

SAVING ANTIBIOTICS

BY DAVID SCHARDT

Imagine a world where antibiotics don't work and a simple infection can kill you. Far-fetched? Hardly. The problem: bacteria are becoming increasingly immune to antibiotics. Part of the solution may lie in the brand of chicken or beef you buy.

Ken Koehler lay curled up on the floor of his bathroom in late November of 2011, waiting for the diarrhea and stomach pain to finally end.

A week earlier, the 53-year-old business consultant had grilled hamburgers from ground beef he bought at a local supermarket near Portland, Maine.

The beef was contaminated with *Salmonella typhimurium*. But this wasn't your everyday *S. typhimurium*. The bacteria that felled Koehler—along with 19 other people in Maine and six other states, including a one-year-old and a 79-year-old—were resistant to nine different antibiotics.

Koehler had become one of at least 440,000 Americans who are sickened each year after eating or handling food that's tainted with antibiotic-resistant bacteria, according to the Centers for Disease Control and Prevention (CDC).

At least 2,000 of them die from their infections.

Resistance Training

Bacteria evolve rapidly. The more they are exposed to an antibiotic, the more likely it is that those that survive the drug (because they have a natural immunity to it) will flourish.

And because bacteria readily exchange genetic material, antibiotic-resistant bacteria can easily spread their resistance to other bugs.

And that's frightening... because if you happen to become infected with a resistant strain of bacteria, the antibiotics you're

prescribed may not work.

"This summer I cared for two patients with diabetes and urinary tract infections caused by a highly resistant strain of *E. coli*," Barbara Murray, then-president of the Infectious Diseases Society of America, told a U.S. House of Representatives committee in 2014.

"Both had to be admitted to the hospital for intravenous therapy because their infections were resistant to all oral antibiotics. Probably every woman by the age of 60 has had at least one UTI, and there is now no reliable oral anti-

biotic for complicated UTIs."

Keiji Fukuda, the World Health Organization's assistant director-general for health security, warns of a "post-antibiotic era, in which common infections and minor injuries which have been treatable for decades can once again kill."

Ken Koehler didn't die. But after a day and a half of misery, a friend drove him to the emergency room, where nurses gave him three liters

of fluid and took blood, urine, and stool samples to try to figure out what was making him so sick.

Problem Solved?

Most of the antibiotics sold in the United States aren't used to treat sick people. More than half—some estimates go as high as 80 percent—are routinely given to chickens, turkeys, pigs, and cattle to make them grow faster and to prevent disease.

That exposes more bacteria to more antibiotics, which means that more bugs will become resistant to those drugs.

After years of prodding by health advocates, several large poultry producers and restaurant chains are doing—or promising to do—something about that.

Perdue, for example, has ended the routine use of all antibiotics in raising its chickens. Tyson has reduced the routine use of

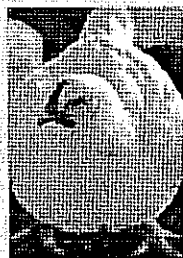
Decoding Labels

Meat with a **green** or **blue** claim comes from animals that never got antibiotics, though companies aren't required to get blue claims verified by an independent third party. If a label says "USDA Process Verified," make sure it also says that antibiotics weren't used to prevent illness or to promote growth.

Label Claim	Antibiotic Use			Is claim verified?
	Never	Allowed	Only for sick animals	
USDA Organic	•			Yes
American Grassfed Association	•			Yes
Food Alliance Grassfed	•			Yes
"No antibiotics added"	•			Voluntary
"Raised without antibiotics"	•			Voluntary
Animal Welfare Approved			•	Yes
Certified Humane			•	Yes
Food Alliance			•	Yes
American Humane Association			•	Yes
"100% grass fed"		•		No
"Natural"		•		No
"Humanely raised"		•		No

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Detoxing the Flocks



Reducing antibiotics in a farming system that's dependent on them "is not something that you can simply turn a switch on to implement," says Perdue veterinarian Bruce Stewart-Brown.

It took Perdue a decade of trial and error before the company could raise 95 percent of

its chickens without using any antibiotics. (Birds that are given antibiotics for illness aren't sold under the Perdue brand.) One of the ways Perdue sidesteps the need for the drugs: it prepares vaccines in "clean rooms" at the hatcheries. And it has eliminated animal byproducts from its feed. "All vegetable protein makes a more consistent diet that helps eliminate the need for antibiotics," notes Stewart-Brown.

Chickens raised without antibiotics take a few more days to grow to market weight, which is one reason why they typically command a higher price.

to tylosin, it also becomes resistant to erythromycin," explains Price. "That's the kind of loophole we need to avoid."

Companies should also be willing to let a third party—preferably the U.S. Department of Agriculture—verify that they're not using antibiotics, adds Price.

It's not just poultry. Antibiotics are also given to cows and pigs. "And stopping the routine use of antibiotics in those animals is going to be much harder," says Price.

Why? Cattle and pigs are more valuable per head, he notes, "so there's more risk—or at least perceived risk—in elim-



Ken Koehler: An antibiotic-resistant infection from ground beef "changed my life."

inating non-therapeutic antibiotics."

And since cows and pigs live much longer than chickens, farmers need to keep the animals healthy for a longer time.

One of the Lucky Ones

Ken Koehler was lucky. He was a victim of a multi-state food poisoning outbreak, rather than a lone victim of a random bug. But the morning after Koehler's ER visit, when a doctor from the hospital called, he didn't know that.

"I was instructed to take this five-day course of Cipro," he remembers. "I came later to find out that I was one of the last people infected from the outbreak, and that they had already figured out that no other antibiotic worked."

Luckily, Koehler wasn't allergic to Cipro. "A guy in New York who was allergic was in

the hospital for eight months," Koehler says he was told.

Chicken Surprise

In the summer of 2013, *Consumer Reports* magazine bought raw chicken breasts from stores in 26 states.¹ Of the 316 samples it tested, 80 percent were conventional (presumably they were raised with antibiotics) and the rest either had "raised without antibiotics" labels or were certified organic.

(Organic chickens can't be treated with antibiotics except on the day before the eggs hatch, when hatcheries can use an antibiotic on the needle that pierces the shell and injects the chicks with vaccines against a host of diseases.)

Consumer Reports' results: roughly half of the samples tested positive for at least one multidrug-resistant bacterium. ("Multidrug" means that a bug is resistant to at least three different classes of antibiotics.)

Here's the puzzler: the no-antibiotics and organic chickens were only slightly less likely to have multidrug-resistant bacteria than the conventional chickens.

And when Price analyzed *E. coli* in samples of raw chicken from 15 New York City stores, "the results surprised us." Organic and raised-without-antibiotics chickens were no more free of antibiotic-resistant bacteria than con-

human antibiotics by 80 percent. And Panera and Chipotle now only serve chicken that has been raised without the routine use of antibiotics.

"Routine" is the key.

"We need to look closely at what these companies say they are doing, because some of them are making strong, meaningful promises while others are offering weaker intentions," says Lance Price, professor of environmental and occupational health at the George Washington University School of Public Health.

Take multinational food giant Cargill. "Cargill Turkey says 'NO' to growth-promoting antibiotics," trumpeted the headline of its July 2014 press release.

People who read the release may have missed the words in parentheses in a list of steps the company is taking: "Antibiotics only used for treatment of illness and disease prevention."

That kind of halfway change isn't good enough.

"Using antibiotics to prevent disease means that the drugs could routinely be given to the animals," says Price. "Companies should say that they will not use any antibiotics that are important for human health except to treat sick animals under the care of a veterinarian."

(The Food and Drug Administration acknowledged the potential harm from antibiotic resistance some 40 years ago, but its guidelines for meat and poultry producers are voluntary, have loopholes, and are hard to police.)

Which antibiotics producers use also matters.

"The list of the off-limits antibiotics should be based on the recommendations of the World Health Organization or at least the CDC, so that companies don't have wiggle room," says Price.

For example, tylosin is on the WHO's list, even though it's not an important human antibiotic. It's there because tylosin is a chemical cousin of erythromycin, which is used to treat people.

"If a bacterium becomes resistant

At the Supermarket

Producers of beef, pork, or chicken that are raised without routinely using antibiotics include:

Applegate
Bell & Evans
Coleman
Estancia Beef
Murray's
Niman Ranch
Perdue

Private-label brands of chicken or beef that are raised without routinely using antibiotics include:

Food Lion (*Nature's Place*)
Kroger (*Simple Truth*)
Safeway (*O Organics, Open Nature*)
Trader Joe's (*All Natural, Organic*)
Whole Foods (*all meat & poultry*)

Source: Companies.

ventionally raised chickens.² And kosher chickens were twice as likely to carry antibiotic-resistant bacteria. (Kosher rules don't prohibit routine use of antibiotics.)

The results of Price's new, still-unpublished study of chicken bought in Arizona are consistent with the New York results, he adds.

Why are so many chickens that are raised without antibiotics turning up with antibiotic-resistant bacteria?

"We're concerned that some companies are trying to cash in on the raised-without-antibiotics market without changing over to dedicated housing and slaughter facilities," says Price.

"If you're using the same environment where there's been a history of routine antibiotic use, animals are going to pick up drug-resistant bacteria. You need to be clean through the whole process, including the slaughtering facilities."

Some companies appear to be doing that. The *Consumer Reports* study found that Perdue chickens—and Price's study found that Tyson chickens—were less likely to contain antibiotic-resistant bacteria than other brands.

Ground beef is a somewhat differ-

ent story. In 2015, *Consumer Reports* analyzed 300 packages of ground beef from 26 cities.³

Eighteen percent of the conventional samples had bacteria that were resistant to three or more classes of antibiotics, compared with just 6 percent of the samples of grass-fed beef that were raised without antibiotics.

"When it comes to ground beef, grass-fed means less resistance," says Price.

Slow Recovery

Even after Ken Koehler finished his Ci-pro, "I was pretty much bedridden for a few weeks," he remembers.

"It took me a month before I could even eat a meal. I was just living on fluids. To be able to eat three squares a day, it was probably three months."

Koehler, who lost 23 pounds, later learned that he likely didn't become ill from eating the tainted ground beef, but from shaping the raw meat into patties.

"The CDC told me that I probably got sick by handling the meat, not ingesting it. Cooking it thoroughly on the grill would have killed the bacteria." That might explain why his

At Chain Restaurants

Which restaurants are curbing the use of important human antibiotics in animals? Six nonprofit organizations put 25 of the largest fast-food and fast casual chains under the microscope. Here's their report card.

A	Chipotle Mexican Grill	Talera
B	Chick-fil-A	
C	Dunkin' Donuts	McDonald's
D	Wendy's	Burger King
E	Subway	Taco Bell
F	Jack in the Box	Arby's
	Papa John's	Little Caesars
	Applebee's	Sonic Drive-Ins
		Olive Garden
		Iliad
		Starbucks
		Outback Steakhouse
		Chili's

To read the full report, go to nrdc.org/food/files/restaurants-antibiotic-use-report.pdf.

girlfriend's daughter, who also ate one of the burgers, didn't get sick.

As it turned out, some uncooked ground beef that Koehler had stored in his freezer was "the smoking gun" that eventually led the supermarket where he bought the meat—Hannaford Bros.—to issue a recall.

What happened "changed my life forever," says Koehler. "I'm much more careful now about how I approach food."

He still buys hamburger meat, but only from local farms. "And when I see people pick up a package of ground beef in a supermarket, I tell them my story."

¹ consumerreports.org/cro/magazine/2014/02/the-high-cost-of-cheap-chicken.

² *F1000Research* 2: 155, 2013.

³ consumerreports.org/cro/food/how-safe-is-your-ground-beef.

The Bottom Line

■ Whenever possible, choose meat and poultry that was raised without antibiotics.

■ Wash your hands and all surfaces thoroughly after handling raw meat or poultry, and always cook it thoroughly.