

ANTIBIOTIC USE IN LIVESTOCK PRODUCTION: ENSURING ANIMAL HEALTH

Why are antibiotics used in livestock and poultry production?

Antibiotics are used in animals for the same reasons they are used in humans: to treat and control diseases and ensure health.

When an animal exhibits clinical signs of an illness or a condition like a respiratory infection or a skin infection, a veterinarian may prescribe an antibiotic drug to treat that condition - just as a doctor would with a human that is sick.

Antibiotics can also be used in a preventative manner. For example, veterinarians use antibiotics to prevent disease at vulnerable times, such as weaning, when animals are very susceptible to disease that can kill them quickly, sometimes in less than 24 hours. Rather than wait for a full-blown infection to manifest and spread throughout the entire herd, some producers, under the careful supervision of veterinarians, may give a group of cattle an antibiotic to prevent an outbreak. Many times it is easier to control the total herd health through the early prevention of a contagious illness.

How is antibiotic use regulated?

The Food and Drug Administration (FDA) regulates all drugs, including antibiotics administered to animals that produce food. FDA has extensive guidelines about how antibiotics must be used to ensure safety for both people and animals. All antibiotics used to keep animals healthy have been evaluated through a rigorous approval process, have been shown to be safe and effective, and have been reviewed for their potential to cause increased antibiotic resistance. Consumers can be confident that this process ensures the safest meat in the world ends up on America's dinner tables.

What is antibiotic resistance?

In nature, microorganisms define the term "survival of the fittest." For as long as we have recognized the existence of microscopic bacteria, we have also understood that in the face of any threat, bacteria must develop a resistance to the external threat. They adapt to survive.

The term "antibiotic resistance" refers to the ability of microorganisms to withstand the effects of antibiotics.

For this reason, both doctors and veterinarians are cautious in prescribing antibiotics and they think carefully about which antibiotic to prescribe for particular situations. In doing so, their goal is to minimize the development of organisms that are resistant to the antibiotics that are available for both humans and animals.

What role does human antibiotic use play in antimicrobial resistance?

In September 2013, the Centers for Disease Control and Prevention (CDC) released a new report called *Antibiotic Resistance Threats in the United States*. In releasing the report, CDC's Director Thomas Frieden, MD, said, "Right now the most acute problem is in hospitals. And the most resistant organisms in hospitals are emerging in those settings, because of poor antimicrobial stewardship among humans." According to the report, 50 percent of all the antibiotics prescribed for people are not needed or are not optimally effective. The report expressed concern about the use of antibiotics for growth promotion in animal production, which was phased out by the FDA in January 2017.

I've heard that an estimated 80 percent of all antibiotics in the U.S. are used in healthy pigs, poultry and beef cattle. Is that true?

Critics of the use of antibiotics in animals cite this statistic, but this "80 percent" is meant to shock and scare consumers. The operative word in the "fact" is "estimated." This figure comes from an unscientific report by the Union of Concerned Scientists (UCS) that *estimated* the amount of antibiotics used in human medicine. No public data are available to quantify antibiotic use in humans.

The figure also includes antibiotics used to prevent and control disease in animals, which are considered "therapeutic" by the FDA, American Veterinary Medical Association (AVMA) and the World Organization for Animal Health (OIE). According to the Coalition for Animal Health, which compiles the annual data from animal health makers, 87 percent of antibiotics used in animals are used for therapeutic purposes.

Does antibiotic use in livestock or poultry production increase the chance that antibiotic resistant bacteria may be present on meat or poultry products in retail stores?

Due to the natural evolution of resistance, antibiotic resistant microorganisms can be found everywhere. Humans, plants, insects, and animals - including pets - can harbor and transfer antibiotic resistant microorganisms to others. Fortunately, microbial contamination on food products in the U.S. is very low.

Does cooking kill antibiotic resistant microorganisms?

Yes. All foodborne bacteria, whether they are antibiotic resistant or not, are destroyed at recommended cooking temperatures, which is 145°F with a 3 minute hold period. Proper cooking of meat and poultry products ensures a safe eating experience.

How do I know there are no residues in my meat products?

USDA's Food Safety and Inspection Service (FSIS), which regulates and inspects meat and poultry products, works with the Environmental Protection Agency (EPA) and the FDA to control veterinary drug, pesticide, and environmental contaminant residues in meat, poultry, and egg products. Residue control is a cooperative effort. The EPA and FDA establish residue tolerances, and FSIS, through the National Residue Program (NRP) tests animal tissues and egg products to verify that tolerances levels are not violated.

Regulations include a specified withdrawal time for each antibiotic used to ensure that the animal's system has been sufficiently cleared of antibiotics well before its meat enters the food supply.

Since 1967, FSIS has administered the NRP to collect data on chemical residues in domestic and imported meat, poultry, and egg products to identify violative levels of chemical residues, reduce consumers' exposure and verify that producers are adhering to withdraw requirements. The industry has a strong record of compliance in this area.

What does it mean when meat products say "raised without antibiotics?"

The term "raised without antibiotics" may be used on labels if the producer sufficiently documents that the animals were raised without antibiotics. The use of antibiotics is a conventional production practice. Animals raised without antibiotics do not produce a safer or higher quality product than those raised in a conventional manner. Some consumers, however, prefer these products for personal or ethical reasons. They are one of many choices in today's meat case.

What are the facts surrounding Denmark's experience with antibiotics?

Some organizations point to Denmark's decision to ban subtherapeutic use of antibiotics as a model approach. But the facts show that the Danish experience has not had the intended results. In fact, the use of therapeutic antibiotics in livestock has increased after the sub-therapeutic ban was implemented.

According to the AVMA, "The Danish ban has not resulted in decreased antimicrobial-resistant human infections in Denmark and has not improved human health." In fact, a four-fold increase in the rate of resistance in people against other antibiotics that are used only sparingly

in Danish food animals has prompted some scientists to suggest that something besides animal use is the cause.

AVMA also notes in the same report "The Netherlands has also instituted a ban on growth promoting antibiotics that has not resulted in the intended benefit of decreased resistance in humans."

Finally, a U.S. Congressional fact finding mission to Denmark in September 2009 found no scientific evidence that reducing antibiotic use in agriculture resulted in public health benefits in that country.

Are there any food safety benefits from using antibiotics to improve animal health?

There is growing evidence suggesting that antibiotics may actually help reduce the levels of naturally occurring microorganisms found in the animals' digestive tracts.

At the farm level, a 2008 study by The Ohio State University found that 54 percent of hogs raised on antibiotic-free operations were infected with *Salmonella*, compared to 39 percent in conventional operations.

USDA research conducted in 2002 found that cattle treated with the antibiotic neomycin sulfate for 48 hours, held for the mandatory 24-hour pre-slaughter drug withdrawal period and then shipped to market for sale shed significantly fewer *E. coli* O157:H7 cells than their pen mates who did not receive the antibiotic.

An analysis by Cox also found that this issue is not so black and white as some would suggest. According to his 2005 paper in *Environmental International*, "While withdrawals of animal antibiotics previously used to control animal bacterial illnesses are being encouraged in many countries, the human health impacts of such withdrawals are only starting to be understood. Increases in animal and human bacterial illness rates and antibiotic resistance levels in humans in Europe despite bans on animal antibiotics there have raised questions about how animal antibiotic use affects human health." (<http://www.ncbi.nlm.nih.gov/pubmed/15871160>)

Additional Reading

The American Veterinary Medical Association Response to The Final Report of the Pew Commission on Industrial Farm Animal Production, November 2009, www.avma.org