What’s happening to our food?

During the past three years alone, there have been more than 16 reported outbreaks of ground beef contaminated with *E. coli* 0157:H7. The deadly bacteria also turned up in fresh spinach and cookie dough. And just last year, *Salmonella*-contaminated peanut products led to the largest food recall in a decade.

Fighting foodborne illness hasn’t been easy.

“We’ve had some success with some bugs like *Listeria,*” says Jeff Bender, director of the Center for Animal Health and Food Safety at the University of Minnesota. “We were making some progress with *E. coli,* but now there’s been an increase in outbreaks and we don’t know why. And it’s quite troubling that we haven’t been able to have more of an impact on *Salmonella.*”

Where does that leave consumers?

*Continued on p. 3.*
Over the next several days, the 51-year-old single mother, who worked three jobs to support herself and her nine-year-old daughter, developed bloody diarrhea so severe that she began to drift in and out of consciousness. A friend rushed her to a hospital emergency room.

Several days later physicians diagnosed what was wrong: a severe infection of *E. coli* O157:H7, a bacterium that is found in the intestinal tract and excrement of animals. Ferus survived, but not before suffering permanent damage to her kidneys.

The spinach that felled Bonita Ferus was picked in a field 1,000 miles away—in San Benito County, California—a few weeks before she ate her salad.

**What Went Wrong?**

A government investigation couldn’t pinpoint exactly how the spinach became contaminated with *E. coli* O157:H7. Maybe wild pigs broke through a wire fence to reach the plants and left manure behind on some leaves. Or maybe rainwater drained from a nearby cattle pasture and splashed cow manure onto the plants.

But no matter how it happened, the contamination mushroomed when the tainted spinach was mixed with spinach from other farms at a processing plant. What started out as a limited number of contaminated plants from one small farm multiplied. According to plant records, 41,760 bags of spinach were packed that day for the U.S. market, and 720 bags were shipped to stores in Canada.

Three weeks later, Wisconsin health officials alerted the Centers for Disease Control and Prevention (CDC) that four people had been diagnosed with hemolytic uremic syndrome (HUS), the serious kidney disease caused by *E. coli* O157:H7.

Within a week—after Oregon, New Mexico, and 17 other states reported new cases of *E. coli* infections—the Food and Drug Administration and the CDC advised consumers not to eat fresh spinach and spinach-containing foods.

By the end of the outbreak, 205 people in 26 states and Canada had become ill, 103 were hospitalized, 31 developed HUS, and 3 died. Sales of spinach and leafy greens plummeted, costing California producers and processors $100 million.

“Our food is generally safe to eat,” says food-safety expert Mansour Samadpour, a former University of Washington microbiologist who runs a private food analysis lab in the Seattle area. “But there is an element of Russian roulette to it.”

Which foods are most likely to make you sick? There is no one culprit. Major outbreaks of *E. coli*, *Salmonella*, and other bugs have been caused by produce grown in the U.S. and abroad, by fresh and processed meat, and by plant and animal foods produced by small companies as well as giant multinationals.

Here’s what the latest outbreaks reveal about weaknesses in the food chain, and what you can do to protect yourself.
What to Do

Thoroughly wash all produce before you eat it, even though that’s no guarantee that it will end up bug-free.

Your best protection, though, is a more vigilant industry. And that’s just what the spinach outbreak may have produced.

“Unfortunately, it often takes an outbreak to motivate the industry to change,” notes University of Minnesota food-safety expert Jeff Bender. “California growers had a significant one that hurt them economically, so they had to come up with how they were going to deal with that in the future.”

Their solution? Produce handlers and shippers formed the California Leafy Green Products Handler Marketing Agreement (LGMA).

“We put a system in place that would verify through mandatory government inspections that farmers and shippers were following good food-safety practices,” says LGMA executive director Scott Horsfall.

USDA-trained auditors who work for the California Department of Food and Agriculture now inspect each LGMA member’s farms and processing facilities at least twice a year. At least one of the visits is unannounced. (Among the rules: wild animals shouldn’t have access to fields where crops are growing and water shouldn’t drain from animal pastures into those fields.)

The industry pays for the audits with a self-imposed tax of $15 to $20 an acre, which works out to pennies per carton, says Horsfall.

“Those who don’t fix even small problems risk being decertified by the program, which will have a huge impact on their business,” he adds.

“I think it’s safe to say that if you want a ticket to this dance, it starts with LGMA certification. So virtually everyone in the California industry is a member.”

Most distributors insist that their suppliers be certified, notes Horsfall, who adds that Canada and Mexico will import California leafy greens only if they’ve been certified.

Between California and Arizona, which has a similar program, roughly 90 percent of U.S.-grown lettuce, spinach, kale, cabbage, chard, arugula, endive, escarole, and spring mix is now covered.

“If you’re buying a packaged salad or a whole head of lettuce or a bunch of spinach, you can now be pretty confident that they have been certified to have been grown under good agricultural practices,” says Horsfall.

How is the program working?

Since the LGMA went into effect in the summer of 2007, several small E. coli outbreaks have been traced back to California greens—including one to romaine lettuce from the Salinas Valley that sickened at least 10 people and one to produce from farms in Santa Barbara that sickened at least 46 people.

But there have been no large outbreaks like the one in 2006 that came from eating contaminated spinach...and no reported deaths.

POT PIES

In February 2007, as battered California growers were trying to figure out how to protect their leafy greens from E. coli and other bugs, the first case of a new food-borne outbreak caused by a rare strain of Salmonella surfaced.

But it would take eight months—and 139 victims in 30 states—before epidemiologists realized that the cases were linked to a single kind of food. Salmonella is normally found in the intestines of animals. The strain responsible for this outbreak had the user-unfriendly name 4,[5],[12]-(pronounced four-five-twelve-eye-minus).

Throughout the spring and summer of 2007, local health departments continued to record three to four cases of the infection every week, but they couldn’t figure out where it was coming from.

In August, it struck Amy Reinert’s 19-month-old daughter Isabelle in Sauk Rapids, Minnesota. The child suddenly became violently ill with unrelenting diarrhea and a temperature that hit 104°F.

After Isabelle suffered a seizure and lost consciousness, Reinert rushed her to the hospital, where the infant was given IV fluids and antibiotics. Doctors sent her home, but the diarrhea persisted for nearly six weeks.

Isabelle had Salmonella, said the doctors, but they didn’t know how she had gotten it.

Isabelle’s illness “was the worst thing I’ve ever experienced as a parent,” Reinert told The Associated Press. “It was horrible.”

In September, the number of reported cases spiked to as many as 12 a day, and by early October, Minnesota state epidemiologists had gathered enough information to finger the culprit: Banquet Turkey Pot Pies.

The pies were manufactured by the food giant ConAgra at a plant in Missouri. At first, the company balked at a recall. It blamed its customers.

“The company believes the issue is likely related to consumer undercooking of the product,” ConAgra declared in a press release.

Doug Powell, a food-safety expert at Kansas State University, says that’s a weak excuse.

“These are 50-cent pot pies that kids coming home from school toss in the microwave. They should have fully cooked ingredients so that kids or anyone else can’t screw it up.”

But the directions on the Banquet package were confusing.

For example, the front panel said “Ready in 4 minutes,” which suggested that the pies simply needed to be reheated. They really required thorough cooking. And there were three different cooking times, depending on the microwave’s wattage.

Yet even following the directions carefully didn’t necessarily result in fully cooked pies, as Powell demonstrated on his Web site (barfblog.com).
After microwaving a pie for 6 minutes, the maximum time specified in the directions, and letting it stand for 3 minutes, as directed, Powell reported that “the interior of the pot pie reaches 148°F,” while “the recommended safe endpoint temperature for poultry is 165°F.”

Amy Reinert said that she cooked the pot pie for her daughter even longer than the directions called for: 7 minutes in the microwave, then 10 minutes in a conventional oven to make the crust crispy. Yet Isabelle still got sick.

Under pressure from health authorities in Oregon and Minnesota and angry consumers, ConAgra eventually relented and issued a recall of 3.4 million pot pies—both the Banquet brand and all the private label pies the company manufactured for stores like Kroger and Albertsons.

By the time the outbreak petered out in December 2007, 401 Salmonella cases in 41 states had been confirmed. Half of the victims suffered bloody diarrhea and a third of them had to be hospitalized.

The CDC estimates that for every reported case of foodborne illness, 38 additional cases go unrecognized or unreported, so it’s likely that more than 15,000 people got sick after eating Banquet Pot Pies.

What Went Wrong?

Which of the more than 25 ingredients in the Banquet Pot Pies was responsible for the Salmonella, and how did it become contaminated?

U.S. Department of Agriculture and ConAgra inspectors were never able to identify the culprit. Like many companies, ConAgra didn’t test ingredients for dangerous bacteria. (It does now, at least for its pot pies.)

What to Do

Always follow cooking instructions. But even that doesn’t guarantee you’ll be safe.

“Consumers need to understand that although some convenience food products look like they’re already cooked, they may not be,” says the University of Minnesota’s Jeff Bender.

ConAgra has replaced the “Ready in 4 Minutes” claim on its label with a warning: “Must be cooked thoroughly.” The label also tells consumers to cook only one pie at a time, and recommends using a conventional oven. The microwave instructions say to cook on high only in an oven rated at 1,100 watts or more, and to insert a meat thermometer into several parts of the cooked pie to make sure the internal temperature reaches 165°F.

(A microwave oven’s wattage is typically printed inside the door or on the back. The American Frozen Food Institute publishes information about wattages of popular ovens at microwaveovenfacts.com.)

GROUND BEEF

In August 2007, while the Banquet plant was manufacturing Salmonella-laden frozen pot pies in Missouri, a Cargill food plant in Wisconsin was turning out frozen ground beef patties contaminated with E. coli O157:H7.

Some of the meat was labeled American Chef’s Selection Angus Beef Patties and was sold at Sam’s Club, which is owned by Wal-Mart. Sharon Smith, a manager of a Dairy Queen about 75 miles northwest of Minneapolis, bought a box and grilled some patties at a Sunday family barbecue. Her 20-year-old daughter, Stephanie, a children’s dance instructor, ate one.

Days later, Stephanie suffered bloody diarrhea, kidney failure, and seizures and convulsions so severe that doctors at the Mayo Clinic were forced to put her into a coma. She regained consciousness nine weeks later, nerve-damaged and paralyzed. Doctors say it’s unlikely that she will ever walk again.

Eventually, 940 people fell sick with E. coli infections linked to meat from the Cargill plant, and the company recalled 845,000 pounds of its ground beef.

What Went Wrong?

“Beef is ground using meat not from one cow, but from various sources,” explains Jeff Bender.

“The meat processor is going to use whatever he can buy and mix it all together, and it will all basically look the same in the end.”

ABC’s “Good Morning America” recently commissioned an independent lab to analyze the DNA from six ground beef packages purchased from major supermarket chains in and around Seattle.

“Each package consisted of the meat from at least four different cows, and sometimes from as many as eight,” says microbiologist Mansour Samadpour, whose IEH Laboratories did the analysis.

Cargill’s contaminated patties were made by grinding beef trimmings from at least three sources: the giant slaughterhouse Greater Omaha Packing, a facility in Texas that slaughters older dairy cows and bulls, and a slaughterhouse in Uruguay where USDA inspectors later found improper testing for E. coli.

The trimmings were combined with a meat mash made by a South Dakota plant. The facility warms fatty meat scraps, centrifuges away much of the fat, and treats what’s left with ammonia to kill E. coli, according to a New York Times investigation last fall.

The U.S. Department of Agriculture doesn’t require companies to test their foods—or the raw materials that go into them—for E. coli O157:H7. And Cargill, like many other meat processors, didn’t test the trimmings or mash before mixing them together.

That explains why the company and the USDA never figured out how the E. coli got into the frozen patties.

In the weeks leading up to the outbreak, USDA inspectors did find un-

Twenty-two-year-old Stephanie Smith suffered permanent nerve damage in 2007 after eating an E. coli-contaminated hamburger patty. She may never walk again.
sanitary conditions in the Cargill plant, according to the Times. They reported seeing large numbers of patties on the floor, grinders encrusted with old bits of meat, and a worker who routinely dumped inedible meat on the floor close to a production line.

But the USDA didn’t penalize the company, and the plant didn’t correct the violations until after the outbreak.

**What to Do**

“With ground beef, you should just assume that *E. coli* can be there, so it’s important to thoroughly cook the product and avoid cross-contamination in the kitchen,” says Bender.

“The doggone bug is just insidious, and there are a number of ways it can get into and contaminate food.”

The only sure way to tell whether meat is cooked enough: use a meat thermometer. “But less than 1 percent of Americans use one on hamburgers or chicken,” notes Kansas State’s Doug Powell. “Everyone uses the color of the meat, and that’s a terrible indicator of temperature.”

What about asking the supermarket’s butcher to grind a whole cut of meat for you? In theory, steaks and chops are safer, since any *E. coli* is likely to be on the surface and would quickly be killed when the meat was cooked. But when the meat is ground, *E. coli* on the surface could end up in the interior, where it could survive if the ground beef didn’t reach a sufficiently high temperature.

**HOT PEPPERS**

In May 2008, the New Mexico Department of Health notified the CDC that it was investigating 19 people with possible food poisoning. Their stools contained a rare strain of *Salmonella* called Saintpaul.

Eventually, the number would swell to more than 1,400 cases and two deaths in 43 states, making it the largest foodborne disease outbreak in the United States in a decade.

“There is no question that the *Salmonella* Saintpaul outbreak investigation has been one of the most complex investigations in recent memory,” the Food and Drug Administration’s David Acheson testified before a Congressional inquiry in the summer of 2008.

During May, June, and July, epidemiologists from New Mexico, Texas, and several other states, working with the CDC, linked the growing number of *Salmonella* illnesses first to raw tomatoes, then to salsa made with raw tomatoes and jalapeño peppers, then to salsa made with canned tomatoes and raw jalapeños, then to corn tortillas, then to any kind of raw jalapeños, and finally to raw jalapeño or Serrano peppers imported from Mexico.

Along the way, the FDA, the CDC, and several states issued a confusing series of advisories. They first warned consumers to avoid red Roma, red plum, or any red round fresh tomatoes. Then they added jalapeño and Serrano peppers from Mexico to the list. Then they lifted the advice to avoid tomatoes.

**What Went Wrong?**

The FDA eventually traced the outbreak to jalapeño peppers that had been contaminated with *Salmonella* Saintpaul in Tamaulipas, Mexico.

“They found the *Salmonella* in water used to wash tomatoes and jalapeños before they were packed for shipment to the States,” notes Doug Powell.

The site likely had never seen an FDA inspector. Of the 216,000 facilities outside the country that produce food for the U.S. market, “FDA inspects only about 1 percent of these establishments each year,” says former FDA associate commissioner William Hubbard.

**What to Do**

“My advice is always to wash produce with plenty of tap water and rub it to the extent you can without damaging the food,” says food microbiologist Larry Beuchat of the University of Georgia’s Center for Food Safety in Griffin. “Microorganisms that are on the surface will likely be dislodged just by that simple step.”

But there’s no guarantee, he adds, “because some pathogens may not be easily removed from some areas of the plant or even be accessible with water or a sanitizer that you might use.”

Of course, there’s no way for consumers to tell if they’ve removed all of the germs.

“Everyone in industry and government says consumers have to do more, which is just silly,” says Powell. “Controlling these kinds of contamination shouldn’t be a consumer problem. Producers and industry need to do better.”

**PEANUTS**

While the Food and Drug Administration was tracking down the source of contaminated jalapeño peppers during the summer of 2008, a deadlier *Salmonella* outbreak was beginning. It would kill at least nine people and lead to the largest food recall in U.S. history.

Shirley Almer, 72, who had overcome both brain and lung cancer, was one of its victims. “Cancer couldn’t claim her,” Almer’s son, Jeffrey, told Congress, “but peanut butter did.”

The Minnesota grandmother died just before Christmas 2008 after eating toast spread with peanut butter while at a rehab facility in Brainered.

Nellie Napier, 85, was another victim. She had survived being deserted by her husband, working for less than a dollar an hour to raise six children as a single mother, and being diagnosed with diabetes.

But the Ohio great-grandmother couldn’t survive a snack of peanut butter and crackers that she ate to control her blood sugar in January 2009.

The peanut butter that Almer and Napier ate was manufactured in a rundown Georgia processing plant that also made peanut paste and peanut meal that scores of companies used in thousands of foods—everything from crackers and cookies to ice cream and fudge.

The Peanut Corporation of America (PCA) operated its plant for eight years despite numerous food-safety violations and at least 12 positive tests for *Salmonella*. And it ran a sister plant in Texas that had never been inspected.

Foods containing PCA peanuts, paste, or meal eventually caused 700 docu-
SAFE AT THE PLATE

How you handle food matters. With enough warmth, moisture, and nutrients, one bacterium that divides every half hour can produce 17 million progeny in 12 hours.

Putting food in the refrigerator or freezer stops most bacteria from growing. Exceptions: Listeria (typically found in lunch meats, hot dogs, and unpasteurized soft cheese) and Yersinia enterocolitica (typically found in undercooked pork and unpasteurized milk) grow at refrigerator temperatures.

RULES FOR LEFTOVERS

2 Hours — 2 Inches — 4 Days

2 Hours from oven to refrigerator.
Refrigerate or freeze leftovers within 2 hours of cooking. Otherwise throw them away.

2 Inches thick to cool it quick.
Store food at a shallow depth—about 2 inches—to speed chilling.

4 Days in the refrigerator—otherwise freeze it.
Use leftovers from the refrigerator within 4 days. Exception: use stuffing and gravy within 2 days. Reheat solid leftovers to 165°F and liquid leftovers to a rolling boil. Toss what you don’t finish.

- Buy fresh-cut produce like half a watermelon or bagged salad greens only if it’s refrigerated or surrounded by ice.
- Separate raw meat, poultry, and seafood from other foods in your shopping cart and in your refrigerator.
- Store perishable fresh fruits and vegetables (like strawberries, lettuce, herbs, and mushrooms) or cut or peeled produce in a clean refrigerator at a temperature of 40°F or below.
- Wash your hands for 20 seconds with warm water and soap before and after preparing any food.
- Wash fruits and vegetables under running water just before eating, cutting, or cooking, even if you plan to peel them. Don’t use soap (it leaves a residue). Produce washes are okay, but not necessary.
- Scrub firm produce like melons and cucumbers with a clean produce brush. Let them air dry before cutting.
- Discard the outer leaves of heads of leafy vegetables like cabbage and lettuce.
- Don’t eat sprouts unless they’re thoroughly cooked. Children, the elderly, pregnant women, and anyone with a weakened immune system should avoid raw sprouts.
- Cooking any food to 160°F will kill any E. coli O157:H7.
- Drink only pasteurized milk, juice, or cider.
- For more information on handling produce safely: www.cfsan.fda.gov/~dms/prodsafe.html.
- For information on E. coli O157:H7: cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm.

Sources: Centers for Disease Control and Prevention, U.S. Department of Agriculture, U.S. Food and Drug Administration, Center for Science in the Public Interest.

What Went Wrong?

“This outbreak is a poster child for everything that goes wrong with the U.S. food-safety system,” says former FDA associate commissioner William Hubbard.

“We say we want a strong FDA and a strong food-safety system, but we have not given FDA the authority and resources it needs to be the agency we want it to be.”

In the 1970s, the FDA conducted 35,000 annual inspections, visiting every food plant every other year.

“Today, with fewer inspectors and far more food plants,” says Hubbard, “the agency can realistically inspect only the 6,000 or so high-risk facilities out there.” In other words, most food plants will never see an FDA inspector.

FDA auditors inspected the PCA plant in Georgia in 2001. And nine times after that, state officials inspected, twice on behalf of the FDA. But the state inspectors missed major violations that they should have caught, says the FDA.

For example, for years the roof leaked so badly that it rained into the plant. (Rainwater could have been the cause of the contamination, depositing bird droppings with Salmonella onto the peanuts.) During that time, PCA knew that its foods had tested positive for Salmonella. Yet the company aggressively advertised to potential customers that its manufac-

Shirley Almer’s son, Jeffery, testifying before Congress in 2009. Almer died after eating Salmonella-contaminated peanut butter.
Turing facility had been rated “superior” by a third-party safety audit.

“These third-party inspections have become an industry that churns out meaningless certificates,” charges food-safety expert Mansour Samadpour.

“Companies pay somebody $1,200 to come in and look at this paper and that paper and then give the company a certificate that says they passed by 96 percent.”

PCA’s third-party inspection was conducted by a friendly inspector from the American Institute of Baking (AIB), who reported no serious safety violations in the plant. (“You lucky guy. I am your AIB auditor,” he wrote to the company shortly before dropping by for his inspection.)

That kind of checkup was good enough for some companies, like Kellogg, which purchased PCA peanut ingredients for its Keebler cookies and some other foods.

Kellogg, which wound up recalling $70 million worth of merchandise, now says that it does its own inspections of suppliers of what the company calls “high-risk” ingredients.

But Nestlé didn’t buy PCA’s promises. The company did its own audits of PCA’s Georgia plant in 2002 and its Texas plant in 2006, and then refused to do business with either.

The Georgia plant was shut down in January 2009. In February, PCA declared bankruptcy.

What to Do

Unfortunately, there’s nothing you can do. There’s no way to tell whether peanut butter or any other prepared food is contaminated. That’s the manufacturers’ job...and the FDA’s.

A mother remembered that her child had eaten raw prepackaged cookie dough, another woman that she had eaten ice cream with cookie dough.

“When cases three, four, and five all confirmed that they ate raw cookie dough, it appeared we had a surprising new possible culprit in our outbreak,” Neil wrote.

CDC microbiologists eventually found E. coli O157:H7 in Nestlé Toll House refrigerated cookie dough. Nestlé recalled 3.6 million packages of the dough and shut down the Virginia plant where it had been manufactured.

But that wasn’t soon enough to prevent at least 80 people in 31 states from getting sick. Thirty-five were hospitalized, including a 57-year-old Nevada woman who started to show signs of hemolytic uremic syndrome a week after she ate the raw dough.

First, Linda Rivera’s kidneys shut down and she went into septic shock. Surgeons had to remove her gallbladder and part of her colon. Then her liver stopped functioning and she lost her ability to speak.

“She’s off the ventilator and is trying to transition from the hospital to a rehabilitation center,” reports her lawyer, Bill Marler.

“You watch a commercial, you go into a store, and you just assume it’s OK to eat,” Rivera’s husband, Richard, told the Los Angeles Times.

Another victim, a four-year-old South Carolina girl, developed hemolytic uremic syndrome, suffered a stroke, and was partially paralyzed.

What Went Wrong?

Nestlé dismantled the Virginia plant and the FDA tested the equipment, the ingredients, and the finished products, but they were never able to determine the source of the E. coli.

Later that summer, the company returned to manufacturing cookie dough. Its packages carried a “New Batch” label and included a warning: “Do not consume raw cookie dough.”

Nestlé also started testing every batch of dough for E. coli O157:H7. Good thing.

This January, the company reported that two new samples of Toll House refrigerated cookie dough made at the same plant tested positive for E. coli.

Nestlé said that it would shut down the plant for two weeks and that when it reopened, the company would “begin using flour that has been heated to kill dangerous bacteria.”

What to Do

“Who would have thought there would be a problem with E. coli in cookie dough?” asks University of Georgia food-safety expert Larry Beuchat.

His bottom line: “Don’t eat raw food products that are intended for cooking or baking.”

In May 2009, the CDC learned of a new cluster of E. coli O157:H7 cases that were popping up in several states.

“We originally suspected ground beef,” CDC epidemiologist Karen Neil wrote on the agency’s blog (blogs.cdc.gov/publichealthmatters). But the victims were generally young and female, “which isn’t what is normally seen with ground-beef-associated outbreaks.”

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