

Resistance – Not All Germs Are Created Equal

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✓ Fact Checked

June 10, 2022

STORY AT-A-GLANCE

- › The documentary film “Resistance” explains the problem of antibiotic resistance, how it was created and what can be done to turn the situation around
- › Antibiotics in medicine have been widely overprescribed and have also been routinely used for growth promotion purposes in livestock, giving rise to bacteria that are now resistant to one or more antibiotics
- › Antibiotics such as oxytetracycline and streptomycin are also used as pesticides in agriculture, and both of these antibiotics are used in human medicine as well
- › In the U.S. alone, antibiotic-resistant pathogens are conservatively estimated to cause at least 2.8 million infections annually, leading to 35,000 deaths each year
- › Drug-resistant urinary tract infections and tuberculosis are on the rise, as are several sexually transmitted diseases

This article was previously published June 9, 2018, and has been updated with new information.

Antibiotic resistance has become a major threat to public health worldwide, and the primary cause for this man-made epidemic is the widespread misuse of antibiotics – drugs used to combat bacterial infections in humans and animals. Over the decades, antibiotics have been widely overprescribed for infections that don't respond well, or at all, to these drugs.

Viral infections, for example, cannot be treated with antibiotics since they only kill bacteria, yet many of you have likely taken a course of antibiotics for an ear infection or a bout of cold or flu – all viral infections. Antibiotics have also been routinely used for growth promotion purposes in livestock, and this practice continues in the U.S. to this day, despite the well-known risks.

In the U.S. alone, antibiotic-resistant pathogens are conservatively estimated to cause at least 2.8 million infections annually, leading to 35,000 deaths each year.¹ Globally, data from a January 2022 study in *The Lancet*² show that there are 4.95 million deaths associated with antibiotic-resistant infections and 1.27 million directly attributable to them, with the leading infections being *E. coli*, *S. aureus* and *K. pneumoniae*.

Statistically, an estimated 21.5% to 64.91% of *K. pneumoniae* infections are now resistant to several different antibiotics, making these infections extremely difficult to treat.³ The rise in pan-resistance (resistance to multiple drugs) in turn has led to a significant increase in use of carbapenems – a class of last-line antibiotics.

Disturbingly, carbapenem-resistant Enterobacteriaceae are also rapidly becoming more common in hospitals,⁴ and an estimated 1 in 25 patients now ends up with a hospital-acquired infection.⁵

The Rise of Antibiotic Resistance

The featured 2015 documentary, "Resistance: Not All Germs Are Created Equal,"⁶ delves into the history of bacteria, antibiotics, and the subsequent development and spread of antibiotic resistance. It also features personal stories of people impacted by drug-resistant infections. Not surprisingly, those affected generally feel we've squandered an awesome resource by overusing antibiotics, thereby creating bacteria that are impervious to these drugs.

For years now, scientists have warned we are entering a preantibiotic era once more, where infections that were once simple to treat will become deadly. Already, drug-resistant urinary tract infections (UTIs) and tuberculosis are on the rise, as are several

sexually transmitted diseases. For example, the two main strains of syphilis in circulation worldwide have developed resistance to azithromycin, the second drug of choice for this infection.^{7,8}

The Street Strain 14 (SS14), which is a newer strain, appears to be far more drug-resistant than the older Nichols strain. A whopping 90% of the SS14 samples had drug resistance genes. There's also evidence showing the three most common STDs — chlamydia, gonorrhea and syphilis — are all developing pan-resistance.

Gonorrhea is already resistant to all antibiotics that have been used against it, and is rapidly developing resistance against cephalosporins, the drugs of last resort. In the case of UTIs, drug-resistant infections have actually been traced back to the consumption of chicken contaminated with antibiotic-resistant E. coli. As more and more antibiotics become useless, surgeries will also become life-threatening events, and organ transplants may become virtually impossible.

Efforts to Scale Back Human Consumption of Antibiotics Fail

Between 2000 and 2015, the global human consumption of antibiotics rose by 65%, reaching 42 billion doses a year.⁹ The increase was driven by low- and middle-income countries and, if no policy changes are made, it's estimated that global antibiotic consumption will rise up to 200% higher by 2030.

Use of antibiotics in high-income countries still remains higher than in most low- and middle-income countries, but their use is rising fast — a concern, in part, because antibiotics are often available without a prescription in lower-income countries, making the potential for abuse high.

In the U.S., while rates of antibiotics didn't rise sharply, they also didn't fall, which suggests efforts to scale back inappropriate usage have largely failed. Lance Price, director of the Antibiotic Resistance Action Center at George Washington University, told NPR:¹⁰

"The biggest driver for the evolution of superbugs is the use of antibiotics ... The more we use antibiotics, the more we are going to encourage the growth of these bacteria that are resistant to them ... [Already] you have these extreme cases like the woman [in Nevada] just about a year ago who died of an infection that was resistant to 26 different antibiotics ...

So, bacteria are out there that are resistant to everything, and they are becoming more and more prevalent."

You're Exposed to Antibiotics From Several Sources

As mentioned, antibiotic overuse occurs not just in medicine, but also in food production. In fact, agricultural uses account for about 80% of all antibiotic use in the U.S.,¹¹ so it's a major source of human antibiotic consumption. The peril with giving animals antibiotics is that it alters their gut microbiome (this is also, in part, how antibiotics promote unnatural growth in the animal).

In the process, some of those gut bacteria become antibiotic-resistant. One of two things can then happen. Either the drug-resistant bacteria are passed into the environment via the animal's manure, or the gut contents may contaminate the meat during slaughter or processing.

So, antibiotics given to animals enter your food supply not only via meat, but also through manure used as fertilizer on crops. Indeed, at least two studies^{12,13} show most vegetables grown in soil fertilized with manure will uptake antibiotics into leaves, plant tissues and tubers, and the greater the amount of antibiotics in the manure, the higher the levels detected in plant tissues.

One of the studies, funded by the U.S. Department of Agriculture (USDA), found that root crops, which are in direct contact with soil, are particularly prone to antibiotic contamination. Antibiotics such as oxytetracycline and streptomycin are also used as pesticides in agriculture — primarily on fruit orchards, but also on some vegetable crops — and both of these antibiotics are used in human medicine as well.¹⁴

Protecting your gut health and reducing the spread of antibiotic-resistant bacteria are significant reasons for making sure you're only eating organically raised grass fed meats and animal products, and biodynamic fruits and vegetables. You can also help yourself and your community by using medical antibiotics only when absolutely necessary, and avoiding antibacterial products altogether.

This includes antibacterial soaps, wipes, gels and sprays, as well as personal hygiene and household products containing antimicrobial agents, such as triclosan-containing sanitizers and Microban-treated cutting boards.

While the U.S. Food and Drug Administration issued a final rule in 2016¹⁵ that manufacturers must remove triclosan and a related ingredient, triclocarban, from antiseptic wash products, they decided not to ban it from toothpaste products, hand sanitizers and mouthwashes, which means you may still find these products in the dental aisles at your local store, which leaves 75% of the U.S. population still exposed to this compound.¹⁶

US Has Been Lax on Curtailing Antibiotic Use in Factory Farms

In August 2017, PBS News¹⁷ featured a concise overview of how concentrated animal feeding operations (CAFOs) serve as breeding grounds for antibiotic-resistant superbugs – and how farmers have the power to change that by raising their animals in a more natural way. Perhaps most disturbing is the FDA's lack of action on this issue, even as antibiotic-resistant disease has become a pressing public health threat.

The FDA issued voluntary guidance on agricultural antibiotics in 2013, asking drug companies to remove indications for "feed efficiency" and "weight gain" from the labels of their antibiotic products. They also required veterinarians to oversee any addition of these drugs to animal feed and water. Most companies agreed to comply with the guidelines and state they no longer use antibiotics for growth promotion purposes, but there's a major loophole being exploited.

Instead of saying the drugs are being used to promote growth, they simply state they use the antibiotics for disease prevention and control, a use that is still allowed under the FDA's guidance. Last year, the FDA officially banned the use of antibiotics for the purpose of growth promotion altogether. A veterinary prescription for antibiotics is now required.

However, this outright ban has had no real impact either. CAFOs are still dispensing antibiotics as usual, since it's easy enough to obtain a veterinary prescription.

Stop Nonmedical Use of Antibiotics to Reduce Drug Resistance

In 2017, the World Health Organization also called on farmers and the food industry to stop the use of antibiotics in healthy animals to "help preserve the effectiveness of antibiotics that are important for human medicine."¹⁸

They cited a study¹⁹ published in *The Lancet Planetary Health*, which found reducing antibiotic use in food-producing animals reduced antibiotic-resistant bacteria in the animals by up to 39% and may similarly reduce such bacteria in humans, particularly those who are directly exposed to food-producing animals.

Lower levels of antibiotic-resistant bacteria in the animals also means less risk to those who consume the meat. In a *Consumer Reports* study²⁰ of 300 raw ground beef samples published in 2015, CAFO samples were three times more likely to be contaminated with multidrug-resistant bacteria compared to grass fed beef raised without antibiotics. The grass fed beef was also less likely to be contaminated with *E. coli* and *Staphylococcus aureus* than the CAFO meat.

As it stands, the excessive use of antibiotics among CAFO animals has turned them into veritable "disease factories"²¹ and, in the U.S., when the FDA tests raw supermarket chicken, they routinely find antibiotic-resistant bacteria to be present.²²

Outrageously, USDA acting chief scientist Chavonda Jacobs-Young countered WHO's international call to action saying,²³ "The WHO guidelines are not in alignment with U.S.

policy and are not supported by sound science. The recommendations erroneously conflate disease prevention with growth promotion in animals."

This assertion flies in the face of previous investigations showing that nontherapeutic use accounts for an estimated 93% of the antibiotics used in American livestock.^{24,25}

Are Antibiotics Essential in Farming?

The question is, are antibiotics absolutely essential in farming? There's plenty of evidence to suggest the answer is no. It does, however, require some healthy changes to be implemented. Pastured animals, for example, rarely need antibiotics as they're nowhere near as prone to disease as animals raised in confinement. Other countries have also shown that antibiotic-free meat can be produced on a larger scale.

In the featured documentary, the filmmakers travel to Denmark, a country in which reforms to tackle drug resistance by eliminating antibiotic use in livestock began in the late 1980s. The EU followed suit, ending the use of antibiotics for growth promotion in 2006, and as noted in the film, raising antibiotic-free meat would be just as feasible in the U.S. as it is in Denmark and other European countries.

Denmark's success is also detailed in a 2014 article in *Environmental Health Perspectives*,²⁶ which notes:

"One of the most striking aspects of Denmark's transformation in antibiotics policy is that it reportedly has had little negative impact on the nation's pork industry. From 1992 to 2008, antibiotic use per kilogram of pig raised in Denmark dropped by more than 50 percent. Yet overall productivity increased.

Production of weaning pigs increased from 18.4 million in 1992 to 27.1 million in 2008. Pig mortality began increasing in 1994 but fell sharply after 2004 and by 2008 was similar to 1992 levels. According to Niels Kjeldsen, a veterinarian with the Danish Agriculture and Food Council, the cost of raising pigs has gone up by about €1 per animal, from birth to slaughter, since the ban.

'We have more efficient production and less disease,' says Jørgen Schlundt, director of the National Food Institute ... Many Danish farmers now allow piglets to stay with their mothers for a longer period, which allows them to build their immune systems naturally ..."

Strategies to Protect Yourself

As noted in the film, it seems inevitable that antibiotic resistance will continue to climb, and that treatment will become more expensive. Unless the drug industry starts making antibiotic development a priority, we may soon lose the fight against drug-resistant bacteria, which will inevitably mean more people will die from infections that were once relatively easy and inexpensive to treat.

While the problem of antibiotic resistance needs to be addressed through public policy, our individual choices also add up, and will influence your personal risk. The following strategies will help curtail the growth of antibiotic resistance in general and lower your personal risk of contracting and/or spreading a drug-resistant infection:

Infection prevention, with a focus on strengthening your immune system naturally. Avoiding sugars, processed foods and grains, stress reduction and optimizing your sleep and vitamin D level are foundational for this. Adding in traditionally fermented and cultured foods is also important, as this will help optimize your microbiome.

The Nitric Oxide Dump exercise will also help improve your immune status. Contrary to supplements that boost immune function, which should be taken only as needed, this exercise is a preventive method that should ideally be done daily.

Limit your use of antibiotics — Any time your doctor prescribes an antibiotic, ask if it's absolutely necessary, and keep in mind that antibiotics do not work for viral infections. For example, antibiotics are typically unnecessary for most ear infections, and they do not work on the common cold or flu, both of which are caused by viruses.

Avoid antibiotics in food by purchasing organic or biodynamic grass fed meats and animal products and organically grown fruits and vegetables.

Avoid antibacterial household products such as antibacterial soaps, hand sanitizers and wipes, as these promote antibiotic resistance by allowing the strongest bacteria to survive and thrive in your home.

Properly wash your hands with warm water and plain soap, to prevent the spread of bacteria – Be particularly mindful of washing your hands and kitchen surfaces after handling raw meats, as about half of all meat sold in American grocery stores is likely to be contaminated with pathogenic bacteria. Avoid antibiotic soaps that typically have dangerous chemicals like triclosan.

Take commonsense precautions in the kitchen – Kitchens are notorious breeding grounds for disease-causing bacteria, courtesy of contaminated meat products, including antibiotic-resistant strains of E. coli. To avoid cross-contamination between foods in your kitchen, adhere to the following recommendations:

- Use a designated cutting board, preferably wood, not plastic, for raw meat and poultry, and never use this board for other food preparation, such as cutting up vegetables. Color coding your cutting boards is a simple way to distinguish between them
 - To sanitize your cutting board, use hot water and detergent. Simply wiping it off with a rag will not destroy the bacteria
 - For an inexpensive, safe and effective kitchen counter and cutting board sanitizer, use 3% hydrogen peroxide and vinegar. Keep each liquid in a separate spray bottle, and then spray the surface with one, followed by the other, and wipe off
 - Coconut oil can also be used to clean, treat and sanitize your wooden cutting boards. It's loaded with lauric acid that has potent antimicrobial actions. The fats will also help condition the wood
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About the Distributor

I believe in bringing quality to my readers, which is why I wanted to share some information about Gaia, the distributor of "Resistance." We sat down to learn a little more about what goes in to making these films. Thank you to Gaia for sharing with us.

What is Gaia?

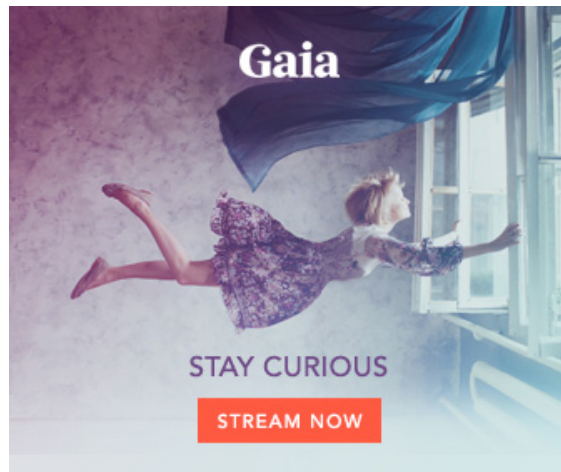
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