

## The unusual suspects

As food production and preparation moves farther afield, tainted items become hard to avoid

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If you were planning to serve shrimp during the holidays, you might not want to talk to Michael Doyle, director of the Food Safety Center at the University of Georgia. You see, most of the shrimp sold in the United States, as well as the tilapia and some other fish, are grown in ponds on small farms in China and Southeast Asia. Doyle has visited those farms. What they feed the fish doesn't belong in a family newspaper.



(Jonathan Ernst For The Washington Post)

Most of us have long been aware that raw meat is crawling with pathogenic microbes. For most Americans, avoiding it is common sense. Undercooked chicken? Send it back. Steak tartare? Non, merci.

But shrimp? Tilapia? Spinach? Peanut butter? Cookie dough? And how about apple juice?

When 5-year-old Brian Dimock was hospitalized in 1996, with his kidneys shut down and his life hanging by the thinnest of threads, no one dreamed that something as innocuous as a bottle of juice had dropped him. When two investigators from the Centers for Disease Control and Prevention (CDC) came to find out why he'd become infected with a deadly strain of *E. coli* bacteria, they asked the boy's mother, Robin, whether he'd eaten a hamburger.

It wasn't until a neighbor heard on the news that the Odwalla Co. was recalling products containing unpasteurized apple juice that Dimock did a little epidemiological sleuthing of her own. She went back to the bagel shop in Colorado where they'd stopped on the way to Brian's kindergarten a week before he fell ill. There in the refrigerator case was the Odwalla juice she'd picked out for her boy.

Dimock, now living in Potomac, wasn't in the mood to blame anyone. "I was in shock; we were all terrified that we'd lose Brian," she said. After a while, shock turned into anger, then a feeling of uncertainty. "When you lose trust in your food, you lose trust in a lot of things," she said. The Dimocks were parties in a lawsuit against Odwalla that resulted in a settlement.

### A steady stream of illness

Whatever our politics, we increasingly eat from a communal kitchen. Once upon a time, winter holidays and church get-togethers were some of the only times that large numbers of us shared the same food. Now, busy Americans rely heavily upon restaurants and prepared foods, and more and more of that food comes from highly centralized operations. A sloppy job in such a kitchen can cause a nationwide epidemic.

The Odwalla poisonings, which killed one child and sickened at least 65 other people, followed close on the heels of the Jack-in-the-Box outbreak, in which four children died and 700 people got sick after eating undercooked hamburgers tainted with the same microorganism that contaminated Odwalla's juice. Since then, a steady roll call of food-borne illness outbreaks and recalls of contaminated products have awakened consumers to the potential dangers of eating almost anything.

Unlike several of the children poisoned by Odwalla's juice, Brian Dimock was relatively lucky. After three weeks in the hospital being treated for hemolytic uremia syndrome, a potentially deadly attack on the kidneys, he recovered, and the illness certainly didn't stunt his growth. Now nearly 19, Brian is a cheerful, strapping 6-foot-5, with size 15 basketball shoes. Yet hemolytic uremia is associated with a number of long-term health issues, and Brian wonders whether the herniated disk, stomach pains and learning disabilities he has suffered might be linked to his kidney problems. "The thing is, I'll never really know," says Dimock, who now works, of all things, as a delicatessen manager in Northwest Washington.

The last major outbreak, in which salmonella traced to two Peanut Corp. of America plants was responsible for nine deaths and about 700 illnesses, seems finally to have pushed Congress into action. With bipartisan support, both houses are moving to give the Food and Drug Administration more regulatory authority over food safety.

### **Is it getting worse?**

The increasing number of front-page outbreaks and the high-profile critiques of the food system by such writers as Michael Pollan ("The Omnivore's Dilemma") and Eric Schlosser ("Fast Food Nation") can give the impression that the U.S. food supply is spiraling out of control. But is Americans' food, in fact, more dangerous than it was in the day of home-cooked meals? People who have studied the numbers aren't convinced. The food supply is certainly safer than it was 100 years ago, experts agree, and probably a bit safer than it was even two decades ago, according to CDC food safety expert Robert Tauxe. That said, it could be a lot safer -- and there are real reasons to worry.

In the mid-1990s, the CDC began bolstering its surveillance of food-borne illness. One result was the ability to measure whether food was becoming more or less safe. Between 1998 and 2004, illnesses reported by CDC that were caused by *E. Coli*, listeria, campylobacter and a few other bacteria decreased by 25 to 30 percent, perhaps because of improvements in the handling of meat and eggs. Since about 2004, however, the rate of these illnesses has basically remained steady.

"It's an ongoing problem, and consumers need to use reasonable caution in terms of food preparation," says John Glenn Morris, director of the Emerging Pathogens Institute at the University of Florida at Gainesville. "But it's not a 'go screaming down the hall the world is coming to an end' kind of thing."

With improved surveillance, more outbreaks are identified, which can make things seem worse than they were in the past. The CDC tracks food-borne outbreaks primarily through two networks, called FoodNet and PulseNet. FoodNet uses hospital records and microbial testing programs to trace the spread of pathogens, while PulseNet uses genetic fingerprinting to link cases of illness.

In the past, outbreaks were usually identified after a number of people who had eaten in the same restaurant or fast-food chain got sick. PulseNet, which contains microbial genetic data from public health labs across the country, allows scientists to link isolated sicknesses that arose from the same product. Many of the recent outbreaks that have made headlines -- for example, the 2006 illnesses linked to Earthbound Farm's bagged spinach and the 2008 hot-peppers-and-potentially-tomatoes outbreak -- probably would not have been identified and traced without PulseNet, says Morris.

As a result, food seems scarier in contemporary America for two reasons. One is better detection, which makes outbreaks more visible. The other is the wide range of the outbreaks, which makes people realize how a trip to the supermarket can put them at the mercy of a dishonest or sloppy manager at a factory far away -- maybe in Georgia, maybe in China.

"We have an increasingly complex food system. Instead of people buying a head of lettuce and the family getting sick, you get these big cut-lettuce operations in which cross-contamination can spread bacteria across the food system," says Michael Taylor, special assistant to the commissioner for food safety at the Food and Drug Administration. "But better detection is definitely helping us. You can't solve problems if you can't detect them."

The PulseNet system reveals how a centralized food system can allow a single batch of contaminated food to hurt people across the country. A single jalapeño pepper patch in Mexico may have sickened 1,400 people in the District and 43 states over a four-month period in 2008. The salmonella-carrying peanuts affected people around the country and may have contaminated 3,900 separate products.

It is also true that the concentrated production techniques that go with Big Food can help propagate pathogens. The crowded chicken houses, pig farms and cattle feedlots that produce most of the meat eaten in America are viewed by scientists as potential breeding grounds for dangerous bacteria and viruses. Take *E. coli O157:H7*, an organism whose virulence stems from its tendency to stick to cells in the human intestine, where it releases a deadly toxin.

Based on its evolutionary tree, scientists think that O157:H7 probably has existed for hundreds or even thousands of years. But it hadn't been noticed in our food supply until 1982, when a small-town doctor in Oregon reported to the CDC that he'd seen a group of patients with bloody diarrhea. Another group got sick with the same symptoms in Michigan a little later. All had eaten hamburgers at McDonald's, says the University of Georgia's Doyle.

McDonald's hired Doyle to help fix the problem, and he told company officials that one way to be sure to kill O157:H7 was by heating their hamburgers to at least 155 degrees. McDonald's officials grumbled that they would lose customers, but they did what he told them, Doyle says. At the time, FDA guidelines recommended heating to 140 degrees.

Most other hamburger chains kept cooking at lower temperatures in order to produce juicier burgers that attracted customers who didn't like the "hockey pucks" being served at McDonald's. That continued until 1993, when Jack-in-the-Box reaped the consequences of looking the other way -- crippling lawsuits, bankruptcy, \$160 million in losses.

Since then, fast-food restaurants have become more mindful of safe handling practices, and more meat producers have taken pains to test meat before it is packaged. But they still aren't required to do so under federal law. The role that densely packed cattle feedlots played in spreading *E. coli* O157:H7 into the food chain suggests that it's safer to eat the products of organic or small-scale farms that don't use such facilities.

But the O157:H7 seems to be out of the barn -- and into the pasture. While it's almost certain that the organism originally took off in crowded lots where cattle were being fed with corn and other grains that seem to encourage its growth, studies have shown that "natural," grass-fed cattle are now also likely to carry it. In the Earthbound Farm case, genetic fingerprinting indicated that the spinach had been contaminated with bacteria carried by cattle that ranged on land nearby.

Centralization doesn't necessarily mean less-safe food. A well-run centralized industry is arguably easier to police and control than a more decentralized one. For example, a handful of companies produce most of the 12 million tons of tomato paste that makes its way into pizza and spaghetti sauces, ketchup, salsas and other products. This industry's record is very clean, in terms of contamination. (It's helped by the fact that tomato paste's acidity is inhospitable to bacteria.)

When it comes to food, our sense of what's healthy can be at odds with the scientific evidence.

As causes of acute illness, bacteria and viruses are much greater threats than pesticides or genetically modified corn, but many people worry more about the latter. The dangers that science points out may not be the ones that our instincts would tell us to avoid -- such as Chinese-raised fish, which are often fed a diet of chicken waste and even human waste. (Doyle has visited farms where the outhouse is perched on stilts above the fish pond.) Antibiotics go into the mix, to prevent the inherent disease threat.

It's all pretty unwholesome, but is it dangerous? So far, no major food poisonings have been associated with imported fish.

The food that the FDA worries most about right now is fresh produce, which Americans are eating more of after hearing for decades about how healthful it is.

It isn't easy to trace produce, and we don't have a good handle on how bacteria can penetrate fruits and vegetables. Plus, there are difficulties in keeping it safe. When tomatoes are picked warm, washed in bacteria-laden water and then stored cool for long-haul shipments, pathogens on their skins tend to be sucked into the fruit, which may explain why so many types of salmonella poisoning have been associated with that crop.

Food experts see ready-to-eat salads, in particular, as a big headache. "There's no good way to make sure you kill bacteria in bagged lettuce," says Doyle. "They use chlorine washes to kill the microbes, but it doesn't always work."

Fact is, if we all ate nothing but canned and freeze-dried food, we'd probably be reasonably healthy and would never get food poisoning, says Tauxe, who is deputy director of the CDC's Division of Foodborne, Bacterial and Mycotic Diseases. After all, astronauts do it.

"But," he acknowledges, "it would be pretty boring."

*Allen, a Washington writer, is the author of "Ripe: The Search for the Perfect Tomato" (March 2010, Counterpoint).*