THE NEXT TIME you’re offered a prescription for antibiotics and ask yourself, “What harm could it do?” think about Peggy Lillis.

Five years ago, the 56-year-old kindergarten teacher from Brooklyn, N.Y., was given the antibiotic clindamycin, which was supposed to prevent a dental infection. Instead, the drug wiped out much of the “good” bacteria in her gut that normally keeps “bad” bacteria in check. Without that protection, harmful bacteria in her belly ran rampant, triggering an intestinal infection so severe that doctors had to perform emergency surgery to remove her colon. Despite that desperate, last-ditch effort, “within 10 days of taking those pills, my mother was dead,” says Lillis’ son, Christian.

Or consider Zachary Doubek, a rambunctious 12-year-old from New Brunswick, N.J. After a baseball game, Zachary came home complaining of knee pain that worsened overnight and quickly escalated. His doctor initially prescribed an antibiotic that failed to bring the problem under control. Zachary had the bad luck of running into a strain of bacteria that, after repeated exposure to antibiotics, had evolved, developing defenses against the drugs.

Zachary’s infection raced through his body, forcing doctors to put him in a medically induced coma until they could rein it in with vancomycin, a powerful antibiotic that, luckily, still worked against the germ. Zachary survived, but a year and six surgeries later, he still walks with a limp from the ordeal. “We may never know how he got infected,” says his mother, Marnie Doubek, M.D., a family physician, “but we know that the antibiotic that should have first helped him didn’t work.”

Raising the Alarm

Peggy Lillis’ and Zachary Doubek’s stories are all too common. Though antibiotics have saved millions of lives since penicillin was first prescribed almost 75 years ago, it’s now clear that unrestrained use of the drugs also has unexpected and dangerous consequences, sickening at least 2.25 million Americans each year and killing 37,000.

That harm comes in two main ways. First, as in Lillis’ case, antibiotics can disrupt the body’s natural balance of good and bad bacteria, which research
A person goes to a hospital for care and is infected by bacteria resistant to antibiotics, possibly bringing home the infection when he’s discharged.

A person goes to a doctor or dentist and is prescribed antibiotics. That can breed bacteria resistant to the drug, so it is less likely to work later when it’s needed.

Animals are fed antibiotics, mostly to help them grow faster and prevent disease. That can breed resistant bacteria, which get passed to people via food or through water and runoff to the environment.

How Superbugs Spread Through the Community

Antibiotic-resistant bacteria can develop any time the drugs are used on farms, in hospitals, or in doctor’s or dentist’s offices.


shows is surprisingly important to human health. Lillis was killed by one such bad bug, the bacteria C. difficile. At least 250,000 people per year now develop C. diff infections linked to antibiotic use, and 14,000 die as a result.

Second, overuse of antibiotics breeds “superbugs”—bacteria that often can’t be controlled even with multiple drugs. (See “From Bug to Superbug,” on page 23.) Doubek was a victim of MRSA (methicillin-resistant staphylococcus aureus), a bacteria once confined to hospitals that has now spread into the community, including nail salons, locker rooms, and playgrounds—where Doubek may have picked up his infection. MRSA and other resistant bacteria infect at least 2 million people in the U.S. annually, killing at least 23,000.

As alarming as those numbers are, experts say things could get much worse, and fast. The Centers for Disease Control and Prevention has sounded the alarm about two threats: CRE (carbapenem-resistant enterobacteriaceae), which—when it gets into the bloodstream—kills almost 50 percent of hospital patients who are infected; and shigella, a highly contagious bacteria that overseas travelers often bring home and that is now resistant to several common antibiotics, raising fears of an outbreak in the U.S.

The World Health Organization and the European Union call the rise of resistant bacteria one of the world’s most serious health crises, putting us on the verge of a “post-antibiotic era.” In June, President Obama convened a forum on the crisis at the White House attended by 150 organizations, including Consumer Reports. And his 2016 proposed budget included $1.2 billion for combatting resistant infections.

A New Approach to Antibiotics

“We have to act now to reverse this problem,” says Thomas R. Frieden, M.D., director of the CDC. “If we lose the ability to treat infections, we lose the ability to safely do much of what we take for granted in modern medicine.”

Part of the solution may come from developing new antibiotics. But experts say it’s even more important that doctors, hospitals, and consumers develop a new attitude toward the drugs, learning when antibiotics should—and shouldn’t—be used.

That applies even to how the drugs are used on farms: About 80 percent of the antibiotics in the U.S. are fed to
chickens, cows, and other food animals, mostly to speed their growth and to prevent disease.

Frieden and others say the problem, although complex, is fixable—if we act now. Here, what you need to know about antibiotic overuse and its consequences, and how to protect yourself and your family:

**Miracle Drugs Gone Awry**

“Antibiotics really are miracle drugs. Patients believe that. I believe that,” says Lauri Hicks, D.O., head of the CDC’s program Get Smart: Know When Antibiotics Work.

Ask anyone who has had a brush with bacterial meningitis. About 85 percent of people treated with antibiotics for that infection survive; without the drugs, almost all die. In fact, many of the advances of modern medicine—organ transplants, invasive surgery, cancer therapy, among others—depend on antibiotics. For example, without the drugs up to 40 percent of people undergoing total hip-replacement would develop an infection and almost one-third of those would die.

But antibiotics have become a victim of their own success. “The drugs seemed so effective that we started using them even in cases when they shouldn’t be,” Hicks says. Overall, in fact, the CDC estimates that up to half of all antibiotics used in this country are prescribed unnecessarily or used inappropriately.

**The Many Forms of Misuse**

Antibiotic misuse happens in many ways:

- **Using the drugs to treat illnesses caused by viruses, not bacteria.** Doctors know, of course, that antibiotics don’t work against viruses, like those that cause the common cold or the flu. But in some cases tests can’t help distinguish between the two. Or doctors may feel that they just don’t have the time to determine the cause, and figure “it’s better to be safe than sorry.” One recent study of 204 doctors suggested some physicians may be more likely to prescribe antibiotics for viral infections toward the end of their office hours—a sign they may be taking the easy route to handling patients’ complaints.

- **Prescribing the drugs just to satisfy patient demand.** Doctors may also just want to make their patients happy—and patients often want antibiotics. For example, in a recent Consumer Reports poll of 1,000 adults, one in five people who got an antibiotic had asked for the drug. “I often have patients who ask for antibiotics,” says Marnie Doubek, who sees many sick children in her practice. “So I understand the pressure to just say OK. But now, especially with Zachary’s experience, no way.”

- **Rushing to drugs too quickly.** Even when infections are caused by bacteria, doctors sometimes prescribe antibiotics when it might be wise to wait a few days to see whether mild symptoms clear up on their own. One example: ear infections in children older than 6 months. When mild, those infections often improve untreated. But as many parents know, a crying child can be a powerful motivator to seek a quick fix even if, in the long run, repeated use of antibiotics may be more likely to cause problems than solve them.

- **Abusing broad-spectrum drugs.** When antibiotics are called for, doctors often reach too quickly for “broad
spectrum” ones that attack multiple bacteria types at once. That shotgun approach is not only more likely to breed resistance but also to wipe out protective bacteria. The drug that triggered Lillis’ C. difficile infection, clindamycin, is one such drug.

Those drugs were developed with the thought that “killing as many bugs as you possibly can in every patient” was a good idea, says John Powers, M.D., former lead medical officer of Antimicrobial Drug Development and Resistance Initiatives at the Food and Drug Administration.

Doctors loved the broad-spectrum antibiotics and, spurred by aggressive marketing from drug companies, began using them for common problems such as ear and sinus infections. Given that widespread use, “it’s hardly a shock that we now have a problem with resistance and C. difficile,” Powers says.

**The Quest for New Drugs**

Many of those broad-spectrum drugs were introduced 30 years ago, when antibiotic development was in its heyday. More than 50 antibiotics were introduced in the 1980s and 1990s. But that once-steady drug pipeline has slowed to a trickle, for several reasons.

One is that coming up with new classes of antibiotics that target superbugs is

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**FROM BUG TO SUPERBUG: HOW BACTERIA ARMOR UP**

“We all have bacteria living in and on our bodies,” says Lauri Hicks, D.O., of the Centers for Disease Control and Prevention. When we take an antibiotic, some bacteria survive—and evolve—so that the next time they encounter that drug, it might not work against them. “It’s a matter of survival,” Hicks says.

Every time we develop a new antibiotic, bacteria evolve to shrug it off. “The ability of bacteria to adapt allows them to become resistant very quickly,” says Jeffrey S. Gerber, M.D., an infectious disease expert at the Children's Hospital of Philadelphia. “Bacteria have found a way to become resistant to every antibiotic man has made,” he adds.

The new, resistant bacteria may not make you sick right away but could lead to a future infection that is more difficult for doctors to treat.

And you can spread the bacteria to surfaces you touch or to people you shake hands with, kiss, or hug. So you can pass the bacteria on to friends, family members, co-workers, and others, spreading those bugs throughout your community even if you never get sick yourself.

As the bacteria circulate, they can become resistant to multiple antibiotics. Several of those “superbugs” have developed the ability to fend off all or almost all of the drugs we have.

“Entire intensive care units have had to be shut down because of these superbugs,” Gerber says. As a result, “people are dying of infections that we have zero antibiotics left to treat.”

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**ACT**

*Share your infection story.*

Go to SafePatientProject.org/share-your-story.

*Learn when antibiotics are, and aren’t, needed.* Go to ConsumerHealthChoices.org/antibiotics.

*Help stop the use of antibiotics in healthy food animals.* Go to NotInMyFood.org.

*Read our complete coverage of America’s Antibiotic Crisis.* Go to ConsumerReports.org/superbugs.

*Follow @ConsumerReports on Twitter and Facebook, and help us stop the spread of superbugs.* #SlamSuperbugs.
proving to be a tough scientific puzzle. Most of the new antibiotics introduced since 2000 have been minor tweaks to existing drugs, not major breakthroughs.

The other big reason? Money. “Developing antibiotics is not that profitable,” says Henry Chambers, M.D., an infectious disease specialist at the University of California San Francisco School of Medicine. Drug companies would rather focus on medications that many people take for a long time, he explains, because the market, and profit potential, is larger.

The government is trying to sweeten the economic incentive. In 2012, the FDA began to fast-track certain antibiotics and told drugmakers that patent protection on the drugs would last an additional five years. Since then, 49 new drugs have entered the pipeline’s fast lane and six have been approved.

The FDA has proposed further streamlining—allowing companies to test drugs using smaller, shorter, or fewer studies—for antibiotics that are meant to treat serious infections in patients with no other options. Legislation now with Congress would also lower the requirements needed to get new antibiotics on the market.

### The Danger of ‘Fast Track’ Drugs

That approach means the FDA “is willing to accept less safety and efficacy data,” acknowledges Edward Cox, M.D., director of the Office of Antimicrobial Products in the FDA’s Center for Drug Evaluation and Research. But he says that’s a trade-off that many doctors are willing to make.

Still, some researchers and patient advocates worry about fast-tracking drugs. “We absolutely need new antibiotics,” says Lisa McGiffert, director of Consumer Reports’ Safe Patient Project. “But that doesn’t justify lowering the bar on the standards for drug approval. These can be dangerous drugs, so they should be thoroughly tested for safety and efficacy.

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**Avoid Germs at the Gym**

About 2 out of every 100 Americans carry potentially deadly MRSA bacteria on their bodies. Athletes, particularly those involved in contact sports, are even more likely to harbor the bacteria—in part because players share the bug when they come in contact with each other. In addition, MRSA can live for days on exercise equipment, benches, and mats in gyms and locker rooms. So take these steps to protect yourself when working out in a gym:

- Wash your hands with soap and water before and after you work out. If that’s not available, use an alcohol-based hand sanitizer.
- Wipe down equipment with alcohol-based sprays or wipes.
- Place a barrier such as clothes or a clean towel between your skin and exercise equipment, benches, and mats.
- Keep cuts and scrapes clean and bandaged until healed.
- Shower immediately after you exercise.
- Never share personal items that touch bare skin, including towels, mats, bar soap, and razors.

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**A History of Overuse**

Alexander Fleming discovered penicillin in 1928, doctors first prescribed it in the U.S. in 1942, and by 1945 Fleming was already warning about the risk of resistant bacteria—a prediction that became all too true over the following decades.

- **Total pounds of antibiotics produced, for use in humans and animals, in the U.S.**
- **1946** Feeding antibiotics to farm animals shown to speed their weight gain
- **1950**
- **1960**
- **1970**
- **1980**
- **1985**
- **1942** First U.S. patient treated with penicillin
- **1945**
- **1947** Penicillin-resistant infections reported
- **1955**
- **1958** Vancomycin approved to treat penicillin-resistant bacteria
- **1965**
- **1968** MRSA, a bacteria resistant to several antibiotics, first identified in a U.S. hospital patient
- **1975**
- **1977** FDA proposes revoking uses of penicillin and tetracyclines in animal feed
- **1986** Vancomycin-resistant enterococci (VRE) reported

Sources: 1944 to 1994, data from the National Academy of Sciences with additional figures from the U.S. International Trade Commission. Because no similar data were collected post-1994,
before we unleash them on the public.”

Perhaps the biggest concern is that even if effective new antibiotics make it to market, they may not provide much long-term help if health care professionals and patients continue to misuse the drugs. And, Chambers says, there may be pressure on doctors to use the drugs widely, despite the growing threat of antibiotic resistance.

Some pressure may come from drug companies, which have a history of marketing new drugs aggressively, and even illegally. Pfizer agreed to pay $1 billion in 2009 to settle allegations that the company illegally promoted four drugs, including the antibiotic linezolid (Zyvox), which was pushed to treat forms of MRSA for which it was not approved.

The Real Antibiotic Solution

With education and a little prodding, doctors have shown that they can do better.

One study, in the Journal of the American Medical Association, found that doctors who attended a 1-hour session on guidelines for treating common upper-respiratory tract infections and then received feedback on their prescribing habits, cut their use of broad-spectrum antibiotics almost in half. Inappropriate prescriptions for sinus infections and pneumonia were cut by 50 to 75 percent.

Several medical organizations, such as the American Academy of Family Physicians and the American Academy of Pediatrics, have distributed guidelines on appropriate antibiotic use to their members. In some cases, that advice is incorporated into electronic medical records, so doctors are alerted if they prescribe a drug inappropriately.

Still, patients play a key role, too, by helping to make sure those drugs are used only when necessary, and by avoiding infections in the first place. Here are a few guidelines to follow:

• Don’t push for antibiotics. If your doctor says you don’t have a bacterial infection, don’t insist. Ask about other treatments that can help you feel better, such as a pain reliever, throat soother, antihistamine, or decongestant.

• Ask whether you can fight it off on your own. If bacteria are the cause but your symptoms are mild, ask about trying

### 6 Myths About Antibiotics

**Myth #1.** They can cure colds and the flu. Antibiotics work against only bacterial infections, not viral ones such as colds, the flu, most sore throats, and many sinus and ear infections.

**Myth #2.** They have few side effects. Almost 1 in 5 emergency-room visits for drug side effects stems from antibiotics; in children, the drugs are the leading cause of such visits. Effects include diarrhea, yeast infections, and in rare cases, nerve damage, torn tendons, and allergic reactions that include rashes, swelling of the face or throat, and breathing problems. And the drugs can kill off good bacteria, increasing the risk of some infections.

**Myth #3.** A ‘full course’ lasts at least a week. Not always. A shorter course can work for some infections, such as certain urinary tract, ear, and sinus infections. So ask your doctor for the shortest course of antibiotics necessary to treat your infection.

**Myth #4.** It’s OK to take leftover medication. Nope. First, you may not need an antibiotic at all. And if you do, the leftovers may not be the right type or dose for your infection. Taking them could allow the growth of harmful bacteria. Return unused antibiotics to the pharmacy or mix them with coffee grounds or cat litter and toss in the trash.

**Myth #5.** All bacterial infections require drugs. Mild ones sometimes clear up on their own. So ask your doctor whether you could try waiting it out.

**Myth #6.** The more bacteria a drug kills, the better. Wrong. So-called broad-spectrum drugs, such as ceftriaxone, ciprofloxacin and levofloxacin, should be reserved for hard-to-treat infections.

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Consumer Reports statisticians extrapolated antibiotic production between 1995 and 2015 based on prior years’ data.
to fight off the infection without drugs.

- **Request targeted drugs.** When possible, your doctor should order cultures to identify the bacteria that caused your infection and prescribe a drug that targets that bug.

- **Use antibiotic creams sparingly.** Even antibiotics applied to the skin can lead to resistant bacteria. So use over-the-counter ointments containing bacitracin and neomycin only if dirt remains after cleaning with soap and water.

- **Avoid infections in the first place.** That means staying up to date on vaccinations. And it means washing your hands thoroughly and regularly, especially before preparing or eating food, before and after treating a cut or wound, and after using the bathroom, sneezing, coughing, and handling garbage. Plain soap and water is best. Avoid antibacterial hand soaps and cleaners, which may promote resistance.

### WHEN TO SAY NO TO A PRESCRIPTION

An April 2015 Consumer Reports survey of 1,000 adults found that patients are often prescribed antibiotics when the drugs aren't necessary, such as for colds, the flu, many sinus infections, and before certain dental or medical procedures. Several major medical organizations, including the American Academy of Family Physicians and the American Academy of Pediatrics, have recently tried to identify conditions for which antibiotics are often misused and explaining when the drugs are, and aren't, needed:

**EAR INFECTIONS** Most ear infections improve on their own in two to three days even without drugs, especially in children 2 or older. **When to consider antibiotics** The drugs may be needed right away for babies 6 months or younger with ear pain, children from 6 months to 2 years old with moderate to severe ear pain, and children 2 or older with severe symptoms.

**ECZEMA** Antibiotics don’t help relieve skin from itching or redness. Instead, moisturize skin or ask your doctor to recommend a medicated cream or ointment. **When to consider antibiotics** If there are signs of a bacterial infection, such as bumps or sores full of pus, honey-colored crusting, very red or warm skin, and fever.

**EYE INFECTIONS** Doctors often prescribe antibiotic eyedrops after treating eye diseases, such as macular degeneration, with injections. But antibiotic drops are rarely necessary after such treatments and can irritate your eyes. **When to consider antibiotics** If you have a bacterial eye infection, marked by redness, swelling, tearing, pus, and vision loss.

**PINKEYE** Conjunctivitis usually stems from a virus or an allergy, not bacteria. Even when bacteria are responsible, pinkeye usually goes away itself within 10 days. **When to consider antibiotics** If you have bacterial pinkeye plus a weak immune system, or severe or persistent symptoms.

**SINUS INFECTIONS** Sinusitis is usually viral. And even when bacteria are the cause, the infections often clear up even if they are not treated in a week or so. **When to consider antibiotics** If symptoms are severe, don’t improve after 10 days, or get better but then worsen.

**SWIMMER’S EAR** Caused by water trapped in the ear canal, over-the-counter eardrops usually help as much as antibiotics, without the risk of those drugs and without causing resistance. **When to consider antibiotics** If you have a hole or tube in your eardrum, check with your doctor. In that case, certain antibiotic eardrops are a better choice. Oral antibiotics may be necessary if a bacterial infection spreads beyond the ear or you have other conditions, such as diabetes, that increase the risk of complications.

**URINARY TRACT INFECTIONS IN OLDER PEOPLE** Doctors often prescribe antibiotics when a routine test finds bacteria in the urine. But if they don’t have symptoms, the drugs won’t help. **When to consider antibiotics** Before certain surgeries or when you experience burning during urination and a strong urge to “go” often.
HOW YOUR HOSPITAL CAN MAKE YOU SICK

Our centers for healing have turned into breeding grounds for dangerous—even deadly—infections. Consumer Reports’ new Ratings of more than 3,000 U.S. hospitals show which do a good job of avoiding the infections—and which don’t.

In the ongoing war of humans vs. disease-causing bacteria, the bugs are gaining the upper hand. Deadly and unrelenting, they’re becoming more and more difficult to kill. You might think of hospitals as sterile safety zones in that battle. But in truth, they are ground zero for the invasion.

Though infections are just one measure of a hospital’s safety record, they’re an important one. Every year an estimated 648,000 people in the U.S. develop infections during a hospital stay, and about 75,000 die, according to the Centers for Disease Control and Prevention (CDC). That’s more than twice the number of people who die each year in car crashes. And many of those illnesses and deaths can be traced back to the use of antibiotics, the very drugs that are supposed to fight the infections.

Terry Otey appears to be one casualty in that ongoing battle. Three years ago, a few weeks after an overnight stay for back surgery at Providence Regional Medical Center in Everett, Wash., he went to the emergency room vomiting, dizzy, and with excruciating back pain. Bacteria known as MRSA (methicillin-resistant staphylococcus aureus) had taken hold in his surgical incision and quickly spread to his heart. He died in the hospital about three months later, following a cascade of serious health problems. “He just wanted to ease his back pain enough to play golf,” says his sister, Deborah Bussell.

Kellie Pearson, 49, a farmer in northern California, says she encountered a different kind of bug after having heart surgery last April. Her doctors prescribed an antibiotic in the hopes that it would prevent a postsurgical infection. Instead the drug killed off healthy bacteria in her body, and another germ, C. diff (clostridium difficile), swooped in, causing diarrhea so severe that she had to stay in the hospital an additional five days until doctors could rein in the potentially deadly infection. She recovered but soon realized that she wasn’t the only patient suffering. “When I was able to walk down the hall in the hospital,” she says, “I was horrified to see room after room with C. diff caution signs on their doors warning that the patients inside, like me, had been infected.”

In the Danger Zone

“Hospitals can be hot spots for infections and can sometimes amplify spread,” says Tom Frieden, M.D., director of the CDC. “Patients with serious infections are near sick and vulnerable patients—all cared for by the same health care workers sometimes using shared equipment.”

Making the situation even more dangerous is the widespread, inappropriate use of antibiotics that’s common in hospitals, which encourages the growth of “superbugs” that are immune to the drugs and kills off patients’ protective bacteria.

It’s “the perfect storm” for infections to develop and spread, says Arjun Srinivasan, M.D., who oversees the CDC’s efforts to prevent hospital-acquired infections. “We’ve reached the point where patients are dying of infections in hospitals that we have no antibiotics to treat.”

But there’s hopeful news: Some
Germ Warfare: Protect Yourself Against Superbugs

First step: Check our Ratings to see how hospitals in your community compare in preventing infections and other measures of hospital safety. (Subscribers to our website can go to ConsumerReports.org/hospitalratings.) But bad things can happen even in good hospitals. For example, Terry Otey developed his infection after a 2012 surgery in a hospital that now gets one of our higher ratings against MRSA. Our experts say there are several things you can do when you’re in the hospital and after you’re discharged to minimize your risk and spot symptoms of possible infection early:

**IN THE HOSPITAL**

**CONSIDER MRSA TESTING.** A nasal swab can detect low levels of MRSA and allow medical staff to take precautions, such as having you wash with a special soap before your procedure.

**INSIST ON CLEANLINESS.** Ask to have your room cleaned if it looks dirty. Take bleach wipes for bed rails, doorknobs, and the TV remote. Insist that everyone who enters your room wash his or her hands.

**QUESTION ANTIBIOTICS.** Make sure that any antibiotics prescribed to you in the hospital are needed and appropriate for your infection.

**WATCH OUT FOR HEARTBURN DRUGS.** Medications such as Nexium and Prilosec increase the risk of developing C. diff symptoms by reducing stomach acid that appears to help keep the bug in check. So ask whether the drug is needed and request the lowest dose for the shortest possible time.

**ASK EVERY DAY WHETHER 'TUBES' CAN BE REMOVED.** The risk of infection increases the longer items such as catheters and ventilators are left in place. If you’re not able to ask, be sure a friend or family member does.

**SAY NO TO RAZORS.** If you need to be shaved, use an electric hair remover, not a razor, because any nick can provide an opening for infection.

**AT HOME**

If you’ve been in the hospital, “assume you’ve been exposed to potentially dangerous bacteria,” says Lisa McGiffert, director of the Consumer Reports Safe Patient Project. Here’s what to do when you get home to keep yourself and your family safe:

**WATCH FOR WARNING SIGNS.** They include fever, diarrhea, worsening pain, or an incision site that becomes warm, red, and swollen. People at particular risk include adults older than 65 as well as infants, anyone on antibiotics, and people with a compromised immune system.

**PRACTICE GOOD HYGIENE.** If you or someone you live with receives a diagnosis of a hospital-acquired infection after being discharged from the hospital, take extra precautions to make sure that it doesn’t spread:

- Clean frequently touched surfaces with 1 part bleach mixed with 10 parts water. Reserve a bathroom for the infected person. If that’s not possible, use the bleach solution to disinfect surfaces between uses.
- Don’t share toiletries or towels; use paper towels rather than cloth hand towels.
hospitals are taking steps to reduce infections and end inappropriate antibiotic use. “But others have made little effort,” Srinivasan says.

What Our Ratings Show

Consumer Reports’ hospital Ratings shine a spotlight on the problem. For the first time ever, those Ratings include information on MRSA and C. diff infections, based on data that hospitals submit to the CDC. And the results are sobering.

Three out of 10 hospitals in our Ratings got one of our two lowest scores for keeping C. diff in check; four out of 10 got low marks for avoiding MRSA. Only 6 percent of hospitals scored well against both infections.

“Hospitals need to stop infecting their patients,” says Doris Peter, Ph.D., director of the Consumer Reports Health Ratings Center. “Until they do, patients need to be on high alert whenever they enter a hospital, even as visitors.”

But there’s plenty that hospitals can do to stop the spread of deadly, sometimes resistant infections, and there are steps you can take as well to keep you and your family safe.

Red Flags for Bad Bacteria

We are focusing on C. diff and MRSA for two important reasons.

First, the infections are common and deadly. More than 8,000 patients each year are killed by MRSA; almost 60,000 are sickened by the infections. The bacteria often find their way into patients’ bodies through the lines and tubes that doctors use to deliver medication and nutrition to patients, or via surgical incisions, as happened to Terry Otey.

C. diff is an even bigger concern. Kellie Pearson is one of the 290,000 Americans sickened by the bacteria in a hospital or other health care facility each year. She was lucky: At least 27,000 people in the U.S. die with those infections annually.

Second, poor MRSA or C. diff rates can be a red flag that a hospital isn’t following best practices in preventing infections and prescribing antibiotics. That could not only allow C. diff and MRSA to spread but also turn the hospital into a breeding ground for other resistant infections that are even more difficult to treat.

For example, as dangerous as MRSA is, an infection can be cured if it is treated promptly with vancomycin, long held out as an “antibiotic of last resort.” But, in part because that drug is now so often used in hospitals, another resistant strain of bacteria—vancomycin-resistant staphylococcus aureus, or VRSA—is emerging. “VRSA infections pose special challenges; they can be even more difficult to treat than MRSA,” Srinivasan says.

Hospitals That Rate Well

To earn our very top rating in preventing MRSA or C. diff, a hospital has to report zero infections—an admittedly high bar. Still, 322 hospitals across the country were able to achieve that level in our MRSA ratings, and 357 accomplished it for C. diff, showing that it is possible. (Experts say some hospitals might game the system. For details, see “How Hospitals Fudge the Numbers,” on page 27.)

More hospitals were able to earn either of our two highest ratings—indicating that they reported either zero infections or did much better than predicted compared with similar hospitals: 623 hospitals received high marks for MRSA, and 917 did so for C. diff.

Hospitals really begin to distinguish themselves when they earn high ratings against both infections: 105 hospitals succeeded in that. Even better, some hospitals excel against not only MRSA and C. diff but also other infections that the CDC tracks and that are in our Ratings. Those include surgical-site infections and infections linked to urinary catheters or central-line catheters, large tubes that provide medication and nutrition.

“Hospitals that do well against infections across the board have figured something out and deserve special mention,” Peter says. Only 9 hospitals in the country—those featured in the “Highest-Rated in Infection Prevention” chart, on page 26—earned that high honor.

And Hospitals That Don’t

You won’t find any familiar, big-name hospitals on that top-performing list. In fact, several high-profile hospitals got lower ratings against MRSA, C. diff, or both, including the Cleveland Clinic in Cleveland, Johns Hopkins Hospital in Baltimore, Mount Sinai Hospital in New

“I’M A FIGHTER”

Barbara Thom, 61, says it was plenty scary undergoing surgery for a benign brain tumor at Sacred Heart Hospital in Eau Claire, Wis., in 2010. But the worst was still to come.

Two different bacteria invaded her incision site and wreaked havoc despite treatment with multiple antibiotics. Ultimately, to control the infections, doctors had to replace part of her skull with surgical mesh and put her on high doses of antibiotics that, five years later, she still must take every day. “I’m a fighter, so I’m going to keep doing whatever it takes,” Thom says, though she worries that the drugs will eventually stop working. “It’s the unknown that scares me.”
Those are all large teaching hospitals in urban areas, which in our analysis did not do as well as nonteaching hospitals of similar sizes in similar settings. That could be because teaching hospitals may do a better job of reporting infections. Or, as a representative for Ronald Reagan UCLA Medical Center told us, they may see sicker patients or have more patients undergoing complex procedures.

Although the CDC adjusts the data to account for some of those factors, teaching hospitals tend to perform worse. For example, only 6 percent of teaching hospitals received one of our two top scores against C. diff, compared with 14 percent of similar nonteaching hospitals.

“Yes, teaching hospitals face special challenges. But they are also supposed to be places where we identify best practices and put them to work,” says Lisa McGiffert, director of the Consumer Reports Safe Patient Project. “Obviously, that is not happening as well as it should.”

Larger hospitals also tended to do worse in our Ratings. That could be because patients in smaller hospitals are less likely to be exposed to infections. But some larger hospitals managed to do a good job avoiding infections. Case in point: Harlem Hospital Center in New York City earned high ratings against MRSA and C. diff. Or consider Northwest Texas Healthcare System in Amarillo, Texas. It made it onto our list of top hospitals in the prevention of all of the infections included in our Ratings.

What Safe Hospitals Do

Good hospitals focus on the basics: **USE ANTIBIOTICS WISELY.** Almost half of hospital patients are prescribed at least one antibiotic, Srinivasan says, but “up to half the time the drug is inappropriate.” To combat antibiotic misuse, many good hospitals have “antibiotic stewardship” programs, often headed by a pharmacist trained in infectious disease, to make sure that patients get the right drug, at the right time, in the right dose.

Such programs often monitor the use of broad-spectrum antibiotics. Doctors at some hospitals use three times more of those all-purpose bug killers than others. Reducing broad-spectrum prescriptions by 30 percent would “cut hospital rates of MRSA and C. diff by 30 percent would “cut hospital rates against C. diff, compared with 14 percent of similar nonteaching hospitals.”

Infections such as C. diff, MRSA, and norovirus must be avoided. But some infections like C. diff are made worse by antibiotics. Most of the best hospital performers are also big users of the latest antibiotics. And they put in place systems to ensure that the right antibiotic is prescribed.

**PROBIOTICS**

There’s some evidence that probiotics might shorten a bout of diarrhea caused by antibiotics. And an analysis of 23 clinical trials found that taking probiotics with antibiotics can greatly cut the risk of diarrhea caused by C. diff.

**FIGHTING BAD BUGS WITH GOOD ONES**

PROBIOTICS

There’s some evidence that probiotics might shorten a bout of diarrhea caused by antibiotics. And an analysis of 23 clinical trials found that taking probiotics with antibiotics can greatly cut the risk of diarrhea caused by C. diff.

Probiotics may be worth a try if you’re on antibiotics for more than a few days, taking two antibiotics at once, or you’re switched from one drug to another. People older than 65 and those who take an acid-blocking drug such as Nexium or Prilosec are at higher risk for C. diff; check with your doctor to see whether probiotics will help you.

Research suggests that the most effective probiotics are combinations of L. acidophilus, L. casei, L. rhamnosus, and S. boulardii. To reduce the risk of diarrhea caused by C. diff, the most effective dose is thought to be more than 10 billion colony forming units, or CFU, daily.

You don’t have to take a pill to get those good bacteria. Yogurts we tested several years ago contained an average of 90 billion to 500 billion CFU per serving. Probiotic supplements contained less, from just fewer than 1 billion to 20 billion CFU per capsule.

Probiotics should be avoided by people with compromised immune systems or serious medical conditions because of a rare risk of bloodstream infections.

**FECAL TRANSPLANTS**

For C. diff infections that keep coming back, a “fecal microbiota transplant” is nothing short of a miracle. In the procedure, a doctor places stool from a healthy donor into an infected person’s colon, usually using colonoscopy. The idea is to repopulate the colon with good bacteria to fight off C. diff. Research shows that it works about 90 percent of the time. In 2013 the Food and Drug Administration decided to allow doctors to perform the procedure in C. diff patients with diarrhea and other symptoms even after being treated with antibiotics.

Some recent reports suggesting that fecal transplants may have other benefits—including weight loss. As a result, a cottage industry of “poo practitioners” has emerged. Some people are even going the DIY route.

“That’s a terrible idea,” says Christina Surawicz, M.D., a gastroenterologist and professor at the University of Washington School of Medicine. For example, there have been reports of people developing autoimmune disorders after the procedure and even suddenly gaining weight.

Instead, if you have C. diff, look for an infectious disease doctor or gastroenterologist with experience in the procedure. The stool can come from a friend or family member, or doctors can buy frozen specimens from screened donors. Check with your insurance company to see whether it will cover fecal transplants to treat C. diff.
Highest-Rated in Infection Prevention
The 9 hospitals below earned high ratings in avoiding MRSA and C. diff, as well as three other infections (see Guide to the Ratings, below). The bigger a hospital is the more difficult it is for it to do well, so hospitals are listed here in order of patient volume.

<table>
<thead>
<tr>
<th>HOSPITAL NAME</th>
<th>CITY</th>
<th>AVOIDING MRSA</th>
<th>AVOIDING C. DIFF</th>
<th>INFECTIONS COMPOSITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwest Texas Healthcare System</td>
<td>Amarillo, Texas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jupiter Medical Center</td>
<td>Jupiter, Fla.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White County Medical Center</td>
<td>Searcy, Ark.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centennial Hills Hospital Medical Ctr.</td>
<td>Las Vegas, Nev.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biloxi Regional Medical Center</td>
<td>Biloxi, Miss.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnston Memorial Hospital</td>
<td>Abingdon, Va.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lima Memorial Health System</td>
<td>Lima, Ohio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Arizona Regional Medical Ctr.</td>
<td>Bullhead City, Ariz.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Baldwin Regional Medical Ctr.</td>
<td>Foley, Ala.</td>
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</tr>
</tbody>
</table>

Lowest-Rated in Infection Prevention
The 12 hospitals below earned low ratings in avoiding MRSA and C. diff, as well as three other infections (see Guide to the Ratings, below). They’re listed alphabetically.

<table>
<thead>
<tr>
<th>HOSPITAL NAME</th>
<th>CITY</th>
<th>AVOIDING MRSA</th>
<th>AVOIDING C. DIFF</th>
<th>INFECTIONS COMPOSITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brooklyn Hospital Ctr.</td>
<td>Brooklyn, N.Y.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Decatur Memorial Hospital</td>
<td>Decatur, Ill.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floyd Memorial Hospital and Health Services</td>
<td>New Albany, Ind.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fremont-Rideout Health Group</td>
<td>Marysville, Calif.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little Company of Mary Hospital and Health Ctrs.</td>
<td>Evergreen Park, Ill.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercy St. Anne Hospital</td>
<td>Toledo, Ohio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riverview Medical Center</td>
<td>Red Bank, N.J.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rockdale Medical Center</td>
<td>Conyers, Ga.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Petersburg General Hospital</td>
<td>Saint Petersburg, Fla.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Charlotte Hungerford Hospital</td>
<td>Torrington, Conn.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UF Health Jacksonville</td>
<td>Jacksonville, Fla.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venice Regional Bayfront Health</td>
<td>Venice, Fla.</td>
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<td></td>
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</tbody>
</table>

Guide to the Ratings. These Ratings reflect how hospitals performed in a snapshot in time, based on data hospitals reported to the CDC between October 2013 and September 2014. The data are released periodically throughout the year. (The Ratings that appear in the September 2015 print issue of Consumer Reports magazine were the most currently available at publication, based on data reported to the CDC between July 2013 and June 2014.) Infections Composite indicates how a hospital did against MRSA and C. diff infections plus surgical-site infections and infections associated with urinary-tract and central-line catheters. The CDC adjusts to account for factors such as the health of a hospital’s patients, its size, and whether it’s a teaching hospital. For complete and the most current Ratings, online subscribers can go to ConsumerReports.org/hospitalratings.

What More Needs to Be Done
Steps such as those, plus federal mandates for some public reporting of infections data, have already led to reduced rates of certain infections. Still, McGiffert says hospitals need to do more:
• Consistently follow the established protocols for managing superbug infections, such as using protections including gowns, masks, and gloves by all staff.
• Be held financially accountable. Already, hospitals in the bottom 25 percent of the government’s data at preventing certain complications now have Medicare payments docked 1 percent. But they should also have to cover all costs of treating infections patients pick up during their stay.
• Have an antibiotic stewardship program. That should include mandatory reporting of antibiotic use to the CDC.
• Accurately report how many infections patients pick up during their stay.
• Be transparent about infection rates. For instance, Cleveland Clinic acknowledges its below-average performance in C. diff prevention on its website. “That’s refreshingly candid,” Peter says.
• Promptly report outbreaks to patients, as well as to state and federal health authorities. Those agencies should inform the public so that patients can know the risks before they check into the hospital.
Hospitals must report certain infections, including C. diff and MRSA, to the CDC if they want to avoid payment penalties from the Centers for Medicare & Medicaid Services. Consumer Reports uses that data, the best available, for our hospital Ratings. But there is no comprehensive system for auditing the data to guarantee that those reports are accurate. And research suggests that hospitals fail to report a shockingly high percentage of infections.

For example, a Harvard study that compared medical records with patient interviews found that patients reported about twice as many infections and other complications as the hospitals had documented. And a report from the Department of Health and Human Services’ Office of Inspector General found that hospitals reported less than 25 percent of infections in Medicare patients.

Underreporting may stem in part from sloppy record keeping. “Some hospitals, especially smaller ones, haven’t put systems in place to collect and report infection data in a standardized way,” says Eric Schneider, M.D., an author of the Harvard study. But in other cases, it may be more deliberate. “For example, a hospital may claim that a patient checked in with the bug, which doesn’t count against the hospital, when in fact she developed it as an inpatient.”

“There’s reason to be skeptical about the accuracy of infection data,” says Lisa McGiffert, director of the Consumer Reports Safe Patient Project. “That’s why we want reporting by patients and their families to be included.”

**WHAT YOU CAN DO TO HELP**

To get our top rating against MRSA or C. diff, a hospital has to report zero infections. “It’s possible, and it’s a standard we want to hold all hospitals to,” McGiffert says. “But we know that some hospitals may not tell the whole truth.”

To help us check, go to ConsumerReports.org/zeroinfections to see a list of all of the hospitals in our Ratings that claimed zero MRSA or C. diff infections between October 2013 and September 2014 (the most recent data available at press time). If you were treated in one of those hospitals in that time frame—and you developed an infection—we want to hear your story.

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### THE HARD WORK OF FIGHTING INFECTIONS

Presence Saints Mary and Elizabeth Medical Center in Chicago shows that even large urban hospitals can do a good job preventing infections—though there are advances and retreats in the ongoing battle. When our September 2015 issue went to press, it was among an elite group of hospitals that earned top Ratings not only against MRSA and C. diff but also against infections following surgery and those associated with urinary-tract and central-line catheters. But based on the most recent government data, released after we published, the hospital went down a notch in two areas—although it still performs well overall in preventing infections. It manages to do this in spite of its high volume of patients, many of whom are minorities—two factors linked to increased infection rates.

“Preventing infections is not something we view as a separate task,” says Christine Balintona, R.N., a critical-care nurse specializing in infection control. “From the leadership, who have provided strong support, to doctors and nursing staff to people who bring meals and clean the rooms—everyone knows how important it is.”

She credits ongoing education keeping staff up to date on new protocols, as well as diligence about basics such as hygiene. “We make rounds every day to observe and educate patients,” Balintona says. “And ‘departments have a friendly competition to get the best report’ from ‘secret shoppers’ on their hand washing.” A key element of Presence’s success: an antibiotic stewardship program. “We’re a multidisciplinary team,” says Ben Colton, Pharm.D., a pharmacist specializing in infectious disease. “Every day, pharmacists, doctors, biologists in the lab, and infection-control people are all working together to arrive at the best treatment for the patient.”

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### How to Say No to Antibiotics

On any given day in the hospital, half of patients are given an antibiotic and 25 percent get two or more, according to the CDC. But up to half of the time, doctors don’t use the drugs right. “It can feel awkward to talk to your doctor about antibiotics,” says Conan MacDougall, Pharm.D., a team leader for antibiotic stewardship at the University of California at San Francisco. But asking a few simple questions can “encourage physicians to be more thoughtful about prescribing,” MacDougall says.

1. **What Is This Drug For?**
   - If your doctor suspects a bacterial infection, ask whether you can be tested for it; results can confirm the infection and determine the type of bug, which can dictate the type of antibiotic that works best.

2. **What Type Is It?**
   - If a narrower-spectrum drug such as penicillin will work against your infection, that’s usually a better choice than a broad-spectrum drug.

3. **How Long Should I Take It?**
   - Ask your doctor to prescribe the drug for the shortest time possible. (Be sure to take it for that duration.) Ask for the type and dose to be re-evaluated when test results are in. A common error, MacDougall says, is not switching from a broad-spectrum drug to a targeted one once the bug is identified.

4. **What About Side Effects?**
   - Most antibiotics are well tolerated; but in addition to C. diff, antibiotics can trigger serious allergic reactions, including rashes, swelling of the face and throat, and breathing problems. Some antibiotics have been linked to tendon and permanent nerve damage.
How Safe Is Your Beef?

If you don’t know how the ground beef you eat was raised, you may be putting yourself at higher risk of illness from dangerous bacteria. You okay with that?

The American love affair with ground beef endures. We put it between buns. Tuck it inside burritos. Stir it into chili. Even as U.S. red meat consumption has dropped overall in recent years, we still bought 4.6 billion pounds of beef in grocery and big-box stores over the past year. And more of the beef we buy today is in the ground form—about 50 percent vs. 42 percent a decade ago. We like its convenience, and often its price.

The appetite persists despite solid evidence—including new test results here at Consumer Reports—that ground beef can make you seriously sick, particularly when it’s cooked at rare or medium-rare temperatures under 160°F. “Up to 28 percent of Americans eat ground beef that’s raw or undercooked,” says Hannah Gould, Ph.D., an epidemiologist at the Centers for Disease Control and Prevention (CDC).

All meat potentially contains bacteria that—if not destroyed by proper cooking—can cause food poisoning, but some meats are more risky than others. Beef, and especially ground
beef, has a combination of qualities that can make it particularly problematic—and the consequences of eating tainted beef can be severe.

Indeed, food poisoning outbreaks and recalls of bacteria-tainted ground beef are all too frequent. Just before the July 4 holiday this year, 13.5 tons of ground beef and steak destined for restaurants and other food-service operations were recalled on a single day because of possible contamination with a dangerous bacteria known as E. coli O157:H7. That particular bacterial strain can release a toxin that damages the lining of the intestine, often leading to abdominal cramps, bloody diarrhea, vomiting, and in some cases, life-threatening kidney damage. Though the contaminated meat was discovered by the meat-packing company’s inspectors before any cases of food poisoning were reported, we haven’t always been so lucky. Between 2003 and 2012, there were almost 80 outbreaks of E. coli O157 due to tainted beef, sickening 1,144 people, putting 316 in the hospital, and killing five. Ground beef was the source of the majority of those outbreaks. And incidences of food poisoning are vastly underreported. “For every case of E. coli O157 that we hear about, we estimate that another 26 cases actually occur,” Gould says. She also reports that beef is the fourth most common cause of salmonella outbreaks—one of the most common foodborne illnesses in the U.S.—and for each reported illness caused by that bacteria, an estimated 29 other people are infected.

THE RISKS OF GOING RARE

It’s not surprising to find bacteria on favorite foods such as chicken, turkey, and pork. But we usually choose to consume those meats well-cooked, which makes them safer to eat. Americans, however, often prefer their beef on the rare side. Undercooking steaks may increase your risk of food poisoning, but ground beef is more problematic. Bacteria can get on the meat during slaughter or processing. In whole cuts such as steak or roasts, the bacteria tend to stay on the surface, so
when you cook them, the outside is likely to get hot enough to kill any bugs. But when beef is ground up, the bacteria get mixed throughout, contaminating all of the meat—including what’s in the middle of your hamburger.

Also contributing to ground beef’s bacteria level: The meat and fat trimmings often come from multiple animals, so meat from a single contaminated cow can end up in many packages of ground beef. Ground beef (like other ground meats) can also go through several grinding steps at processing plants and in stores, providing more opportunities for cross-contamination to occur. And then there’s the way home cooks handle raw ground beef: kneading it with bare hands to form burger patties or a meatloaf. Unless you’re scrupulous about washing your hands thoroughly afterward, bacteria can remain and contaminate everything you touch—from the surfaces in your kitchen to other foods you are preparing.

“There’s no way to tell by looking at a package of meat or smelling it whether it has harmful bacteria or not,” says Urvashi Rangan, Ph.D., executive director of the Center for Food Safety and Sustainability at Consumer Reports. “You have to be on guard every time.” That means keeping any raw meat on your countertop from touching other foods nearby and cooking ground beef to at least medium, which is 160°F. Eating a burger that’s rarer can be risky. In 2014 E. coli outbreak, five of the 12 people who got sick had eaten a burger at one of the locations of an Ohio pub chain called Bar 145®, which was named for the temperature “of a perfectly cooked medium-rare burger,” according to the company’s website.

PUTTING BEEF TO THE TEST

Given those concerns about the safety of ground beef, Consumer Reports decided to test for the prevalence and types of bacteria in ground beef. We purchased 300 packages—a total of 458 pounds (the equivalent of 1,832 quarter-pounders)—from 103 grocery, big-box, and natural food stores in 26 cities across the country. We bought all types of ground beef: conventional—the most common type of beef sold, in which cattle are typically fattened up with grain and soy in feedlots and fed antibiotics and other drugs to promote growth and prevent disease—as well as beef that was raised in more sustainable ways, which have important implications for food safety and animal welfare. At a minimum, sustainably produced beef was raised without antibiotics. Even better are organic and grass-fed methods. Organic cattle are not given antibiotics or other drugs, and they are fed organic feed. Grass-fed cattle usually don’t get antibiotics, and they spend their lives on pasture, not feedlots.

We analyzed the samples for five common types of bacteria found on beef—clostridium perfringens, E. coli (including O157 and six other toxin-producing strains), enterococcus, salmonella, and staphylococcus aureus.

The routine use of antibiotics in farming has contributed to the rise of antibiotic-resistant bacteria, so once-easy-to-treat infections are becoming more serious and even deadly. We put the bacteria we found through an additional round of testing to see whether they were resistant to antibiotics in the same classes that are commonly used to

HOW SAFE IS YOUR BEEF?

Labels to Look For

<table>
<thead>
<tr>
<th><strong>BASIC</strong></th>
<th><strong>GOOD</strong></th>
<th><strong>BETTER</strong></th>
<th><strong>BEST</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No Antibiotics</strong></td>
<td>Producers must provide the Department of Agriculture with paperwork showing that no antibiotics were used during the animal’s life, but independent verification of those claims is not required. Beef with these labels can be fed grain, and there are no standards for humane treatment of the animals. Reliable terms are “no antibiotics administered” and “raised without antibiotics.” If the package also says “USDA Processed Verified,” a no antibiotics claim is more trustworthy. But beware of labels such as “no antibiotics used for growth promotion,” which can still mean that antibiotics were used.</td>
<td>The USDA requires that beef labeled “grass-fed” or “100 percent grass-fed” come from animals that have never been given grain and have access to pasture during the grazing season. Though the producer must provide written documentation and a signed affidavit, there is no required independent verification of the label. USDA grass-fed standards allow for antibiotic use, so look for grass-fed beef that also carries a no antibiotic claim. USDA Never Ever 3 seal is ideal because it guarantees that there are no antibiotics as well as no growth promotants (such as hormones) and no animal byproducts in the feed.</td>
<td>Cattle are fed organic feed (no pesticides, synthetic fertilizer, or genetically engineered ingredients). They are not given antibiotics, hormones, or other drugs. Animals must be given access to pasture for most of their lives, but feedlots and grain feeding during their last few months are allowed. American Grassfed Association The animals are never given grain and have continuous access to pasture or a grass-based forage when the weather does not allow for pasture access. Antibiotics and growth hormones are prohibited. The Association verifies those practices. Pesticides and herbicides are allowed on the pastures the animals feed on, and they can also be fed genetically engineered alfalfa. Grass-Fed Organic With this combination of labels, you get meat from cattle that have not been fed grain and eat only organically grown grass and forage. Antibiotics, hormones, and other drugs are prohibited. If the package also has the Animal Welfare Approved seal, the Certified Humane seal, or the Global Animal Partnership (GAP) 5 or 5+ seal, animal welfare standards also apply.</td>
</tr>
</tbody>
</table>
How Much Bacteria Is in Beef?

We tested 300 samples of conventional (181 samples) and more sustainably produced (119 samples) of raw ground beef purchased at supermarkets, big-box, and "natural" food stores in 26 metropolitan areas across the country. We classified beef as being more sustainably produced if it had one or more of the following characteristics: no antibiotics, organic, or grass-fed. Here are the percentages of samples in each type that contained each of the five bacteria we tested for and the samples that contained two or more types of bacteria.

### How Much Bacteria Is in Beef?

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Conventional</th>
<th>More Sustainably Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella</td>
<td>20%</td>
<td>18%</td>
</tr>
<tr>
<td>C. perfringens</td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>S. aureus</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>E. coli</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>≥ 2 Types of Bacteria</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Foods That Make Us Sick

Food poisoning strikes an estimated 48 million people in the U.S. each year. Beef is a top cause of outbreaks, causing more of them than chicken or pork.

#### Source: Centers for Disease Control and Prevention.

<table>
<thead>
<tr>
<th>Foods</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>17%</td>
</tr>
<tr>
<td>Dairy</td>
<td>11%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
</tr>
<tr>
<td>Beef (all types)</td>
<td>9%</td>
</tr>
<tr>
<td>Mollusks</td>
<td>9%</td>
</tr>
<tr>
<td>Chicken</td>
<td>8%</td>
</tr>
<tr>
<td>Vegetable Row Crops</td>
<td>7%</td>
</tr>
<tr>
<td>Pork</td>
<td>7%</td>
</tr>
<tr>
<td>Fruits</td>
<td>7%</td>
</tr>
<tr>
<td>Turkey</td>
<td>4%</td>
</tr>
<tr>
<td>Grains-Beans</td>
<td>4%</td>
</tr>
<tr>
<td>Seeded Vegetables</td>
<td>3%</td>
</tr>
<tr>
<td>Eggs</td>
<td>3%</td>
</tr>
</tbody>
</table>

One of the most significant findings of our research is that beef from conventionally raised cows was more likely to have bacteria overall, as well as bacteria that are resistant to antibiotics, than beef from sustainably raised cows. We found a type of antibiotic-resistant S. aureus bacteria called MRSA (methicillin-resistant staphylococcus aureus), which kills about 11,000 people in the U.S. every year, on three conventional samples (and none on sustainable samples). And 18 percent of conventional beef samples were contaminated with...
superbugs—the dangerous bacteria that are resistant to three or more classes of antibiotics—compared with just 9 percent of beef from samples that were sustainably produced. “We know that sustainable methods are better for the environment and more humane to animals. But our tests also show that these methods can produce ground beef that poses fewer public health risks,” Rangan says.

**Cows: They Are What They Eat**

The majority of beef (about 97 percent) for sale comes from “conventionally raised” cattle that begin their lives grazing in grassy pastures but are then shipped to and packed into feedlots and fed mostly corn and soybeans for three months to almost a year. The animals may also be given antibiotics and hormones. That practice is considered to be the most cost-efficient way to fatten up cattle: It takes less time, labor, and land for conventionally raised cattle to reach their slaughter weight compared with those that feed on grass their whole lives. “The high-carbohydrate corn and soy diet causes cattle to become unnaturally obese creatures that would never exist in nature,” says farmer Will Harris, who decided 20 years ago to switch to raising grass-fed cattle at White Oak Pastures, his 2,500-acre fifth-generation family farm in Bluffton, Ga. “Conventional cattle reach 1,200-plus pounds in 16 to 18 months. On our farm, it takes 20 to 22 months to raise an 1,100-pound animal, which is what we consider slaughter weight.”

Cows’ digestive systems aren’t designed to easily process high-starch foods such as corn and soy. Cattle will gain weight faster on a grain-based diet than on a grass-based one. But it also creates an acidic environment in the cows’ digestive tract, which can lead to ulcers and...
infection. Research shows that this unnatural diet may also cause the cattle to shed more E. coli in their manure. In addition, cattle may be fed a variety of other substances to fatten them up. They include candy (such as gummy bears, lemon drops, and chocolate) to boost their sugar intake and plastic pellets to substitute for the fiber they would otherwise get from grass. Cattle feed can also contain parts of slaughtered hogs and chickens that are not used in food production, and dried manure and litter from chicken barns.

Conventional cattle farmers defend their methods, however. “If all cattle were grass-fed, we’d have less beef, and it would be less affordable,” says Mike Apley, Ph.D., a veterinarian, professor at Kansas State University College of Veterinary Medicine, and chair of the Antibiotic Resistance Working Group at the National Cattlemen’s Beef Association, a trade group. “Since grass doesn’t grow on pasture year-round in many parts of the country,” he says, “feedlots evolved to make the most efficient use of land, water, fuel, labor, and feed.”

**LIFE ON THE FEEDLOT**

Farmers such as Will Harris are also concerned about the humaneness of crowding cows into feedlots. “Animals that have never been off grass are put into a two-story truck and transported for 20-plus hours with no food, water, or rest,” Harris says. The animals are crowded into pens; the average feedlot in the U.S. houses about 4,300 head of cattle, according to Food & Water Watch’s 2015 Factory Farm Nation Report. On some of the country’s biggest feedlots, the cattle population averages 18,000.

“You always know when you’re approaching a feedlot. The unmistakable stench hits you first, then you see the hovering fecal dust cloud, followed by the sight of thousands of cattle packed into pens standing in their own waste as far as you can see,” says Don Davis, a cattle farmer in Texas and president of the Grassfed Livestock Alliance. The manure contains potentially dangerous bacteria that gets on the cattle’s hides and can be transferred to the meat during slaughtering. The conditions also stress the cattle, which makes them more susceptible to disease, and any illness that develops can quickly spread from animal to animal.

To control for that, cattle are often fed daily low doses of antibiotics to prevent disease. According to Apley, cattle in feedlots are given antibiotics to prevent coccidiosis, a common intestinal infection, but he notes that those drugs aren’t medically important for people. He also said that cattle are given an antibiotic called tylosin to ward off liver abscesses.

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**Should You Have the Steak Instead?**

Steaks and roasts are less likely to make you sick than ground beef is because the bacteria that might be present on the surface of the meat is more easily killed during cooking. That’s why you can safely serve those cuts medium-rare—145°F. Just be sure to flip the steak twice during cooking to make sure that the heat is evenly distributed. The exception is beef that’s been mechanically tenderized, a process in which a machine punctures the meat with blades or needles to break down the muscle fibers. That can drive bacteria into the center of the meat. A 2013 Canadian study concluded that the risk of illness from eating mechanically tenderized beef is about five times that of intact cuts of beef. Some retailers label the mechanically tenderized beef they sell, and starting in May 2016, U.S. meat producers will be required to do so. Until then, unless you’re sure that your steak has not been tenderized, cook it to 160°F.

**Protein Portion Control**

Ground beef is a great source of protein, but eating too much red meat can increase your risk of heart disease, colon cancer, and type 2 diabetes. Grass-fed beef can be leaner and slightly lower in artery-clogging saturated fat and slightly higher in healthy polyunsaturated fats than grain-fed beef is. But even so, you want to keep your portions small (about 3 to 4 ounces) and swap out beef at least a few times per week with other protein sources. Check out the protein substitutes below, which are lower in total fat and saturated fat. You also might want to consider going meatless one day per week to help lower your disease risk (and save money—beef is generally more expensive than many alternative sources of protein).

<table>
<thead>
<tr>
<th></th>
<th>Grass-Fed Burger</th>
<th>Tofu</th>
<th>Shrimp</th>
<th>Chicken Breast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>22 grams</td>
<td>18 grams</td>
<td>15 grams</td>
<td>26 grams</td>
</tr>
<tr>
<td>Total Fat</td>
<td>14 grams</td>
<td>10 grams</td>
<td>1 gram</td>
<td>3 grams</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>6 grams</td>
<td>1 gram</td>
<td>0 grams</td>
<td>1 gram</td>
</tr>
</tbody>
</table>

Nutrition information is based on 4 ounces, raw.
That drug is in a class of antibiotics that the World Health Organization categorizes as “critically important” for human medicine. What’s more, in our tests we found that resistance to classes of antibiotics used to treat people was widespread. Three-quarters of the samples contained bacteria that were immune to at least one class of those drugs.

Antibiotics were also given to cattle to promote weight gain (although just how the drugs do that is unknown), but in 2013 the Food and Drug Administration issued voluntary guidelines to stop that practice. Previously, ranchers could buy those drugs over-the-counter and give them to their animals, but the FDA has proposed that antibiotics be used only under the supervision of a veterinarian. “That doesn’t mean, though, that antibiotics can’t be used for disease prevention anymore,” says Jean Halloran, director of Food Policy Initiatives at Consumer Reports. “Vets can still authorize their use to ‘ensure animal health,’ so the status quo of feeding healthy animals antibiotics every day can continue.”

Widespread daily and unnecessary use of antibiotics in healthy animals in turn fuels the spread of antibiotic-resistant bacteria, which has become a serious public-health threat.

MEAT MONOPOLY
More than 80 percent of beef produced in the U.S. is processed by four companies. Cattle can be slaughtered at high-speed rates—as many as 400 head per hour. Those slaughterhouses use a variety of methods to destroy bacteria on the carcass after the hide has been removed, such as hot water, chlorine-based, or lactic acid washes. But when so many cattle are being processed, sanitary practices may get short shrift. The result is that bacteria from cattle’s hides or digestive tracts can...
be transferred to the meat. “USDA has a presence in these plants to do inspections—though it’s against the companies’ wishes,” says Patty Lovera, assistant director of Food & Water Watch. “The economic power of the Big Four gives them a lot of political weight to push back against USDA inspectors’ efforts to enforce existing rules and to fight against any tighter safety standards being enacted.” And, she adds, “the sheer volume of beef that big-company plants crank out means that a quality control mistake at a single plant can lead to packages of contaminated beef ending up in stores and restaurants across 20 or 30 states.”

THE BETTER BURGER STARTS HERE

Cattle can have a healthier (and more humane) upbringing if they graze in pastures for most—if not all—of their lives. “The most sustainable beef-production systems don’t rely on any daily drugs, don’t confine animals, and do allow them to eat a natural diet,” Rangan says. And what’s good for cows is good for people, too. “Our findings show that more sustainable can mean safer meat.” That’s why Consumer Reports recommends that you buy sustainably raised beef whenever possible. Sustainable methods run the gamut from the very basic ‘raised without antibiotics’ to the most sustainable, which is grass-fed organic. (See “Labels to Look For,” on page 28.) “We suggest that you choose what’s labeled ‘grass-fed organic beef’ whenever you can,” Rangan says. Aside from the animal welfare and environmental benefits, grass-fed cattle also need fewer antibiotics or other drugs to treat disease, and organic standards and many verified grass-fed label programs prohibit antibiotics. Sustainably raised beef does cost more (see “Why Grass-Fed Costs More,” on the facing page), but it’s the safest—and most humane—way for Americans to enjoy our beloved burgers ... cooked to medium, of course.

Funding for this project was provided by The Pew Charitable Trusts. Any views expressed are those of Consumer Reports and its advocacy arm, Consumers Union, and do not necessarily reflect the views of The Pew Charitable Trusts.

How to Handle Beef: From Store to Table

Until we have more robust regulations in place, the undue burden falls on consumers to treat raw beef (or any meat) carefully. That means you have to always assume it’s contaminated with bacteria and take appropriate precautions. The best practices include:

Pick it up last at the supermarket. You want it to stay cold as long as possible, so visit the meat case last. Bag it separately from other foods, and put it in a chilled cooler or on ice if you’re traveling more than a short distance home.

Keep it cold at home, too. Bacteria multiply rapidly in what federal health officials call the “Danger Zone”: temperatures between 40° F and 140° F. Use an appliance thermometer to make sure that your refrigerator stays no warmer than 37° F. If you don’t use ground beef within two days, freeze it. Defrost frozen meat in the refrigerator—not out on the counter.

Don’t allow it to touch other foods. Use separate plates and utensils for raw and cooked meats. Always wash your hands with soap and water after handling raw meat, as well as thoroughly sanitize sinks or any other surfaces that came in contact with the meat. Plastic cutting boards should be washed in the dishwasher.

Turn up the heat. The safest temperature for ground beef is 160° F. You can’t tell by the meat’s color whether it has reached that temperature, so use a meat thermometer. If you’re reheating leftover burgers or a casserole with ground beef, get it to 165° F.

Take “rare” out of your vocabulary. Rare is risky, and even medium-rare is, especially for kids, who are more susceptible to food poisoning. Medium may be too inexact when ordering out. To be safe, specify that you want 160° F when ordering a burger. In one study of 385 restaurants in eight states, just 12 percent always used a thermometer to measure burgers’ cooked temperatures. And 12 percent of all burgers were served at an unsafe temperature.

Be very careful if you grind it yourself. It might sound like a safer bet than buying prepackaged meat, but any pathogens on whole cuts would be spread throughout the batch of meat you grind at home. Bacteria also can linger in the equipment you use, increasing the odds of cross-contamination in your kitchen. So wash in hot soapy water or, preferably, in the dishwasher.
ONE OF THE GREATEST medical discoveries of the 20th century happened by accident. In 1928, scientist Alexander Fleming found mold growing in one of his petri dishes—then noticed that the bacteria all around it had been destroyed. That bacteria-killing mold was the first form of penicillin—and we as a society embarked on a brave new world in medicine. Suddenly, deadly diseases such as tuberculosis, scarlet fever, bacterial meningitis, and diphtheria could be cured with a pill. Surgery for heart disease and organ transplants, as well as chemotherapy, could succeed because those miracle drugs wiped out the infections that arose after treatment.

But less than 100 years after that breakthrough, antibiotics are losing their lifesaving effectiveness. Their overuse has allowed bacteria to evolve so that they are almost impervious to the drugs. That has led to the rise of “superbugs”—which include methicillin-resistant staphylococcus aureus (MRSA) and bacteria resistant to three or more types of antibiotics. And as the number of superbugs increases, the development of new antibiotics to kill them has lagged. At least 2 million Americans fall victim to antibiotic-resistant infections every year; 23,000 die. “The antibiotics we’ve relied on for decades are becoming less effective—and we risk turning back the clock to a time where simple infections killed people,” says Tom Frieden, M.D., M.P.H., director of the Centers for Disease Control and Prevention.

Over this past year, Consumer Reports has investigated the dangers of antibiotic overuse in hospitals and doctors’ offices. (See our August and September 2015 issues.) But nowhere are the drugs more inappropriately employed than in the meat and poultry industries. About 80 percent of the antibiotics sold in the U.S. are given to animals raised for food—including hogs, cattle, chickens, and turkeys. The most recent data from the Food and Drug Administration show that more than 32 million pounds of antibiotics were sold for use in food animals in the U.S. in 2013—up 17 percent from just four years earlier.

Recently, several meat and poultry producers, such as Tyson, and restaurant chains, like McDonald’s and Subway, have pledged to reduce the production or sale of meat or poultry from animals raised with antibiotics. “But whether such measures will end up significantly reducing antibiotic use remains to be seen,” says Gail Hansen, D.V.M., who has more than 25 years of experience in veterinary public health and infectious disease.

“In the last few years we’ve witnessed some of the bacteria most commonly found in food—germs such as salmonella and campylobacter—become increasingly
resistant to some important antibiotics,” says Robert Tauxe, M.D., M.P.H., deputy director of the CDC’s Division of Foodborne, Waterborne, and Environmental Diseases. Those resistant strains can cause infections that are “more severe, longer lasting, and harder to treat,” Tauxe says. In fact, our calculations using data from the CDC show that about 20 percent of people sickened by an antibiotic-resistant bug don’t pick it up in the hospital or from another person—they get it from their food.

Superbugs in Your Meat
Four years ago, Ruby Lee of Sandy, Ore., wound up fighting for her life against a superbug. She was only 10 months old when her parents rushed her to the emergency room with severe diarrhea and a high fever. “Ruby was so sick the first five days that she barely moved,” says her mother, Melissa Lee. “We were terrified of losing her.” Doctors eventually determined that Ruby’s illness was part of a salmonella Heidelberg outbreak involving ground turkey that sickened 135 other people in several states. That bacteria was resistant to several antibiotics, but luckily Ruby’s doctors found one that still worked.

Even just handling contaminated meat poses a risk. Ken Koehler, 55, always cooked his burgers to well-done. But he still got sick during a 2011 outbreak of salmonella typhimurium linked to ground beef. Public health officials told him that he may have gotten the resistant bacteria on his hands when shaping the raw meat into patties. Bedridden for weeks, the Old Orchard Beach, Maine, resident counts the experience as one of the worst of his life. Antibiotics tackled the infection, but recovery was slow. “It was a month before I could eat a full meal,” he says. “My digestive system is still not back to normal.”

Ruby and Ken’s stories aren’t isolated incidents. Information on cases like these is often incomplete, but according to data from the CDC, at least six multistate outbreaks of food poisoning involving antibiotic-resistant bacteria have occurred since 2011. The largest one, linked to Foster Farms chicken, began in spring 2013 and continued through summer
2014, infecting 634 people in 29 states. About 40 percent were sick enough to be hospitalized—double the usual percentage in salmonella outbreaks.

“Antibiotic-resistant bacteria are all too prevalent in our meat supply,” says Urvashi Rangan, Ph.D., executive director of the Food Safety and Sustainability Center at Consumer Reports. “Multistate outbreaks get a lot of attention, but the other reason producers give healthy animals low doses of antibiotics to keep them from getting sick. Under probably don’t work well to promote growth, at least in some animals. According to Hansen, that may be because animals farmed today differ genetically from those of yesteryear or because any effect from the antibiotics declined as bacteria grew resistant to the drugs.

The other reason producers give healthy animals low doses of antibiotics is to keep them from getting sick. Under pressure from large processors, over the past few decades small to midsized farms have increasingly been replaced by industrial-scale farms and feedlots that confine thousands of animals together, according to a recent analysis of Department of Agriculture farm census data by Food & Water Watch. In such crowded conditions disease can spread rapidly. These days farmers often have little say in how their animals are raised. “The majority of food animals now are raised under contracts with major meat-producing companies that require farmers to use feed supplied by the company that may be premixed with antibiotics,” Hansen says. “Many have no idea how much and what kind of drugs their animals get.”

Most of the antibiotics given to animals are in the form of drug-laced feed or water, according to the FDA.

Why Resistance Is Risky
Antibiotics do have their place on the farm: to treat sick animals. When the drugs are used in therapeutic doses, antibiotic resistance is less likely to occur. But the low doses given to animals routinely are problematic. “The combination of frequent antibiotic use and the conditions the animals are raised in creates a hospitable environment for superbugs to develop and proliferate,” Rangan says. The drugs can kill off weaker bacteria in the animals’ digestive tracts, leaving a few hardy survivors to multiply. Those bacteria, as well as certain antibiotic residues, are excreted in manure, which is the perfect medium for antibiotic-resistant bacteria to grow. Over time, you wind up with colonies of almost indestructible superbugs. “On industrial farms, the animals are literally surrounded by their own waste,” Rangan says. So those bacteria get on the animals’ hides and skin, and can contaminate the meat we eat when the animals are slaughtered. And, Rangan says, the bacteria continue to reproduce and spread resistance to other bacteria in the animal waste and can get into our environment if the waste is not well-managed.

The problem doesn’t just lie with the bacteria that cause foodborne illness. Once resistant bacteria are in the environment, they can mingle with other bacteria and share genetic material, which could contribute to additional antibiotic-resistant infections in hospitals and communities.

What has experts most concerned is the use of antibiotics that are important in human medicine or similar to ones that are. Antibiotic-resistant infections in hospitals and communities.

Why Animals Are Drugged
The practice of feeding drugs to animals dates back some 70 years. Thinking it would be easier to study nutrition in “sterile” chicks, a group of researchers fed them antibiotics with the intent of wiping out their gut bacteria. The “rather unexpected result,” according to the 1946 study, was that the chicks grew faster. By 1950, researchers had discovered that when given antibiotics, animals reached market weight sooner while consuming less feed. “At the time, they didn’t know why the animals grew faster,” Gail Hansen says. “We still really don’t.” But the profit advantage seemed clear, and adding the drugs to feed became standard practice. But research from the past 15 years suggests that today, antibiotics data underestimate the total number of illnesses because there are many more that occur at the local level.” For example, this past August, pork contaminated with salmonella immune to four antibiotics sickened 152 people in Washington state. “Over the years, we’ve tested hundreds of packages of supermarket meat, poultry, and shrimp, and found multidrug-resistant bacteria in samples from every type of animal,” Rangan says. (See “Our Flawed Food Supply,” on page 44.)

What has experts most concerned is the use of antibiotics that are important in human medicine or similar to ones that are. For example, tetracyclines are used in people, but certain types are used primarily in animals. If bacteria develop resistance to the animal drugs, they may also become resistant to the human tetracyclines. When resistant infections occur, doctors have limited options to treat them. For example, the strain of salmonella that sickened Ken Koehler was resistant to nine of the 15 antibiotics the CDC tested it against while investigating the outbreak.

Animal-only antibiotics are also a concern. A group of antibiotics called ionophores that are fed to animals are not generally important in human medicine. But there is a possibility that their long-term use could lead to problems with human drugs. And their use helps make it possible to continue to raise livestock and poultry in crowded conditions, where bacteria can quickly reproduce.
Which Chains and Producers Have the Best Practices?

Consumer Reports’ food-safety experts reviewed the antibiotic-use policies of popular chain restaurants and meat and poultry producers. The best policy bans human and animal antibiotics for growth promotion and disease prevention, as well as other drugs (beta-agonists and hormones) in all types of meat. Any routine drug use makes it possible for producers to avoid correcting conditions that can make animals sick in the first place. If a company permits the use of one of those drugs in at least one of the animals it raises or one type of meat it serves, you’ll see “Allows” in the Other Drugs column. Though some of the companies here have pledged to make changes in antibiotic use in the future, these are their practices at press time. Not all brands or companies are represented. For more details go to GreenerChoices.org/animalag.

<table>
<thead>
<tr>
<th>CHAIN RESTAURANTS</th>
<th>Antibiotics for Growth Promotion</th>
<th>Antibiotics for Disease Prevention</th>
<th>Other Drugs</th>
</tr>
</thead>
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<tr>
<td>Applebee’s</td>
<td>ALLOWS</td>
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<td>Chick-fil-A</td>
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<tr>
<td>Chipotle Mexican Grill</td>
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<td>Dunkin' Donuts</td>
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<td>McDonald’s</td>
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<tr>
<td>Outback Steakhouse</td>
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<tr>
<td>Panera Bread deli turkey</td>
<td>ALLOWS</td>
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<tr>
<td>Panera Bread beef, chicken, pork, roasted turkey</td>
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<tr>
<td>Pizza Hut</td>
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<tr>
<td>Wendy’s</td>
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</tbody>
</table>

1 Company has announced eliminating at least some antibiotic use, but the policy is not yet widely implemented. 2 Hormone and beta-agonist use legally prohibited in chicken. 3 Bans human but not animal antibiotics. 4 Bans antibiotic use in chicken but not in beef or pork.

<table>
<thead>
<tr>
<th>MEAT AND POULTRY PRODUCERS</th>
<th>Antibiotics for Growth Promotion</th>
<th>Antibiotics for Disease Prevention</th>
<th>Other Drugs</th>
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<tr>
<td>1855 Black Angus (JBS)</td>
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<td>Applegate (Hormel)</td>
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<td>BANS</td>
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<tr>
<td>Aspen Ridge (JBS)</td>
<td>BANS</td>
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<td>BANS</td>
</tr>
<tr>
<td>Bell &amp; Evans chicken</td>
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<tr>
<td>Black Canyon Angus Beef</td>
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<tr>
<td>(National Beef Packing)</td>
<td></td>
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<tr>
<td>Blue Ribbon Beef (JBS)</td>
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<td>Butterball</td>
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<td>Coleman Natural (Perdue)</td>
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<tr>
<td>Foster Farms Fresh &amp; Natural</td>
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<td>Foster Farms Simply Raised</td>
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<td>Gerber’s Amish Farm</td>
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<td>Swift (JBS)</td>
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<tr>
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AMERICA'S ANTIBIOTIC CRISIS | PART 3

Industry Pushback
Trade groups representing the meat and poultry industry mostly say that the drugs are not widely overused and that they do not put human health at risk. “An important point that’s often missing in this discussion is that antibiotics are really needed to both ensure animal health and welfare as well as food safety,” says Christine Hoang, D.V.M., assistant director of animal and public health at the American Veterinary Medical Association. Hoang says that the industry is already phasing out use of antibiotics for growth promotion and that drugs used for disease prevention are necessary. As for antibiotic resistance, she says the jury is still out. “The science that is available is unclear on how use of antibiotics in animals relates to human health and resistant infections in the community,” Hoang says. The association has gone on record as saying that the use of the drugs in food production “plays an extremely small role.” Other organizations that represent the animal agriculture industry echo that view. For example, the Animal Agriculture Alliance says that “layers of protection have been put in place to ensure that animal antibiotics don’t affect public health.”

Lance Price, Ph.D., a professor of environmental and occupational health at George Washington University in Washington, D.C., categorically disagrees. “As a microbiologist, I have dedicated my career to studying bacteria, and I know that those notions are false,” he says. “Studies dating back to the 1960s have repeatedly shown how antibiotic use in food-animal production contributes to the growing crisis of antibiotic-resistant infections in people.”

Consumer Reports’ tests show that, in general, meat and poultry from animals raised without antibiotics are less likely to harbor multidrug-resistant bacteria than meat from animals that get the drugs routinely. For example, in our most recent tests, we found that ground beef from conventionally raised cows was twice as likely as that from cows raised without antibiotics to contain superbugs. “Those results suggest that farming practices can profoundly affect the safety of our food,” Rangan says.

What happens on the farm also has implications for our health overall. Research shows that resistant bacteria bred on the farm wind up reaching people in a surprising number of ways. For example, farm workers can pick up antibiotic-resistant bacteria handling animals and manure; even if the germs don’t make them sick, they can still pass them along to other people.

Disposing of the more than 700 billion pounds of manure generated by industrial farming creates a health hazard as well. Some is used as commercial fertilizer and can spread superbugs to crops and taint streams and groundwater. Studies also suggest that resistant bacteria can be picked up and transmitted by flies and spread by the wind. In one study, for example, rural Pennsylvania residents living near fields fertilized with manure from pig farms were up to 38 percent more likely to develop MRSA infections than others in their community.

Government Loopholes
In 2013, the FDA announced a voluntary plan to change the way veterinary antibiotics are labeled and sold. The plan is voluntary, the FDA says, because “it is the fastest, most efficient way to make these changes.” People need a prescription for antibiotics, but currently almost all of the drugs are available over the counter for use in food animals. By the end of 2016, though, the FDA’s plan calls for requiring a veterinarian’s approval before feeding animals antibiotics that are important in human medicine. And those drugs will no longer be labeled for use for growth promotion.

But that doesn’t mean food producers will immediately cut back on antibiotics. Under the FDA plan, they can continue to use them by saying they’re to prevent disease. “That’s a pretty big loophole,” says Laura Rogers, deputy director of the Antibiotic Resistance Action Center at George Washington University’s Milken Institute School of Public Health. “In fact, it has the potential to make the FDA plan meaningless.” What’s more, producers are free to

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**Our Flawed Food Supply**

Over the past three years, we’ve tested four types of meat for bacterial contamination. We found superbugs in all of them. And in most of our tests, we saw differences between meat raised conventionally and meat that was more sustainably produced, without antibiotics. The number and type of bacteria we tested for vary, so the results from one test can’t be compared with those from another.

<table>
<thead>
<tr>
<th>Meat</th>
<th>Conventional samples</th>
<th>Sustainable samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>Total samples</td>
<td></td>
</tr>
<tr>
<td></td>
<td>contaminated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>superbugs</td>
<td></td>
</tr>
<tr>
<td>BEEF</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>Total samples</td>
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<tr>
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<tr>
<td>Sustainable samples</td>
<td>116</td>
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</tr>
<tr>
<td>SHRIMP</td>
<td>Total samples</td>
<td></td>
</tr>
<tr>
<td></td>
<td>contaminated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>superbugs</td>
<td></td>
</tr>
<tr>
<td>SHRIMP</td>
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<td>3%</td>
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<tr>
<td>Total samples</td>
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<tr>
<td>Farmed</td>
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<td>Wild</td>
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<table>
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<th>Meat</th>
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<th>Sustainable samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
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</tr>
<tr>
<td></td>
<td>contaminated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>superbugs</td>
<td></td>
</tr>
<tr>
<td>TURKEY</td>
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<td>80%</td>
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<td>Sustainable samples</td>
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</tr>
<tr>
<td>Chicken</td>
<td>Total samples</td>
<td></td>
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<tr>
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<td>contaminated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>superbugs</td>
<td></td>
</tr>
<tr>
<td>CHICKEN</td>
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<td>49%</td>
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<tr>
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</tr>
<tr>
<td>Sustainable samples</td>
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</tbody>
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Funding for these projects was provided by The Pew Charitable Trusts. Any views expressed are those of Consumer Reports and its advocacy arm, Consumers Union, and do not necessarily reflect the views of the Pew Charitable Trusts.
use other drugs to promote growth.

Indeed, for certain veterinary antibiotics, label directions—the dosages used and the way they are administered—for preventing disease are the same as those for promoting growth, according to a 2014 analysis by The Pew Charitable Trusts. What that means is that “the spigot of drugs can keep flowing,” says Rogers, who at the time of the study directed Pew’s campaign on human health and industrial farming.

Government actions have been “weak baby steps,” according to Price. “Until we take a stronger stand, we’re not leading the world in protecting important antibi-otics,” he says. “We are just supporting an industry trying to maximize profits at the expense of causing drug-resistant infections in people.”

Progress on Poultry
If you’ve read the headlines about companies pledging to reduce antibiotic use over the past year, you might think that the marketplace is solving the problem, even without tough regulations. Last spring, for example, McDonald’s announced that it would move toward serving chicken raised without antibiotics important to human medicine within two years, Tyson said it would phase out those drugs in chicken, and Wal-Mart called on its vast chain of suppliers to adopt guidelines for “responsible use of antibiotics.” And in the fall, Subway pledged to stop all antibiotic use, starting with poultry but expanding to other animals within 10 years. But a closer look reveals a lot of wiggle room in the way some of those pledges are phrased. “When a company says it will stop selling or producing meat or poultry with antibiotics important in human medi-cine, it can mean they simply switch to using other drugs like ionophores for disease prevention,” Rangan says. “That can increase our exposure to bacteria because it

‘Farming practices can profoundly affect the safety of our food.’

Meat-Label Lingo: What It Means and Doesn’t Mean

Shopping for “no antibiotics” meat and poultry can be confusing. Some of the labels can be misleading or opaque. To empower you while shopping, we have investigated the claims. For more label ratings, go to GreenerChoices.org/animalag.

**No Antibiotics Used Routinely**

**ANIMAL WELFARE APPROVED** No antibiotics are used for growth promotion or disease prevention. Some animal welfare and hygiene practices are addressed.

**GAP STEPS 1-5+ (SOLD AT WHOLE FOODS)** No antibiotics are used. Animal welfare and hygiene practices are addressed to varying degrees.

**NO ANTIBIOTICS/RAISED WITHOUT ANTIBIOTICS** The drugs aren’t used for any purpose. Similar claims: “no antibiotics administered,” “no antibiotics ever,” and “never given antibiotics.” Though those claims on their own are accurate, the ones accompanied by the USDA Process Verified shield are more reliable.

**ORGANIC** Animals can’t be given antibiotics. Sick animals treated with antibiotics can’t be labeled organic. The exception is chickens: They can be given antibiotics in the egg or on the day they hatch but not afterward.

**Antibiotics May Be Used**

**AMERICAN HUMANE ASSOCIATION** Neither animal nor human antibiotics are used for growth promotion, but both can be used for disease prevention. Some animal welfare and hygiene practices are addressed.

**GRASSFED** Don’t assume all grass-fed beef is raised without routine antibiotics; look for a no-antibiotic or organic label as well. Also, the American Grassfed Association seal means no antibiotics, and the claim is verified.

**NATURAL/ALL NATURAL** This has nothing to do with antibiotics, hormones, or other drugs, or how the animal was raised. In fact, “natural” on meat and poultry means only that it contains no artificial ingredients or added color and is only minimally processed.

**NO HORMONES** This doesn’t mean no antibiotics or other growth promotants. By law hormones can’t be used in poultry or hogs, so packages of meat from those animals with this claim are no different from those without it.

Her daughter, Ruby, had a bout with salmonella when she was just 10 months old, and that had a big effect on Melissa Lee’s grocery-shopping habits. “Before, I bought what was on sale or what looked good,” she says. “Now I look for no antibiotics and no hormones. What goes in our bodies makes a big difference.”
allows animals to continue to be raised in conditions that promote the bugs’ growth and spread.” And, she adds, claims such as “sustainable” and “responsible antibiotic use” aren’t regulated. Companies are free to define them as they see fit. “Moreover, some of these changes won’t take place for many years.”

Much of the progress in reducing antibiotic use has been in chicken, not in other animals. Certain chicken producers, including Perdue and Tyson Foods, have pledged to reduce their use of antibiotics and are already making changes. For example, Perdue says that 96 percent of its chickens are not given antibiotics used in human medicine; more than half receive no antibiotics ever. To achieve that, the company had to “relook at virtually everything,” says Bruce Stewart-Brown, D.V.M., senior vice president of food safety, quality, and live production at Perdue. Changes include constructing cleaner hatcheries, using probiotics (which may help foster the growth of healthy bacteria) in the birds, and expanding the use of vaccinations to prevent disease.

Even when it comes to chickens, though, Rogers points out that not every pledge involves eliminating all antibiotics. “When people say, ‘Good job, you’re almost there,’ I say, ‘Whoa, we’re so far from almost there,’” she says. “There’s been a lot of ‘me too’ on chicken, but until it’s verified to be raised without antibiotics and there is movement when it comes to turkey, pork, and beef, it’s far from time to raise the victory flag.”

“It’s good that change is taking place, but it’s moving too slowly,” Rangan says. “Ideally not only would all meat be raised

### Protections That Consumers Deserve and Should Demand

The changes recommended by the Food and Drug Administration to reduce antibiotic use in livestock and poultry, and the changes that certain players in the food industry have made, are good first steps, but government and industry must do more to create meaningful change. These are the steps Consumer Reports recommends.

#### THE GOVERNMENT SHOULD

**Ban the routine use of antibiotics important to human medicine.** The FDA has issued voluntary guidelines that phase out the use of these drugs for growth promotion but still allow their use for disease prevention with a veterinarian’s approval. That leaves the door open to animals getting antibiotics routinely. At a minimum, the FDA should prohibit all uses of medically important antibiotics except for the responsible treatment of sick animals. Congress should pass the Preservation of Antibiotics for Medical Treatment Act to require the FDA to move in that direction, and state legislatures should establish similar requirements. Ideally, CR believes, no drugs should be given to healthy animals routinely.

**Improve monitoring of antibiotic use.** Right now, because of inadequate and untimely data, it’s very difficult to measure how well programs to reduce the use of antibiotics are working—and it’s impossible to identify problem areas. The FDA, working with the Department of Agriculture, should collect more detailed data from feed mills and veterinarians on the actual use of antibiotics in food animals—including the particular drug, animal species, and purpose for which the drug was used—and publicly release the data. Congress should pass the Delivering Antimicrobial Transparency in Animals Act or similar legislation that would make that mandatory.

#### THE FOOD INDUSTRY SHOULD

**Implement more sustainable agriculture practices.** The vast majority of animals are raised or finished in crowded, confined, and unsanitary conditions, where they are susceptible to disease outbreaks. Drug use in animal agriculture will be more likely to decline if changes are made to the way animals are raised.

**Use clear and meaningful labels.** Those such as the USDA Organic seal, or a true “no antibiotics” claim accompanied by a USDA Process Verified shield, are reliable because they are independently verified. Other labels, which either prohibit antibiotic use or allow antibiotics only for the treatment of sick animals, include Animal Welfare Approved, Global Animal Partnership, and American Grassfed. Companies should not use the “natural” label.

**Prohibit misleading labeling.** The USDA requires producers making a no-antibiotics claim to submit paperwork that states that animals were raised without antibiotics. But the agency has approved some claims that imply “no antibiotics,” when in fact they can still be used for disease prevention. One example, found on turkey, is “no antibiotics used for growth promotion” accompanied by the USDA Process Verified shield. The claim does not mean “no antibiotics,” but the shield gives a false sense of credibility. The USDA should not approve such claims unless antibiotics are never used. The department should also address the misleading use of the “natural” label, which can be used on meat and poultry raised with antibiotics and other drugs.

**Offer consumers more sustainable options.** Grocery stores and restaurants—large chains in particular—should phase out the sale of meat and poultry raised with the routine use of antibiotics and other drugs. They should use their purchasing power to encourage suppliers to raise animals in more humane and hygienic conditions.
without any routine antibiotics, but we also would raise animals for food differently. Crowded conditions and unsanitary practices on factory farms are a big part of what makes daily antibiotics and other drugs necessary in the first place.”

**Consumers as Change-Makers**

The biggest driver of change, the CDC’s Tauxe says, is likely to be consumer demand: “It comes down to millions of consumers making choices every day about what food to buy and the level of safety they want for their families.”

More than one-quarter of Americans report that they are buying meat and poultry raised without antibiotics. More often than they did a year ago, according to a nationally representative survey of 1,008 adults from the Consumer Reports National Research Center in September 2015. Almost half said that they check labels on meat and poultry packaging with claims for a “no antibiotics” claim.

And it is becoming easier to find those products. The percentage of labels on meat and poultry packaging with claims about animals raised without antibiotics more than doubled between 2011 and 2014, according to a recent report from the market research firm Mintel. Meat and poultry sold at Whole Foods, for example, never comes from animals treated with antibiotics, but Consumer Reports’ shoppers have also found a wide selection of no-antibiotic products at chains across the U.S., including Giant, Hannaford, Publix, QFC, Ralphs, and Trader Joe’s.

But consumers don’t always know what they’re buying in their quest for no-antibiotic meat. “We also see quite a bit of confusion about what claims mean,” says Julia Gallo-Torres, a senior analyst at Mintel. The report found that one of the top factors people consider, for example, is whether a product is “all natural.” But that claim doesn’t indicate anything about how an animal is raised or whether drugs are used. Two reliable claims to look for: “organic” and “no antibiotics administered.”

The box on page 45 defines the most common antibiotic-related claims on meat and poultry packaging.

Some argue that changing current farming practices to make antibiotics unnecessary would make meat prohibitively expensive for the average consumer to buy. But that assumption is not always true. A 1999 report from the National Research Council (the most recent data available) found that if all routine use of antibiotics were eliminated, the cost to consumers would be about $10 per year—around $4 in today’s dollars.

Farms in the U.S. and around the world are proving that it’s possible to raise all types of livestock without the excessive use of drugs. For example, Niman Ranch, one of the largest suppliers of sustainable meat in the U.S., eschews factory farming. Instead it relies on a network of more than 700 family ranchers and farmers that supply the company with meat raised according to its strict standards, which include never using antibiotics. “If your animals are living in a healthy environment—they are given enough space and not stressed—and you vaccinate them against routine diseases, then antibiotics aren’t needed,” says Paul Willis, a hog farmer who was one of the founders of Niman Ranch. Willis says that sick animals would still be treated with antibiotics, but their meat could not be sold under the Niman Ranch label. But he says that rarely happens. “We take care of our animals,” Willis says. “I haven’t had a really sick pig that needed antibiotics for years.”

Scandinavian countries are modeling how it can work on a large scale. For example, Denmark stopped the use of antibiotics for growth promotion in broiler chickens and pigs about 15 years ago without harming the animals’ health or the farmers’ incomes. And in 2009, the Netherlands, one of the world’s largest meat exporters, set a goal of halving the amount of antibiotics farmers use in four years; it met that goal a year early.

“Europe has no more disease in livestock that we have here. They haven’t seen a difference in animal growth,” Hansen adds. “That experience proves that it is possible to maintain a thriving agriculture industry using far less drugs.”

**‘Legislation is important.’**

Before Ken Koehler got severely ill from ground beef tainted with antibiotic-resistant salmonella, he had never heard of antibiotic resistance. “I’ve gotten quite an education since,” he says. “The majority of antibiotics are used on healthy animals, and it’s creating strains of bacteria that are dangerous because most antibiotics won’t work against them. I support legislation to ban antibiotic use in healthy animals.”

**ACT**

Share your infection story. Go to SafePatientProject.org/share-your-story

Learn when antibiotics are, and aren’t, needed. Go to ConsumerHealthChoices.org/antibiotics

Help stop the unnecessary use of antibiotics in raising animals for food. Go to ConsumersUnion.org/animals-off-drugs

Follow @ConsumerReports on Twitter and Facebook, and help us stop the spread of superbugs. #SlamSuperbugs