



Antibiotics in Agriculture - What Is Their Place?

Vita Plus Whitepaper • By Dr. Al Schultz, Ph.D., Vice President • June 2012

Antibiotics are drugs capable of killing bacteria or, in some cases, not killing but stopping their reproduction. Beginning with the discovery of penicillin in 1928, they have been a huge part of human medicine since the 1940s. Antibiotics have saved millions of lives, but we are getting increasingly worried because they don't work as well as they used to. Pharmaceutical companies keep trying to find new antibiotics to replace the ineffective ones as well as develop other tools that will reduce our reliance on antibiotics - but the man-versus-bacteria war continues onward.

Antibiotic resistance

Antibiotic resistance is a common discussion point when we talk about health issues these days. Antibiotic resistance emerges through genetic mutation of the bacteria. In any given bacterial population, maybe 99.999 percent of the bacteria are killed by an antibiotic. But that one in a million that survives because of its ability to adapt keeps multiplying and, many generations later, that one bacteria may now be 1 million or 1 billion or 1 trillion – all capable of surviving the same antibiotic that was once so great and doing some real damage. Once bacteria develop resistance to one antibiotic, they will likely also be resistant to other antibiotics that have a similar mechanism of action.

So we all know that a visit to the doctor, which at one point was guaranteed to result in a prescription for antibiotics, may not always lead to the same outcome these days. Aren't we disappointed when the doctor tells us that the infection is likely viral and hence no antibiotics? "Please give me some antibiotics – I'm feeling miserable!" This change in attitude by your doctor is an attempt to save the antibiotics for when they will most likely be effective. Theoretically, every time antibiotics are used, their efficacy diminishes ever so slightly.

Antibiotic use in livestock production

It is reasonable then to make the short leap to, "If antibiotic overuse in humans causes a loss in potency over time, so then antibiotic use in livestock is just as much a problem." The livestock and poultry industry has come under attack for its continued use of antibiotics. FDA has been under attack because it has not just said NO to any use of antibiotics by the ag constituencies.

I see the battle continuing to escalate. This is a battle over science, but in many cases both sides of the argument have some science to support their positions even though the positions may be diametrically opposite. Truthfully, at the end of the day (or maybe decade), public policy and livestock management practices may be more influenced by the court of public opinion than by the science. So what is the true story? Here is the issue as I see it.

- Antibiotic resistance is an emotional issue. There are plenty of made-for-TV stories where a child died because an infection was resistant to antibiotics. These stories tug at our hearts, but in study after study, no link between antibiotics used in agriculture and resistance in humans can be found. Although theoretically plausible, most science cannot prove that hypothesis. This doesn't mean we shouldn't err on the side of caution. However, anyone advocating for a ban on the use of antibiotics in livestock and poultry and expecting that step to solve the resistance issue is either uninformed or overly optimistic. All risk assessments conducted on the antibiotics most commonly used in agriculture have found the risk is extremely small. As one source quotes, you are more likely to die from a bee sting than be affected by agriculture's use of antibiotics. That doesn't mean however that we can ignore the issue.
- Livestock and poultry farmers have a social responsibility to produce meat, milk, and eggs with a concern for animal welfare, the environment, the health of workers and food customers, and the quality of the product they produce. Livestock and birds get sick. In my opinion, withholding antibiotics from treating a disease outbreak because we need to "protect" antibiotics at any cost is irresponsible. Should we withhold antibiotics from our pets as well the next time they get sick? This is one of my complaints with the organic standards. If they cannot treat animals with antibiotics in order to maintain the organic certification, producers are likely to let a disease situation develop, hoping that a natural remedy will take care of the problem. Meanwhile, that animal or bird will be sick longer (or even potentially die) because the best possible treatment was withheld.



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- While pharmaceutical companies originally marketed the same antibiotics to both the human and animal side of their businesses, such is generally not the case any longer. Newer antibiotics that have been approved for the livestock and poultry industries are products that were deemed not useful for human medicine. On the other hand, antibiotics that are approved for human use are withheld from the agricultural market. Thus, although resistance to a particular antibiotic may develop after years and years of use, this may eventually be an animal health problem, but is really not a human health concern because those antibiotics are not used in human medicine.
- I believe it is a myth that the amount of antibiotics used, or carelessness in using them, is somehow related to size of operation. In fact, if I had to guess, I believe the amount of drug used per animal or bird may be higher in small farms versus larger units. If you object to the proliferation of larger farms in agriculture, please do so because of nostalgia or other reasons and not use antibiotic use as a compelling reason to prevent the growth of our well managed farms.
- Occasionally, I hear objections to the use of antibiotics on a whole herd or flock basis. The rationale for the objection is that while it may be okay to treat sick individual animals or birds, it is not okay to treat the whole group when not all are sick. However, many of us have probably returned from the doctor with an antibiotic prescription for the whole household because, if several are already sick, the rest are likely to follow and it is best to proactive.

Producers choose group over individual dosing of antibiotics for several reasons. First, treatment of a whole group with an antibiotic in the feed or water reduces animal stress. Penning, restraining and medicating individuals is a mammoth task often accompanied by measurable stress on the animal. Secondly, group dosing reduces the risk of handling related animal injuries, such as bruises or broken bones as well as broken needles caused by improper restraint. Finally, group dosing results in less chance of injury to employees handling large, stubborn and panicky animals.

- The use of antibiotics as a means to improve performance in situations where there is no specific disease challenge has reduced substantially over the past years. There is scientific evidence that the practice of low-level antibiotic use may not be a risk, but the court of public opinion probably doesn't care about the science on this one. This often looks to be a case of taking a chance (however small) on antibiotic resistance in exchange for improved profits. I quickly point out that in order to be sustainable, the farm must be profitable, but there is a certain "Really!!!" factor around this practice that comes into play here. You can stand on principle, but I think the FDA has it right with the push to voluntarily get a reduction in the use of "medically important antimicrobial drugs" in situations where performance enhancement is the only goal. Again, keep in mind that many compounds used in livestock and poultry have no use whatsoever in human medicine.
- We must always remember that the food consumer is our customer. Consumer polls consistently show that food safety is the No. 1 food-related concern and recently antibiotic concern has moved to the top of perceived food safety issues. The food industry recognizes that "food safety" means more than microbiological control. It also incorporates consumer perception of what is "safe." As food retailers are quick to point out – "We can stand on principle and lose the customer!" At some point, the marketing aspect becomes part of the equation. For those of us driven by science, that is sometimes hard to accept.
- Don't forget the rule of unintended consequences. After Denmark banned low-level antibiotics, the use of therapeutic antibiotics increased by 30 percent. In an Ohio study, antibiotic-free pigs had a higher incidence of disease and parasites. Making a knee-jerk reaction to change one outcome may result in other consequences we didn't anticipate. That is why measured responses and data-driven science rather than emotion is so important.

The antibiotic resistance problem is a significant public health challenge, but the causes are very complex and multi-dimensional. Simple politically expedient fixes aren't going to lead us to answers, but neither is a total ignoring of what we see happening around us. I believe some measured reaction, maybe something close to what FDA is proposing in its recent guidance documents (#209 and #213), offers the best opportunity to make some medical progress as well as offering a response to maintain the trust of our customers for meat, milk, and eggs in the face of a highly emotional debate.