EXTENSION

AGEC-1067

What consumers need to know about the use of antibiotics in food animal production

July 2025

One concern consumers have is the possibility of antibiotic residues on meat products. While it could be possible that meat and dairy products contain antibiotic residues, it is very unlikely. The United States Food and Drug Administration studied antibiotic contamination in milk from dairy cows. The study targeted producers who had previously failed residue tests for the meat from their cull cows (cows that are no longer producing milk and are sold for use as meat) in comparison to a group of producers without a history of a failed residue tests. The result showed that 99.22% of the combined samples had no residues. However, after the FDA released the results, headlines contained misleading information implying that almost 1% of U.S. milk supplies were tainted with antibiotics. The problem is the FDA targeted farms with a history of non-compliance, so it was not a random sample. In short, non-compliant farms were over-represented in the study (about 50% of the samples), meaning the actual percentage of milk produced with residues is *far* lower than the study's 0.78% rate. The complete study can be found at https://www.fda.gov/media/91217/download.

Below we answer common questions regarding the use of antibiotics in animal agriculture. Our focus is on why antibiotics are used in meat animal production and the potential to contribute to antibiotic-resistant bacterial infections in humans.

Why do farmers use antibiotics in livestock production?

First, antibiotics are used to prevent, treat and control bacterial infections in livestock. Just like humans, animals can contract infections, such as pneumonia. Antibiotics are used to humanely and economically treat and prevent these diseases. While often portrayed as cruel and uncaring by some in the media, the vast majority of livestock producers are very concerned about the welfare of the animals under their care. Leaving sick animals to suffer from infections that are easily treated with antibiotics is cruel and inhumane. In addition to their humanity, farmers stay in business and feed their own families by earning profits through livestock and milk production. Unhealthy animals are unprofitable, can infect other animals in the herd and may die. In short, it is in farmers' best interest to provide appropriate veterinary care for sick and injured animals.

Second, antimicrobials can increase animal performance. By using antimicrobials, farmers can produce more meat with less feed input. Some antimicrobials change the colony of bacteria in the rumen (one of four stomachs in cattle) to produce more of the compounds needed by cattle for growth. Some are used to prevent diseases that are difficult to control once an animal is infected. For example, anaplasmosis is a disease carried by parasitic insects that feed on cattle. Once infected, mature beef cattle (breeding cows and bulls) usually die within days. Importantly, the antibiotics used to increase production (a class of products referred to as ionophores) are not used to treat people nor do they leave residues in meat if properly used. Antibiotics used to treat diseases in humans can no longer be used in livestock to improve production; they are strictly used for the prevention, control and treatment of disease.

Why has the use of some antibiotics in U.S. animal agriculture been discontinued or regulated?

The pharmaceutical industry voluntarily agreed to eliminate non-therapeutic uses of antibiotics to reduce the likelihood that resistant bacteria develop and threaten human health. There are several classes of antibiotics that are used in both humans and livestock production. There is some probability that the continued use of these antibiotics to improve performance of livestock would have sped up resistance in bacteria that infect people. To our knowledge, there have been no documented cases of infections in people attributed to antibiotic-resistant bacteria originating from livestock. However, cases of individuals being colonized (the presence of bacteria without illness) by antibiotic-resistant bacterial strains have been documented. These strains are believed to have originated in livestock and often the colonized individuals have been in contact with livestock (Landers et al.). So, there are

reasons to be concerned about the potential for impacting human health. Out of an abundance of precaution, classes of antibiotic drugs used in human medical care cannot be used in animals except for purposes of disease prevention, control and treatment.

Why not eliminate all antibiotics in animal agriculture?

There are three reasons not to eliminate antibiotics in animal agriculture. First, it would be inhumane to allow animals to suffer when they contract diseases that can be treated or prevented with antibiotics. Second, it is unclear what the public health benefits would be from eliminating usage for prevention, control and treatment of disease in animals. Further study is warranted, but it is likely that animal welfare and economic impacts would far outweigh the limited benefits derived from a complete ban. Lastly, it is uneconomical to allow animals to suffer and/or die from treatable and/or preventable diseases. The agriculture and food sector contributes about $1.5 trillion (in 2024) to the U.S. economy and provides about 22 million jobs, 10.4% of jobs in the U.S. (in 2023). If antibiotics were eliminated, fewer meat and milk animals would be produced in the U.S., making food far more expensive and eliminating many jobs. Lower-income U.S. citizens would suffer the most from increased food prices. Given the U.S. exported over 4.3 million metric tons of beef and pork products worth over $19 billion (in 2024), foreign consumers would also be impacted with their poor being the most significantly harmed.

How do we know that meat, eggs and milk do not contain potentially dangerous antibiotic residue levels?

When antibiotics are used to prevent, control, or treat disease, livestock producers are required to stop using the antibiotic for a specified length of time (called a withdrawal period) before selling animals for processing. The withdrawal period assures that residues in excess of allowable limits will not be present in carcasses if the producer follows protocols. Producers who fail to withdraw antibiotics face regulatory actions, and carcasses testing positive for residues are destroyed.

The U.S. Department of Agriculture inspects animal carcasses to reduce the likelihood that meat is sold with antibiotic residues in excess of allowable limits. Producers selling animals that test positive for antibiotic residues face regulatory action and increased testing of future animals sold for slaughter.

Antibiotics used in animal agriculture are labeled with instructions limiting the amount of the product injected, fed or consumed through water and mandatory withdrawal period. They also include instructions on method of injection for injectable drugs. These instructions, if followed, greatly reduce the likelihood of a positive test for antibiotic residues.

The USDA and FDA test for antibiotic residues in carcasses and food products. Carcasses testing positive for residues are condemned and are not used for human consumption. Despite all precautions, there are very isolated cases of meat with antibiotic residues reaching consumers. Only in a very small percentage of those cases were there adverse effects, such as allergic reactions. A 2006 study (Doyle) reported two cases, one from 1972 and another from 1984.

Are more antibiotics used in veterinary medicine than in human medicine?

If we just look at the quantity used, then yes. However, there are far more farm animals, including beef and dairy cattle, sheep, goats and poultry, than humans in the U.S. According to an article in the Journal of the American Veterinary Medical Association, humans and their pets use at least 10 times more antibiotics per year than what is used for food-producing animals when adjusted for the weight of people and their pets versus the weight of animals used for food production (Barber). According to Barber, this suggests that human and pet use of antibiotics is a more likely source of antibiotic resistance.

References

Barber, D. A. (2001). New perspectives on transmission of foodborne pathogens and antimicrobial resistance. *Journal of the American Veterinary Medical Association, 218*(10), 1559–1561.

Doyle, M. E. (2006). Veterinary Drug Residues in Processed Meats—Potential Health Risk: A Review of the Scientific Literature. *Food Research Institute Briefings, University of Wisconsin—Madison.*

Food and Drug Administration Compliance Program Guidance Manual, Chapter 71: Post approval monitoring of animal drugs, feeds, and devices. (2023, April 7). https://www.fda.gov/media/74810/download?attachment

Inspection of Meat Products | Food Safety and Inspection Service. (2012). Usda.gov. https://www.fsis.usda.gov/inspection/inspection-programs/inspection-meat-products

Landers, T. F., Cohen, B., Wittum, T. E., & Larson, E. L. (2012). A Review of Antibiotic Use in Food Animals: Perspective, Policy, and Potential. *Public Health Reports*, 127(1), 4–22.

Medicine, C. for V. (2022). Drug Residues. *FDA* https://www.fda.gov/animal-veterinary/compliance-enforcement/drug-residues

Milk Drug Residue Sampling Survey. (2015, March). Food and Drug Administration's Center for Veterinary Medicine. https://www.fda.gov/media/91217/download

U.S. Meat Export Federation. (n.d.). https://www.usmef.org/

Zahniser, S., & Kassel, K. (2024, December 19). *USDA ERS - Ag and Food Sectors and the Economy.* https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx

Cheryl S. DeVuyst
Department of Agricultural Economics

Eric A. DeVuyst
Department of Agricultural Economics

Scan the code or visit **extension.okstate.edu/fact-sheets** for more OSU Extension fact sheets.

EDUCATION EVERYWHERE FOR EVERYONE
Division of Agricultural Sciences and Natural Resources

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President for Agricultural Programs and has been prepared and distributed at a cost of 20 cents per copy. July 2025 SM.

AGEC-1067-3