Chickens Bought Nationwide Harbor Salmonella or Campylobacter

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OF BIRDS AND BACTERIA

"Superbugs" that resist the usual antibiotic treatments are nasty, and they could be in your chicken dinner. Here's how to protect yourself.

In the fall of 1997, almost three-fourths of the broilers that Consumer Reports bought in stores nationwide harbored salmonella or campylobacter--the bacteria most likely to give Americans food poisoning. Our new tests revealed contamination in about half of the chickens we analyzed, but there's a dark cloud within that silver lining. Many of the contaminated chickens harbored strains of salmonella and campylobacter that are resistant to antibiotics commonly used against those bugs, which can cause fever, diarrhea, and abdominal cramps.

As a result, the estimated 1.1 million or more Americans sickened each year by undercooked, tainted chicken, or by food that raw chicken juices have touched, may stay sick longer, possibly with more serious illnesses. Doctors may have to prescribe several antibiotics before finding one that works. And patients may have to pay more to be treated.

For what is, to our knowledge, the largest nationally representative analysis of antibiotic resistance in store-bought chicken, we tested 484 fresh, whole broilers bought at supermarkets and health-food stores in 25 cities nationwide last spring.

Represented in our tests were 4 leading brands (Foster Farms, Perdue, Pilgrim's Pride, and Tyson), 14 supermarket brands, 9 premium brands (usually from smaller companies, usually more expensive, labeled as raised without antibiotics, and including free-range and organic brands), and 2 kosher brands.

Our shoppers packed the raw birds in coolers and shipped them overnight to a lab. There, tests determined whether salmonella and campylobacter were present, showed whether those bacteria were resistant to a range of human antibiotics, and measured the chickens' total plate count, an indicator of spoilage. Key findings:

- Campylobacter was present in 42 percent of the chickens, salmonella in 12 percent. Five percent of all chickens had both campylobacter and salmonella; 51 percent had neither.
- No major brand was less contaminated than others overall. Pilgrim's Pride had an exceptionally low incidence of salmonella but, along with Tyson, a higher incidence of campylobacter than most other brands.
All 12 samples from Ranger, a premium brand sold only in the Northwest, were free of campylobacter and salmonella. Ranger's chickens also had among the fewest bacteria that can cause spoilage. Ranger was the only brand that was clean across the board.

Ninety percent of the campylobacter bacteria tested from our chicken and 34 percent of the salmonella showed resistance to one or more antibiotics.

To see whose chickens harbored bacteria and how many of those bacteria remained unaffected by antibiotics, see How contaminated? How resistant?. We've also deciphered the claims you're likely to find on packages of chicken, including free-range, organic, and natural, in Behind the labels.

HOLE IN THE SAFETY NET

Since 1998, a federally mandated system called HACCP (pronounced hass-ip) has been the consumer's main protection against contaminated poultry, meat, and seafood. The initials stand for Hazard Analysis and Critical Control Points, and the system requires chicken producers to spell out where contamination might occur during processing, then build in procedures to prevent it.

After slaughter, for instance, chickens typically become contaminated with bacteria naturally found in their digestive tract, so processors spray carcasses inside and out with an approved disinfectant. Later, the birds are submerged in an icy wash that must chill them from about 100' F to below 40'.

U.S. Department of Agriculture (USDA) inspectors monitor HACCP plans and sit on production lines, rejecting carcasses that pass by with visible signs of illness or filth. They also test random samples for the presence of salmonella, but, unfortunately, not for campylobacter. Studies that could create a standard for campylobacter testing are under way, a USDA spokesman says, but no time frame has been set for putting tests in place.

According to the Centers for Disease Control and Prevention (CDC), there has been a significant reduction in major foodborne illnesses since HACCP was implemented. Still, the system has shortcomings. USDA inspectors at meat and poultry plants are failing to spot faults in HACCP plans, according to a report issued last August by the General Accounting Office, the government watchdog agency. The agency concluded that inspectors missed problems or, when they found them, didn't require quick corrections. "As a result," the report said, "consumers may be unnecessarily exposed to unsafe foods that can cause foodborne illnesses."

HACCP protections have become even more important with the discovery of chickens harboring antibiotic-resistant strains of campylobacter, salmonella, and enterococcus (a germ linked with deadly hospital-acquired infections).

Antibiotics--which may include, experts say, low doses of human drugs such as penicillin, erythromycin, and tetracycline--are given to chickens to prevent or reduce sickness and to speed growth. That practice is based on studies dating to the 1950s that showed animals given antibiotics reach their market weight faster, though perhaps only a day faster, than untreated animals.
When birds actually get sick, perhaps with respiratory disease from *Escherichia coli* picked up from their own droppings, they need full-strength antibiotics for a short time. Flocks are too big for veterinarians to treat individual birds, so all birds may receive antibiotics in their drinking water.

These drugs kill not only the bacteria that cause chickens to become sick, but also some of the many other types of bacteria that normally live inside chickens. Their routine use in so many birds sets the stage for the evolution of drug-resistant microbes that multiply around chicken coops, each of which can hold up to 20,000 birds. Bacteria that survive drug treatment may eventually contaminate carcasses during slaughtering and processing. And if chicken isn't cooked thoroughly enough to kill those bacteria, they could end up on your dinner plate, then colonize your intestines.

Antibiotic-resistant bacteria can enter your system from an outside source, such as undercooked chicken, but bacteria that normally live inside you can also develop resistance--as a result, for example, of the overuse or misuse of prescription antibiotics.

In either case, once the bacteria are in you, they may stay. Some stay for a short time, causing acute illness; others live peacefully in your digestive tract only to cause hard-to-treat disease when transferred to the bloodstream or urinary tract. Danish researchers recently found that when healthy volunteers ate just one meal contaminated with antibiotic-resistant strains of the bacterium *Enterococcus faecium* that came from chicken or pork, the bug lingered in the volunteers' intestinal tracts for up to 14 days. Antibiotic-resistant *E. faecium* does not cause disease if confined to your intestines, but if it escapes into your bloodstream, say during surgery, it can be fatal.

Also disheartening is that resistance can be "catching." Certain bacteria tend to carry their resistance genes on circular strips of DNA, called plasmids, that can move to other bacteria, conferring resistance upon them as well. Antibiotic-resistant bacteria in undercooked chicken, for instance, could pass on their resistance to other bacteria already living in your intestines and make it hard to treat any infection those bacteria might eventually cause.

Although stronger-than-usual or extended doses of antibiotics might eventually kill the bugs in most people, resistant germs can be risky for the very young, the very old, and people with weakened immune systems.

**THE ROOTS OF RESISTANCE**

What the CDC would later call a growing threat to public health was suspected as early as 1952, when two University of California bacteriologists warned, according to an article in *Scientific American*, that "chicks raised on antibiotics may develop resistant bacteria and poison people who eat them." The suspicion was confirmed in 1998, when CDC researchers studied salmonella-tainted chickens and stool samples from people sickened by salmonella. They found strains of the bacterium resistant to the human antibiotic gentamicin, a drug routinely injected into chicken eggs to reduce the chance of bacterial contamination.

In May 1999, investigators in Minnesota published findings that revealed the presence of drug-resistant campylobacter in store-bought chicken. They also found that newer fluoroquinolone
antibiotics, such as the anthrax drug ciprofloxacin (Cipro), had rapidly lost effectiveness against foodborne campylobacter infections in people.

Food and Drug Administration (FDA) investigators concluded in October 2000 that two fluoroquinolone drugs made specifically for animals had spawned drug-resistant campylobacter in chickens' intestinal tracts. One of the drugs was quickly pulled off the market by its maker. The FDA proposed to withdraw approval of the second drug for treating disease in poultry, but its maker, Bayer, has challenged the proposal. Hearings were ongoing as of last fall.

Last September, the agency announced a proposal that companies submitting animal drugs for FDA approval assess their potential to promote resistance in humans.

The Animal Health Institute, which represents manufacturers of animal drugs, says antibiotic resistance is a top concern. But it maintains that the use of antibiotics in food animals poses an extremely small risk to human health and that the increase of bacterial resistance to antibiotics in humans is largely the result of overreliance on antibiotics in human medicine.

A spokesman for the National Chicken Council, an industry group, notes that "a very large percentage" of antibiotics used in chickens are not closely related to any drugs used in humans. The council also points to data indicating that the overall usage of antibiotics in animals of all kinds has been declining since 1999.

Indeed, four of the biggest U.S. poultry producers recently announced that they have reduced their use of certain antibiotics. Last year, Tyson said it had "chosen to discontinue its previously minimal use" of fluoroquinolone antibiotics in broiler chickens. Perdue says it stopped using fluoroquinolones last year.

Foster Farms says it stopped using them approximately five years ago and does not give other important human drugs to chickens except when they're sick. Pilgrim's Pride says it stopped using fluoroquinolones in October 2000.

Margaret Mellon, director of the food and environment program at the Union of Concerned Scientists, a nonprofit environmental group, applauds any cut in antibiotic use. "You don't ever want to use antibiotics where you don't need them," she says. "The rule in antibiotics is, if you use them you lose them." But Mellon points out that industry data don't provide specifics about antibiotic use and production that would be helpful in monitoring ways to prevent drug resistance. The government doesn't collect such data, either. "We know nothing," she says. "We are flying blind."

Moreover, although the use of fluoroquinolones may have tapered off, at least nine other antibiotics are approved for use in both chickens and humans, and some are used in substantial quantities. For example, the Union of Concerned Scientists estimates that more than 380,000 pounds of erythromycin are given to poultry every year to hasten growth and prevent disease.

Our tests support the need for continued concern.
WHAT WE FOUND

Overall, chicken had less bacterial contamination than in our 1997 study, but it was still far from pristine, and there was widespread antibiotic resistance in the bacteria.

**Contamination.** You need swallow just 15 to 20 salmonella bacteria, or about 500 campylobacter, to become ill. Both bugs can cause intestinal distress.

Campylobacter can also cause serious complications, including meningitis, arthritis, and Guillain-Barré syndrome, a severe neurological disorder.

Of all the chickens we tested, 42 percent harbored campylobacter--down from 63 percent in our 1997 tests. Among big brands, incidence ranged from 34 percent, in Perdue, to 56 percent, in Tyson. Supermarket brands as a whole were in the middle of that range.

Twelve percent of all chickens harbored salmonella, as against 16 percent in 1997. Pilgrim's Pride had an extremely low incidence of salmonella: Only 1 percent of its chickens were contaminated. (Pilgrim's Pride was in the news for less laudable reasons last October, when a company it owns recalled more than 27 million pounds of cooked turkey and chicken deli meat. The meat was possibly contaminated with listeria bacteria.)

As a group, the premium chickens were not significantly more free of microbes than others. On average, 33 percent were contaminated with campylobacter; 12 percent with salmonella. That said, the five premium brands labeled organic or free-range had no salmonella, and one of those, the free-range Ranger, also had no campylobacter, at least in the 12 samples we tested. We wondered whether Ranger's birds were treated differently from most others, so, without revealing our results, we checked with Rick Koplowitz, chief executive officer of Draper Valley Farms, which raises Ranger chickens. His answer revealed no unusual HACCP steps that would have made those birds cleaner.

Both kosher brands represented in our tests, Empire and Rubashkin's Aaron's Best, had a relatively high incidence of salmonella: Five of 20 samples of Empire and 1 of 6 samples of Aaron's tested positive. The incidence of campylobacter in Empire's chickens was slightly lower than the average for all chickens. None of Aaron's chickens had campylobacter.

We're still pondering one interesting result from our tests: Of 97 chickens from three processing plants in the Southwest and sold under the Pilgrim's Pride or Tyson name, only one harbored salmonella. That could result, perhaps, from drier weather or different processes in the plants. In any case, a Southwestern origin didn't make a difference when it came to campylobacter.

**Spoilage.** As a check of freshness, we measured total plate count, testing chickens for a broad class of bacteria whose presence in large numbers can make foods smell or feel slimy, though they generally don't make you sick. Only 12 of the broilers we tested, or 2 percent, had a total plate count high enough to suggest they were almost spoiled. That's a bit better than in our 1997 study, when we found 5 percent of birds had nearly gone bad. The 12 in this study came from 6 different brands.
Chickens from the premium brand Bell & Evans were relatively high in spoilage bacteria. It's possible that those birds stayed in the case too long: Some Bell & Evans birds we bought didn't have a sell-by date.

Antibiotic resistance. Despite the chicken producers' announcements and the premium-chicken label claims, antibiotic resistance is still a concern, especially in chickens harboring campylobacter.

Our tests showed that if you are sickened by one of those chickens, two commonly used antibiotics--tetracycline, an older but still important drug used against germs from pneumonia to chlamydia, and erythromycin, an option for patients allergic to penicillin--may not help. In 66 percent of the ampylobacter-contaminated chickens, the bacteria were resistant to tetracycline. In 20 percent, they were resistant to erythromycin.

Your chances of being cured by the usual doses of two fluoroquinolones, ciprofloxacin and ofloxacin, may also be limited. The latest figures from the FDA, reported in 2001, indicate that 11,477 Americans were infected in 1999 by fluoroquinolone-resistant campylobacter in chicken.

Antibiotic-resistant campylobacter appeared even in chickens from the two brands labeled "certified organic," Rosie and Springer Mountain Farms. That isn't as surprising as it might sound. Although antibiotics are not allowed in organic poultry, and farmers must demonstrate to organic certifiers that they have not been used, antibiotic-resistant bacteria are ubiquitous and can persist in the environment for years. In any case, we learned after our tests were finished that Springer Mountain Farms had taken the organic claim off its label.

In 19 percent of the chickens contaminated with salmonella, the bacteria were resistant to ampicillin, used against a dozen or more different bacterial infections. In 17 percent, bacteria were resistant to tetracycline.

Six salmonella-tainted samples from the two kosher-chicken companies showed no antibiotic resistance.

RECOMMENDATIONS

Chicken becomes contaminated long before you put it in your shopping cart. For that reason, the first line of attack needs to be a change in food-safety policies. But because consumers are the last line of defense against unsafe food, we've also listed steps you can take.

What policymakers can do:

- The government should require companies to monitor data on the use of antibiotics in food animals.
- Congress should ban subtherapeutic uses of medically important drugs in poultry and other livestock.
- The USDA should extend its food-safety program to include testing for campylobacter in poultry plants, should better train its inspectors to spot deficiencies, and should require speedy fixes.
What you can do:

- Make chicken one of the last items you buy before heading to the checkout line.
- Pick chicken that is well wrapped and at the bottom of the case, where the temperature should be coolest. Sell-by dates are not a perfect indicator of freshness. We found a few spoiled chickens with sell-by dates as far away as four to six days. If you can find a chicken with a sell-by date seven or more days away, buy it.
- Place chicken in a plastic bag like those in the produce department, to keep its juices from leaking.
- If you'll be cooking the chicken within a couple of days, store it at below 40° F. Otherwise, freeze it.
- Thaw frozen chicken in a refrigerator or microwave oven, never on a counter. Leave it in its packaging and put it on a plate, so juices can't drip.
- Separate raw chicken from other foods. Immediately after preparation, use hot, soapy water and paper towels to wash and dry your hands and anything you or raw chicken might have touched.
- Cook chicken thoroughly to kill harmful bacteria. Whole chicken should be heated to 180° F, breasts to 170°. Use a thermometer; chicken that is no longer pink can still harbor bacteria.
- Don't return cooked meat to the plate that held it raw. And don't use a sauce in which raw chicken has been marinating unless it has been brought to a rolling boil for at least a minute.
- Refrigerate or freeze leftovers within two hours of cooking.