediatrics; ACIP, Advisory Committee on Immunization Practices; PI, package insert.

In some cases, your healthcare professional may choose to use a desensitization protocol, a method that involves administering a single dose of vaccine in two or more portions to reduce the potential risk of an allergic reaction.

Guideline 31 recommends that children with egg allergy, even those with a history of severe reactions, receive vaccines for measles, mumps, and rubella (MMR) and for MMR with varicella (MMRV).

What else you should know: MMR and MMRV vaccines are safe because the egg protein content of these vaccines is very low.

Influenza vaccine

Currently, there is not enough clinical evidence to recommend that a patient with a history of severe allergic reactions to egg protein receive the influenza vaccine. Severe allergic reactions include a history of hives, **angioedema**, asthma, or anaphylaxis.

This statement applies to influenza vaccines that are inactivated (made from viruses that are dead so they cannot cause disease) or live-attenuated (made from viruses that are alive but weakened so they cannot cause disease).

You should talk with your healthcare professional if you have egg allergy and are thinking about getting the influenza vaccine.

Rabies and yellow fever vaccines

The Guidelines recommend against receiving yellow fever or rabies vaccines if you have a history of severe allergic reactions to egg proteins, unless you first undergo allergy evaluation and testing with the vaccine. The ACIP and AAP recommend this approach, which also is approved by the vaccine manufacturer.

What else you should know: The Imovax rabies vaccine does not contain egg protein and is safe for people with egg allergy. No data are available on the amount of egg protein in other rabies vaccines or the yellow fever vaccine. The concentration may not be low enough to be safe for patients with egg allergy. Your healthcare professional can evaluate you to see whether you are allergic to the vaccine. Based on the results, you and your healthcare professional can decide whether it is safe to receive the vaccine.

Can avoiding nonfood allergens and cross-reactive food allergens prevent food allergy from developing?

Guidelines 32 and 33 suggest that if you are at risk for developing food allergy, you should not limit exposure to nonfood allergens (for example, dust mites, pollen, or pet dander) or to foods that may be cross-reactive with the eight major food allergens (milk, egg, peanut, tree nuts, soy, wheat, fish, and crustacean shellfish).

What else you should know: A person at risk for developing food allergy has a biological parent or sibling with existing hay fever, asthma, eczema, or food allergy, or a history of any of these. There is not enough evidence to suggest that avoiding nonfood allergens has any effect on the development of food

allergy or that foods that cross-react with the major allergenic foods will cause allergic symptoms. Avoiding foods unnecessarily could put you at risk for inadequate nutrition.

Should a child at high risk for food allergy be tested prior to introducing highly allergenic foods into the diet?

The Guidelines state that there is not enough evidence to recommend routine food allergy testing before introducing highly allergenic foods (such as milk, egg, and peanut) to children who are at a high risk of reacting to these foods. Children at high risk are those who already have severe allergic disease or a family history of food allergy.

Should a child with no preexisting severe allergic disease and no family history of food allergy be tested prior to introducing highly allergenic foods into the diet?

Guideline 34 suggests that a child with no preexisting severe allergic disease and no family history of food allergy should *not* be tested for food allergy before highly allergenic foods are introduced into the diet.

Why not? There is insufficient evidence to suggest any benefit to testing for food allergy in children who have no symptoms or risk factors.

Should a child with eczema be tested for food allergy?

Guideline 35 suggests that a healthcare professional should consider evaluating a child for milk, egg, peanut, wheat, and soy allergy if the child is younger than 5 years old *and* has eczema that does not go away with treatment, *or* has eczema and a history of allergic reactions to a specific food.

What else you should know: Children with moderate to severe eczema are at risk for developing food allergy, especially allergy to milk, egg, and peanut. These children may benefit from a food allergy evaluation.

Can food allergy be prevented?

Guideline 36 recommends that a mother *not* restrict her diet during pregnancy or when breastfeeding as a way to prevent food allergy from developing in her child.

What else you should know: There is no evidence to suggest that restricting a mother's diet while she is pregnant or breastfeeding prevents the development of food allergy in her child.

Guideline 37 recommends that a mother exclusively breastfeed her infant until age 4 to 6 months, unless breastfeeding is not advised for medical reasons.

What else you should know: There is no strong evidence that breastfeeding increases the likelihood that an infant will develop food allergy.

Guideline 38 does *not* recommend giving an infant at risk for food allergy soy milk formula instead of cow's milk formula to prevent food allergy from developing.

What else you should know: There is neither long-term harm nor significant benefit in giving an infant soy milk formula.

Guideline 39 suggests that parents and caregivers should consider using hydrolyzed infant formulas instead of cow's milk formula to prevent food allergy from developing in children at risk for food allergy and who are not exclusively breast-fed.

What else you should know: Only a limited number of studies, with varying results, have examined whether the use of hydrolyzed infant formulas can prevent food allergy.

Guideline 40 suggests that you should *not* delay introducing solid foods, including potentially allergenic foods, to an infant beyond 4 to 6 months of age.

What else you should know: There is no evidence that supports delaying the introduction of solid foods to an infant beyond 4 to 6 months of age to prevent allergic diseases from developing. This includes giving an infant a food containing milk, eggs, peanut, tree nuts, soy, or wheat.²

² Healthcare professionals generally advise that no infant or young child should be given whole or pieces of peanuts or tree nuts because of the risk of choking. This is an important safety consideration. This information is not found in the Guidelines and was not considered by the expert panel. Please check with your healthcare professional for specific guidance.

Diagnosis and Management of Anaphylaxis Caused by Food

What should your healthcare professional understand when diagnosing anaphylaxis caused by food?

Guideline 41 recommends that a healthcare professional diagnosing a patient with anaphylaxis should understand the following:

- Signs and symptoms of anaphylaxis
- Timing of symptoms in relation to exposure to the allergenic food
- Conditions such as asthma that may be associated with food allergy and how these conditions may affect treatment
- The limited value of laboratory tests during an anaphylactic episode

What else you should know: If you are experiencing symptoms of anaphylaxis, seek immediate treatment and tell your healthcare professional if you have a history of allergic reactions to food or have been previously diagnosed with food allergy.

The symptoms of anaphylaxis

The symptoms of anaphylaxis vary and can be difficult to recognize. If you experience any *one* of the following three conditions, you may be experiencing an anaphylactic episode:

- Your symptoms appear within minutes to several hours and involve skin, mucosal tissue (moist lining of the body cavities, such as the nose, mouth, and GI tract), or both. You also have trouble breathing or a drop in blood pressure (pale, weak pulse, confusion, loss of consciousness).
- You have two or more of the following symptoms that occur within minutes to several hours after exposure to a suspected allergenic food:
 - Hives, itchiness, or redness all over your body and swelling of the lips, tongue, or the back of the throat
 - Trouble breathing

- Drop in blood pressure
- GI symptoms such as abdominal cramps or vomiting
- Your blood pressure drops, leading to weakness or fainting, within minutes to several hours after exposure to a food to which you know you have an allergy.

Timing of anaphylaxis

An anaphylactic reaction can occur as:

- A single reaction that occurs immediately after exposure to the allergenic food and gets better with or without treatment within the first minutes to hours. Symptoms do not recur later in relation to that episode.
- Two reactions. The first reaction includes an initial set of symptoms that seem to improve and go away but then reappear. The second reaction can occur between 8 and 72 hours after the first reaction.
- A single, long-lasting reaction that continues for hours or days following the initial reaction.

What else you should know: The delayed use of the drug **epinephrine** has been associated with deaths due to anaphylaxis. Most of these cases are allergic reactions to peanut or tree nuts.

Diseases such as asthma, chronic lung disease, and cardiovascular disease may increase the risk of death from anaphylaxis. Medications such as those that treat high blood pressure also may affect symptom severity and response to treatment.

There are no useful laboratory tests to perform when a patient is experiencing an anaphylactic reaction. After the patient has been successfully treated, laboratory testing may suggest what foods caused the reaction. An oral food challenge test can then be done to confirm the diagnosis of food allergy.

How should anaphylaxis be treated?

Guideline 42 recommends treating anaphylaxis immediately after symptoms begin with an intramuscular (IM) injection of epinephrine.

After epinephrine has been given, the patient may be placed in a reclining position to help restore normal blood flow. A healthcare professional also may give the patient any of the following secondary treatments:

- Medications to help the patient breathe
- Antihistamines to relieve itching and hives
- **Corticosteroids** to prevent pain, swelling, and redness
- Medications to help restore normal blood pressure and maintain a normal heart rate
- Supplemental oxygen therapy
- Intravenous (IV) fluids

What else you should know: 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.

If you or someone you know is having an anaphylactic episode, health experts advise that you do the following as quickly as you can:

- Remove the allergenic food from the mouth or skin.
- If an auto-injector is available, inject epinephrine into the thigh muscle.
- Call 9-1-1 if you are not in a hospital, or summon a resuscitation team in the hospital.

When medical help arrives, the patient should be placed lying down, if possible, with the legs raised and given oxygen and IV fluid.

What else you should know: Antihistamines should only be used as a secondary treatment. Giving antihistamines instead of epinephrine may place you at significantly increased risk for a life-threatening allergic reaction.

How should anaphylaxis caused by food be managed?

Guideline 43 recommends that a healthcare professional should assist patients experiencing anaphylaxis by immediately giving IM epinephrine and then transferring the patient to an emergency facility. The healthcare professional

should observe the patient for 4 to 6 hours or longer and oversee any further necessary treatment.

Before leaving emergency medical care, your healthcare professional should provide 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 of the food allergy
- Education about allergen avoidance, recognizing the symptoms of anaphylaxis, and giving IM epinephrine
- An anaphylaxis emergency action plan (see sample plan on the next page)

What else you should know:

- Always carry your epinephrine auto-injector and know how to use it
- Know how to properly store your auto-injector, make sure the color of the liquid within the injector remains clear (discard if not clear), and know when it expires (usually after 1 year)
- Instruct family and friends on how to use the auto-injector for times when you are unable to inject yourself

Sample Anaphylaxis Emergency Action Plan

(Adapted From JACI Publications[†])

NAME: _____ **AGE:** _____

ALLERGY TO: _____

Asthma: ☐ Yes (high risk for severe reaction) ☐ No

Other health problems besides anaphylaxis: _____

Current medications, if any: _____

Wear medical identification jewelry that identifies the anaphylaxis potential and the food allergen triggers.

SYMPTOMS OF ANAPHYLAXIS INCLUDE:

- MOUTH—itching, swelling of lips and/or tongue
- THROAT*—itching, tightness/closure, hoarseness
- SKIN—itching, hives, redness, swelling
- GUT—vomiting, diarrhea, cramps
- LUNG*—shortness of breath, cough, wheeze
- HEART*—weak pulse, dizziness, passing out

Only a few symptoms may be present. Severity of symptoms can change quickly.

* Some symptoms can be life-threatening! **ACT FAST!**

WHAT TO DO:

1. INJECT EPINEPHRINE IN THIGH USING (check one):

- ☐ EpiPen Jr (0.15 mg) ☐ Adrenaclick 0.15 mg
☐ EpiPen (0.3 mg) ☐ Adrenaclick 0.30 mg

Note: Patients should be allowed to self-carry and self-administer epinephrine.

Other medication/dose/route: _____

IMPORTANT: Asthma inhalers and/or antihistamines can't be depended on in anaphylaxis!

2. CALL 9-1-1 or RESCUE SQUAD (before calling contacts)!

3. EMERGENCY CONTACTS

#1: home _____ work _____ cell _____
 #2: home _____ work _____ cell _____
 #3: home _____ work _____ cell _____

DO NOT HESITATE TO GIVE EPINEPHRINE!

COMMENTS:

 Doctor's Signature/Date

 Parent's Signature (for individuals under age 18 years)/Date

[†]Adapted from *J Allergy Clin Immunol* 1998;102:173–176 and *J Allergy Clin Immunol* 2006;117:367–377.

Glossary

Allergen-specific immunotherapy is a type of treatment in which a patient is given increasing doses of an allergen—for example, milk, egg, or peanut allergen—with the goal of inducing immune tolerance (the ability of the immune system to ignore the presence of one or more food protein allergens while remaining responsive to unrelated proteins).

Allergic contact dermatitis (ACD) is a form of eczema caused by an allergic reaction to food additives or molecules that occur naturally in foods such as mango. The allergic reaction involves immune cells but not IgE antibodies. Symptoms include itching, redness, swelling, and small raised areas on the skin that may or may not contain fluid.

Allergic proctocolitis (AP) is a disorder that occurs in infants who seem healthy but have visible specks or streaks of blood mixed with mucus in their stool. Because there are no laboratory tests to diagnose food-induced AP, a healthcare professional must rely on a medical history showing that certain foods cause symptoms to occur. Many infants have AP while being breast-fed, probably because the mother's milk contains food proteins from her diet that cause an allergic reaction in the infant.

Anaphylaxis is a serious allergic reaction that involves more than one body system (for example, skin and respiratory tract and/or gastrointestinal tract), begins very rapidly, and may cause death.

Angioedema is swelling due to fluid collecting under the skin, in the abdominal organs, or in the upper airway (nose, back of the throat, voicebox). It often occurs with hives and, if caused by food, is typically IgE-mediated. When the upper airway is involved, swelling in the voicebox is an emergency requiring immediate medical attention. Acute angioedema is a common feature of anaphylaxis.

Contact urticaria (hives) occurs when the skin comes in contact with an allergen. The hives can be local or widespread. They are caused by antibodies interacting with allergen proteins or from the direct release of histamine, a molecule involved in allergy.

Corticosteroids are a class of drugs similar to the natural hormone cortisone. These drugs are used to treat inflammatory diseases, such as allergies and asthma.

Cross-reactive foods are foods that are seen as similar to allergenic foods by the immune system. An antibody that reacts with the allergenic food also reacts with the cross-reactive food. For example, a person who is allergic to shrimp also may be allergic to lobster, because shrimp and lobster are closely related foods. In this case, lobster would be a cross-reactive food.

Eczema (atopic dermatitis, atopic eczema) is a disease of the skin. Symptoms include scaly, itchy rashes and blistering, weeping, or peeling of the skin. The causes of the disease are unclear. There may be a problem in the skin's ability to maintain an effective barrier against environmental factors, such as irritants, microbes, and allergens. A person who has a biological parent or sibling with a history of allergy and eczema is at risk for developing food allergy.

Enterocolitis is an inflammation of the colon and small intestine.

Enteropathy is a disease of the intestine.

Eosinophilic esophagitis (EoE) is a disorder associated with food allergy, but how it is related is unclear. It occurs when types of immune cells called eosinophils collect in the esophagus. Both IgE- and non-IgE-mediated mechanisms appear to be involved in EoE.

Epinephrine (adrenaline) is a hormone that increases heart rate, tightens the blood vessels, and opens the airways. Epinephrine is the best treatment for anaphylaxis.

Exercise-induced anaphylaxis is a type of severe, whole-body allergic reaction that occurs during physical activity. Food is the trigger in about one-third of patients who have experienced exercise-induced anaphylaxis. This reaction is likely to recur in patients.

Food protein-induced enterocolitis syndrome (FPIES) is a non-IgE-mediated disorder that usually occurs in young infants. Symptoms include chronic vomiting, diarrhea, and failure to gain weight or height. When the allergenic food is removed from the infant's diet, symptoms disappear. Milk and soy protein are the most common causes, but some studies report reactions to rice, oat, or other cereal grains. A similar condition also has been reported in adults, most often related to eating crustacean shellfish.

Immunotherapy with cross-reactive allergens is a type of treatment in which a patient is given increasing doses of an allergen to induce tolerance to a similar allergen that is causing a reaction.

Noncontact food allergy develops as a result of the food allergen being ingested. Specific IgE antibodies to the food are only made after eating the food, not after simply touching the food.

Systemic contact dermatitis is a rare disorder with symptoms that include eczema, fever, headache, and stuffy nose. To develop systemic contact dermatitis, a person first develops specific IgE antibodies to the allergen through contact with the skin. If the person subsequently swallows the allergen or is exposed to it through a skin cut or puncture, symptoms develop.

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