

# ALLERGIC REACTION

BY DENNIS MEREDITH

The skyrocketing incidence of food allergies demands both new treatments and old-fashioned attention to patients.

**F**or Eric Nguyen, it only took a bite of candy to trigger a medical emergency.

Some 15 years ago, while on vacation in California, the toddler was given a piece of chocolate with nuts, recalls his mother, Theresa. "Within maybe 15 minutes, he was itching like crazy, with hives from top to bottom," she says. Gasping for breath, Eric was rushed to the emergency room for a lifesaving shot of epinephrine.

For Eric's little brother, mere cooking vapors did it. "My husband was cooking shrimp, and I was folding the laundry at the time, and Conrad was just running around, laughing and giggling and having a good time, and I said to my husband, 'His voice is getting higher pitched,'" says Theresa. "The next thing I knew he was flat on the floor, passed out."

As it turned out, all three of Theresa Nguyen's children—Eric, now 17, Tessa, 15, and Conrad, 13—have allergies to such foods as peanuts, eggs, milk, and shellfish. And the recognition that those allergies can be life-threatening has made her a careful, proactive parent.

She has worked closely with their allergists, thoroughly researched causes and treatments for food allergies, learned to cook allergen-free foods, joined support

groups, and educated teachers and nurses in her children's schools about the need to adjust to children with such allergies.

Her kids have had to adjust, too. Conrad cannot even be in the same room with peanuts, so he takes his school lunch outside with a friend. Eric always carries his medicine and his EpiPen. And they all look out for each other—Tessa, for example, is learning to cook treats that her brothers can eat.

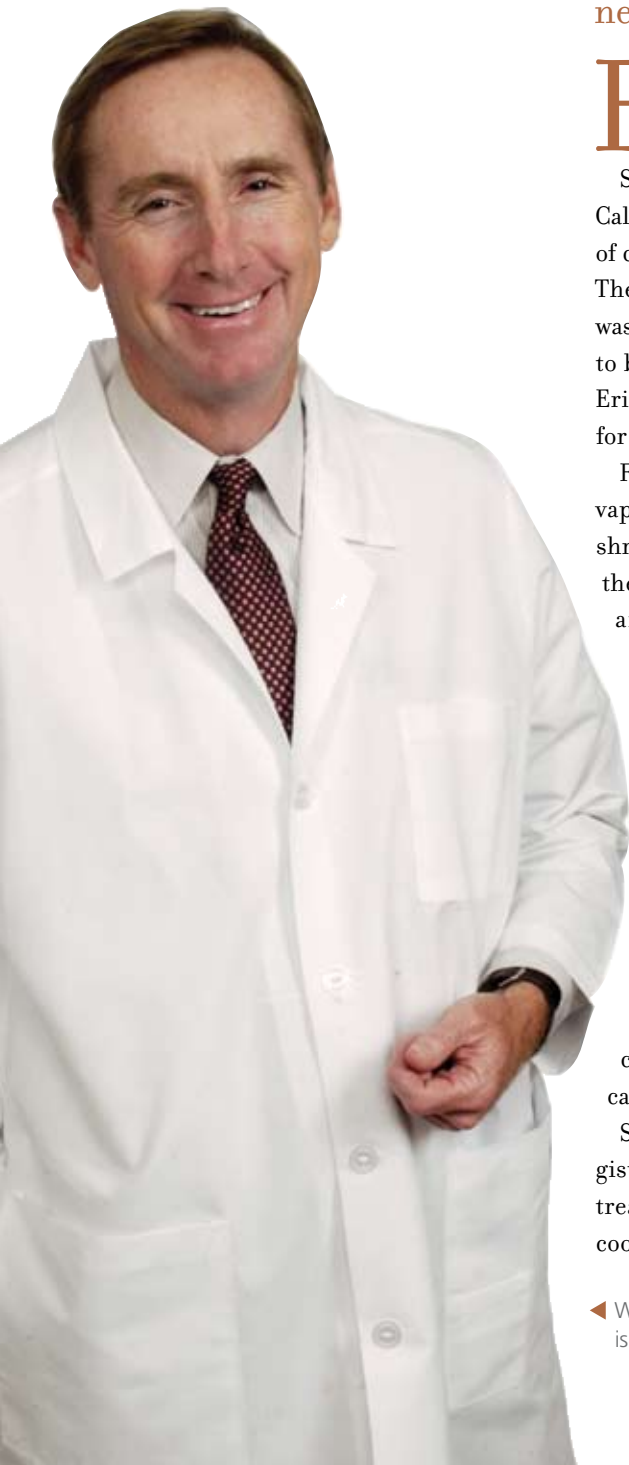
Still, there are problems, sometimes from surprising directions. When the family first moved to North Carolina in 2002, the first physician Theresa saw shocked her with his dismissive attitude.

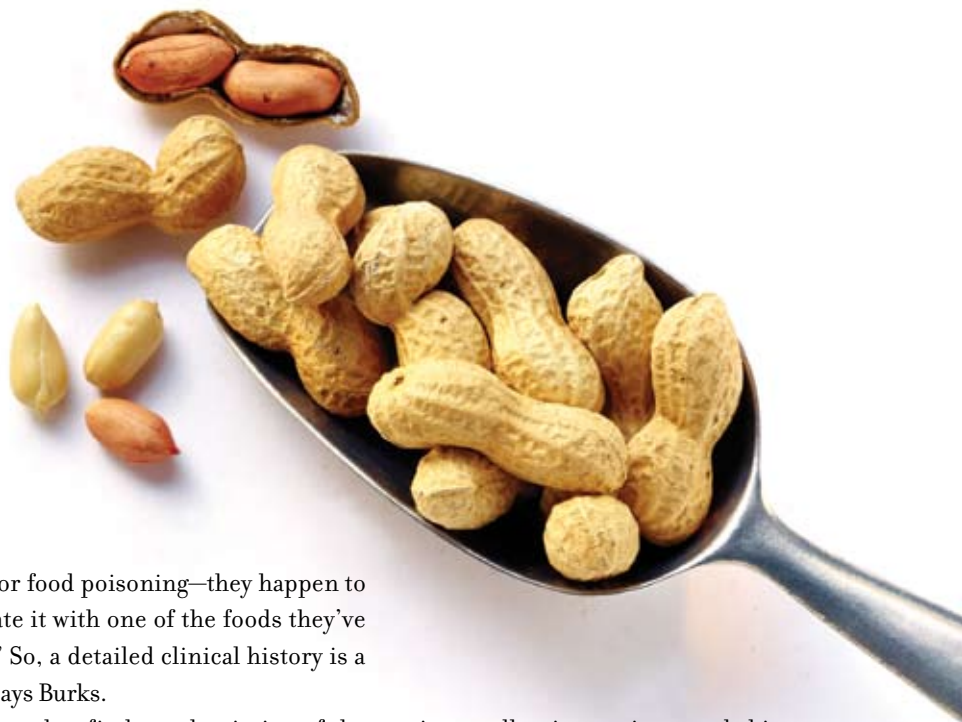
"He didn't want to believe that Conrad had food allergies, or that they were severe," she recalls. "I had all Conrad's records, and it was like the doctor didn't want to accept the paperwork that I had, or that anybody could have a peanut allergy."

Fortunately, she says, after that first disappointing encounter, she sought out Duke's Wesley Burks, MD, chief of pediatric allergy and immunology. In Burks, she says, she found a physician who is not only a research leader in food allergies, but an involved clinician.

"My kids love him, and the thing I like as a parent is that Dr. Burks will talk with the kids himself. I'm sitting there, but his conversation is with the kids, making

◀ Wesley Burks, MD, chief of pediatric allergy and immunology at Duke, is developing a peanut-allergy vaccine.





them feel important and asking them for their contribution in terms of what's bothering them or what they want help with. I think at their age, it's very important to have that kind of a relationship, to feel like they're an important part of making decisions about their life."

#### THE ALLERGY DETECTIVE

To Burks, taking time with each patient is more than just good bedside manner. Such involvement is necessary both to properly diagnose subtle, potentially deadly food allergies and also to help patients develop the extensive lifestyle habits necessary to live with food allergies.

Diagnosis can be challenging, he says, because many people assume that any

teritis or food poisoning—they happen to associate it with one of the foods they've eaten." So, a detailed clinical history is a must, says Burks.

"You need to find out the timing of the ingestion and the clinical symptoms," he says. "Reactions to an allergen such as peanuts occur literally within minutes, not more than an hour or two, after ingestion. So, if the patient ate the food four hours ago and they're having symptoms now, then it's probably not an allergy. Food allergy symptoms are also isolated to the GI tract, the respiratory tract, and the skin. And, they're reproducible. Each time they have the food, they ought to have fairly similar symptoms." Such symptoms, says Burks, include abdominal cramps, vomiting, diarrhea,

triggers allergic reactions, and skin tests for sensitivity.

Food allergies typically appear between 6 and 18 months of age, says Burks, since that is when many youngsters first sample foods such as peanut butter. While children often outgrow certain food allergies, such as to eggs and milk, peanut allergies are usually for life.

#### LIVING WITH ALLERGIES

The first line of defense is avoiding foods containing an allergen such as peanuts, says Burks. That means families

with food allergies must scrutinize the ingredients of everything they eat—not an easy task. The federal Food Allergen Labeling and Consumer Protection Act, which

goes into effect in January 2006, will simplify the task somewhat by requiring such measures as plainer labeling of foods with allergens—but hazards will still abound.

"Peanuts are in foods people don't even realize," Burks says. "For example, homemade chili or Rice Krispies treats may have peanuts. And Asian food may either have peanuts in it, or be cooked in a wok

**"Everyone is watching Dr. Burks's work because it could be lifesaving for millions of kids."**

—Anne Munoz Furlong

reaction to a food is an allergy.

"A lot more people think they're allergic to foods than actually are," he says. "The public perception is that about 30 percent of the population has a food allergy. But the scientific reality is about 6 to 8 percent of children and 3 to 4 percent of adults are allergic. I think what happens is that people eat all kinds of foods, and if they have a reaction—perhaps viral gastroen-

teritis or food poisoning—they happen to associate it with one of the foods they've eaten." So, a detailed clinical history is a must, says Burks.

Besides a careful clinical history, diagnosis also depends on tests to measure the blood level of the immune protein IgE that

skin symptoms like hives or itchy rash, difficulty breathing, and swelling of the lips or the eyes. He counsels parents to report any such symptoms to their physicians, and physicians to pay careful attention to such reports and take appropriate actions to refer patients to allergists.



Duke researchers are clinically testing a desensitization therapy that involves giving patients tiny amounts of egg or peanut protein orally in an attempt to gradually desensitize their immune systems.

that was used to cook peanuts and has protein contamination.”

Families must also develop a response plan should a severe allergic reaction occur—giving the person an antihistamine and epinephrine using an EpiPen and immediately taking them to the nearest emergency room.

This is especially important because allergic reactions are highly unpredictable. The same amount of allergen that caused only mild symptoms in the past can abruptly trigger severe anaphylaxis. “In our fatality studies, we found over and over again that a large number of patients never had a severe reaction until the day they died,” says Anne Munoz Furlong, director of the Food Allergy and Anaphylaxis Network (FAAN).

Teenagers are at especially high risk of death, she says. An important insight into reasons for their heightened risk came from a FAAN survey of parents and teenagers. In that survey, parents said the most difficult part of coping with a food allergy was the fear that their child would die. But the teenagers cited as most difficult not fitting in with their friends and being socially excluded, notes Furlong. “They’re out with friends, they want to be

like everybody else, they’re not expecting to eat a food that will cause a reaction, and they’re not carrying their epinephrine. And so one thing leads to the other.”

Fortunately, says Burks, support groups such as FAAN ([www.foodallergy.org](http://www.foodallergy.org)) offer teens and their families invaluable news and information on coping with food allergies, as well as critical support.

Such support is becoming more important given the enormous increase in food allergies. “The numbers are staggering—eleven million Americans have food allergies and one-and-a-half million have a peanut allergy,” she says. “We conducted prevalence studies of peanut and tree nut allergy in 1997 and 2002 and found in that five-year period the incidence of peanut allergy in children had doubled. This is a lifelong allergy that is responsible for the majority of allergy-related deaths.”

#### PEANUT ALLERGIES PROLIFERATE

What’s behind the alarming rise in peanut allergy? There are two main theories, according to Burks. First, unrecognized allergens may lurk in the processed foods that are increasingly common in the Western diet, heightening sensitivity to peanut and other allergens. Then there’s the “hygiene hypothesis,” which holds that in a Western culture of antibacterial

products and obsession with hygiene, children are not as frequently exposed to microbes and allergens that would “train” their developing immune systems to react appropriately.

The rapid increase and hazards of food allergies mean that “The work that Dr. Burks is doing is very much something that everyone is watching, because it could be lifesaving for millions of kids as they grow into adulthood,” says Furlong.

In their basic studies, Burks and collaborators—including former mentor Hugh Sampson of the Mount Sinai School of Medicine—have identified the predominant allergy-triggering proteins in peanuts. They have also explored the machinery of that allergic reaction, in which the peanut proteins attach to receptors on the surface of immune-system T cells. This attachment activates the T cells, which trigger production of an antibody called immunoglobulin E (IgE). IgE, in turn, becomes the molecular alarm that recognizes peanut proteins when ingested and launches the allergic reaction.

In studies with mice, Burks, Sampson, and their colleagues are experimenting with methods of altering the peanut protein so that it will damp the T cell’s response—heading off subsequent production of IgE—and also not attach to pre-existing

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IgE, tripping the allergic alarm.

Such experiments could lead to a vaccine against peanut allergy, in which the altered protein could be given to allergy sufferers to desensitize them to peanuts. The researchers have just received a grant from the National Institutes of Health to begin testing such a treatment in adults—collaborating with SEER Pharmaceuticals of Southport, Connecticut.

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—Theresa Nguyen

More immediately, the researchers are clinically testing a desensitization therapy that involves giving patients tiny amounts of egg or peanut protein orally in an attempt to gradually desensitize their immune systems.

“So far the therapy has been surprisingly well accepted by the families, and the kids are having really minimal symptoms,” says Burks. “Even those in the trial who have had accidental ingestions to, say, egg, haven’t had reactions to it.” According to Burks, while initial protein doses are the equivalent of about a hundredth of a peanut, after three months, patients can

consume an entire peanut each day, as part of the treatment.

“We know we’re changing their immune system in some way over those three months,” says Burks, “but only longer-term studies will tell us whether the tolerance is permanent.”

Says Furlong, “We’re very excited about this work because it’s a very simple therapy. If it works, the treatment hopefully could

be put into larger clinical trials and then become available to the public in fairly short order.”

Burks and his colleagues are also participating in a clinical trial of the asthma drug omalizumab (trade name Xolair) as a treatment for peanut allergy. This therapy could also find rapid application, given that the drug is already on the market.

Both Burks and Furlong, however, caution that there will be no magic bullet against food allergies. Immunotherapies, drug therapies, vigilance against allergens, and preparation for allergic attacks

will always be part of the arsenal against the disorder.

Still, says Burks, “I think that in five years we’ll have combinations of treatments that will prove effective. And they will be applied according to the individual patient’s needs. What we may do earlier in life, versus for an adult, may be quite different.”

For Nguyen, on the front lines with her children, changing attitudes is also critical—among physicians, school administrators, and managers of any public facilities.

“Food allergies are real, and people with them should be treated no differently than somebody with diabetes or heart disease,” she asserts. “It’s a medical condition that we deal with as part of our life. We don’t want labels; we don’t want sympathy; we want people to be educated and to treat our kids like any other kids.” □

*For more information on Duke clinical studies related to food allergy, particularly peanut, egg, and milk, in both children and adults, please call 919-668-1333 or e-mail [foodallergy@mc.duke.edu](mailto:foodallergy@mc.duke.edu).*