

# For the Record

Volume 9, Issue 3 — August 2010

Straight talk about antibiotic use in food animal production presented by ALPHARMA Animal Health

## A FEW TOUGH QUESTIONS FOR THE EASY SOLUTIONS

■ “As a doctor, I know that curbing all non-therapeutic use of antibiotics, both in animals and in humans, to protect human health is simple common sense.”

— *David Wallinga, MD, Institute for Agriculture and Trade Policy*

■ “There is a simple solution to agriculture’s contribution to this problem: Outlaw the use of subtherapeutic antibiotics on farm animals.”

— *Barry Estabrook, former contributing editor, Gourmet magazine*

■ “Simply put, the practice of feeding antibiotics to healthy animals jeopardizes the effectiveness of...medicines in treating ill people and animals.”

— *Sen. Olympia Snowe, D-Maine*

### OH, THE INCONVENIENT COMPLEXITY

One of the most — if not *the* most — important sources of the shrill contention today about antibiotic use in farming is an odd phenomenon repeated in many science-based debates. Three different sets of apparently reasonable people — one, professional, knowledgeable veterinarians and farmers; two, advocates of applying cautious regulation like a laser scalpel to trim out what they believe to be risky antibiotic uses without amputating an entire system of food production; and three, advocates of a legislative nuclear option that would effectively ban nearly all antibiotic

uses — all three can arrive at their widely differing beliefs using the same set of scientific data.

It demonstrates that, once again, the simple answers are often the wrong ones. What looks like hesitant indecision or malicious stonewalling to those on the outside of a complicated issue may in fact be one of the most noble virtues of the traditional scientific researcher: A humble unwillingness to impose the vanity of simplistic over-interpretation on Nature. Nowhere is that more true than in the debate over how farm antibiotic use affects human health. The nuance of its complexity can prove inconvenient in the political theater of television soundbites.

Says Guy Loneragan, DVM, PhD, a West Texas A&M associate professor and one of the **leading minds** on the complicated universe of beef feedlot pathogens and resistance: “Unfortunately if we ignore the complexity of antimicrobial resistance, if we brush aside some of the unusual findings, and if we over-reach with our inferences, then we get into a black-and-white argument...when really the truth is probably somewhere in the middle and it is certainly a lot more grey than black and white.

“Whenever my students adopt a position very firmly, I remind them that if you think you understand antimicrobial resistance, then it hasn’t been explained to you properly.”

### Also in this issue

- Six good questions producers and veterinarians can ask to counter the overly simplified notions on preventing antibiotic resistance
- Two good examples of how science has been tortured to support a predetermined political outcome

### For the record...

Promoting easy solutions like farm antibiotic bans fails to consider the scientific complexities involved in antibiotic resistance.



# SIX MODEST QUESTIONS TO HELP

Even the American Medical Association, the lobbying guild representing less than one in five U.S. physicians and an active advocate of harsh restrictions on the veterinarian's ability to use antibiotics, observes this: "No simple solution exists to deal with antibiotic resistance, and more scientific study is required on the myriad aspects of resistance acquisition."

Nevertheless, AMA and 350 other organizations have looked at the existing body of scientific study and

concluded farm antibiotics pose such a risk to public health Congress **must halt their use** within the next 24 months. To those groups, we suggest producers, veterinarians and others who believe caution should be exercised in making such hasty change in a system that's worked for more than half a century pose the following six questions—a half dozen good questions that, as America's first Nobel prize winning economist Paul Samuelson said, always outrank the easy answers.

## 1. If bacteria freely swap the genetic material to resist antibiotics, why aren't all bacteria resistant to all antibiotics by now?

Until relatively recently, scientists believed antibiotic resistance was only passed among bacteria by reproduction; therefore, resistance to one type of antibiotic couldn't be passed across bacterial species. A recent trend has emerged **toward the hypothesis** that bacteria living in a common environment readily swap "plasmids" or pieces of floating genetic material between individuals, passing resistance freely across species lines.

But, says Paula Fedorka-Cray, MAS, PhD, research leader of USDA's Bacterial Epidemiology and Antimicrobial Resistance Research Unit, although it's a phenomenon that can be recreated in the lab, under ideal conditions, it doesn't commonly happen in the wild—or least we can deduce it doesn't.

"We have data that is unpublished that shows *Salmonella*, *E. coli*, *Campylobacter* and *Enterococci* all coming from the same samples, and there's no correlation in resistance attributes between them," she says. "Conceptually, you can show bacteria hooking up and plasmids going from one to the other. It's very pretty and it looks 'sexy,' ...but the reality of the situation is that it's not that

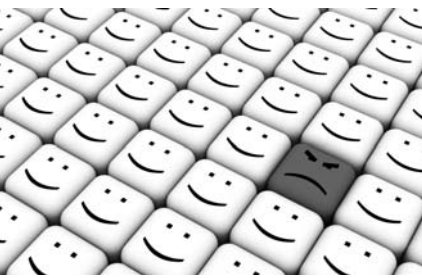
easy. If it just takes a big party of bacteria being together in the gut, then you should be able to sample your gut and see the same thing—a homogenous population. And we don't. All these populations behave differently, and there are different pressures that have to be exerted before they express whatever they have in their genome."

## 3. If it's 'too risky' to allow farmers to use antibiotics, what's an acceptable risk?

Opponents of farm antibiotic use often repeat the claim that the practice poses risk to human health. It may surprise them to learn most advocates of the practice agree. But the critical question is: How *big* is the risk? The science shows it pales in comparison to other, more common—more acceptable—risks:

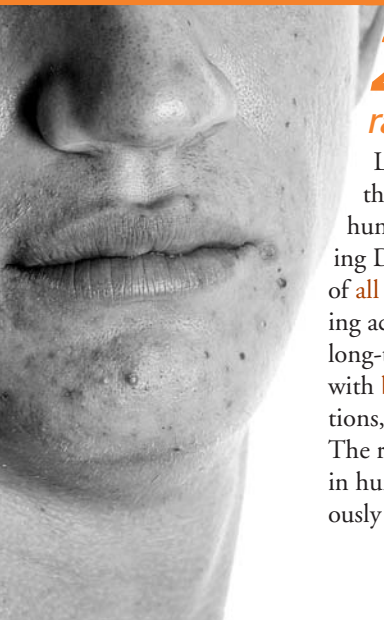
RISK OF...	ANNUAL ODDS
■ Dying of heart disease	1 in 384
■ Dying in a traffic accident	1 in 6,808
■ Dying from a medical mistake	1 in 3,061
■ Dying from an infection caught during a hospital stay	1 in 3,333
■ Dying due to air pollution	1 in 26,918
■ Having diarrhea that's harder to treat because poultry vets use enrofloxacin	1 in 30,000
■ Dying from a medication error	1 in 40,590
■ Getting hit by lightning	1 in 550,000
■ Dying from a bee sting	1 in 6 million
■ Suffering prolonged disease because farmers use macrolide antibiotics	1 in 10 million
■ Suffering prolonged disease because farmers use Virginiamycin	100 in 100 million
■ Dying because farmers use penicillin	4 in 1 billion
■ Suffering prolonged disease because dairies use enrofloxacin	1 in 61 billion

Source: Scott Hurd, DVM, PhD, Iowa State University; Council for Agricultural Science and Technology.



## 2. Where is the policy position against the use of tetracycline to clear up teen acne?

Long term use of low-dose antibiotics for "non-therapeutic" purposes "would never be allowed in human medicine," says PEW Health Group Managing Director Shelley Hearne, MD. Yet fully one-third of all tetracycline used by people goes toward reducing acne. And, studies from the '70s found those long-term, low-dose oral antibiotics were associated with **better overall health** and 25 percent fewer infections, despite an increase in some intestinal resistance. The results beg the question: If some antibiotic uses in humans, even though "non-therapeutic," are obviously "judicious," why not for animals?



# REVEAL A LACK OF EASY ANSWERS

No one is opposing the veterinarian's use of antibiotics to treat sick animals, opponents argue.

Yet several recent regulatory actions and public criticisms are aimed directly at that ability to effectively doctor animals and birds.

- The **only antibiotic** FDA has pulled off the market because the agency believed it posed an unacceptable risk of causing human health problems by making human antibiotics less effective was never approved for growth promotion, was not given by feed and was available only by veterinary prescription to **treat respiratory infections** in turkeys and chickens. The loss of Bayer's enrofloxacin antibiotic has been blamed for leading to small but real increases in poultry deaths.
- A year ago, FDA announced in the *Federal Register* it planned to begin **forbidding veterinarians** from using antibiotics in the cephalosporins class for any use not specified on the label. Ceftiofur, an injectable cephalosporin labeled for treatment and control of respiratory disease in cattle, is also an important emergency therapy used by veterinarians in extreme cases of scouring which lead to blood poisoning—a use not on the label but allowed under strict veterinary supervision. Ceftiofur is **not used for growth promotion**

## 4. If 'no one's questioning the use of antibiotics to treat a sick animal' then why have you actively opposed...?

or other production purposes. Yet critics accused FDA of bowing to industry pressure when it reversed its initial decision based on science presented during the public comment period.

"We are hoping...the new FDA will support legislation that would review all the existing approvals for antibiotics for animal use and determine which ones may be contributing to resistance in humans," said Environmental Defense Fund's John Balbus, MD, MPH.

- Denmark's Food and Agriculture Ministry announced in late June it was introducing a **warning system to sanction veterinarians** and pig farmers its national database finds are using "too many" antibiotics. After Denmark banned all low-level antibiotic uses, the **resulting increase in disease outbreaks** led to a leap in use of therapeutic antibiotics by 30 percent. It hasn't stopped rising since, leading the country to even further draconian measures to control all uses—even therapeutic. If the latest measures taken don't succeed, the agency said, violators will be fined.



## 5. If food animals consume an unacceptable fraction of all antimicrobials, then what's a fair percentage?

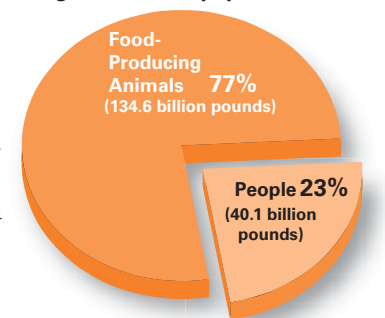
Media and Internet pundits repeat claims that up to 84 percent of all antimicrobials sold in the U.S. go to food animals—70 percent for "non-therapy." Any rational re-evaluation of the inflated statistics make them suspect—based on numerous unproven assumptions, several of which are clearly wrong (like the fact it creates out of thin air tonnages for drugs that were FDA-approved but never sold in the U.S.) But the more important question is this: Even if true, is **70 percent too much**?

- Each year, America's farms grow one third more animals and birds than the combined human population of the entire world. Those 9.5 billion birds and animals outnumber the U.S. human population by more than 31 times. Shouldn't their use be higher?
- Not only does the U.S. population of farm animals outnumber humans, it also outweighs the human population—by almost 3.4 times. Since doses are calculated based on the estimated weight of animals being medicated, we should naturally expect the animal population to consume more antimicrobials. In this case, their share of the total should be 77 percent.
- When you recalculate the estimated use of antimicrobials by converting the dosage for farm animals into an "allometric calculation," which comes as close as

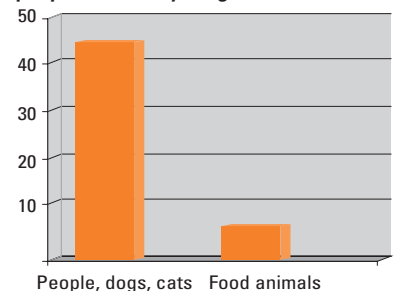
possible to making an apples-to-apples comparison between the dose given humans and the dose given animals—it becomes clear farm use is not out of line. Depending on which allometric model you use, farm animals should be consuming from 2.3 to 3.7 times more antimicrobials than humans in order to receive a comparable dose. So an appropriate share for farms, based on the best numbers we have, should fall between 69 percent and 79 percent.

- Rather than hogging humanity's share of the antibiotics, individual farm animals on a pound-per-pound basis actually use only a fraction of the antibiotics humans do. Based on a 2001 estimate published in the *Journal of the American Veterinary Medical Association* by USDA veterinary researcher David Barber, DVM, pound-for-pound, each human and pet consumes 10 times more of the nation's supply of antibiotics than each farm animal uses.

Weight of the U.S. population (2008)



Milligrams of antibiotics used per pound of body weight



Source: *Journal of the American Veterinary Medical Association*. Vol 218(10), May 15, 2001.

**Principal Points**  
**A Few Modest Questions**  
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○ To opponents of farm antibiotic use, the solution to failing human antibiotic effectiveness seems simple: Ban farm antibiotics. Producers and veterinarians can pose six simple questions to to opponents illustrating why simplistic solutions don't properly address complex resistance issues:

1. If bacteria freely swap the genetic material to resist antibiotics, why aren't all bacteria resistant to all antibiotics by now?
2. Where is the policy position against the use of tetracycline to help clear up teenage acne?
3. If it's 'too risky' to allow farmers to use antibiotics, what's an acceptable risk?
4. If "no one is questioning the use of antibiotics to treat a sick animal" then why have you actively opposed...?
5. If food animals consume an unacceptable fraction of all antibiotics, then what's a fair percentage?
6. If animal suffering is a concern, why eliminate the least stressful means of medicating animals?

**For the Record**, sponsored by a grant from ALPHARMA Animal Health, is designed to help unite the industry and provide a unified, rational message on behalf of producers whose freedom to use safe, effective, economical production methods is at stake. Working together, we can set the record straight on antibiotics.

Questions or comments? E-mail Steve Kopperud at [skopperud@poldir.com](mailto:skopperud@poldir.com) or editor Mike Smith at [CustomMedia@Food360.com](mailto:CustomMedia@Food360.com). Read past issues or link to more information on this issue at [www.AntibioticTruths.com](http://www.AntibioticTruths.com).

# TWO EXAMPLES TO SHOW IT'S NOT AS SIMPLE AS IT SEEMS

RANDALL SINGER, PHD, DVM, ASSOCIATE PROFESSOR, EPIDEMIOLOGY, UNIV. OF MINNESOTA

I hate cherry picking the scientific literature...but I feel the need to show why two articles in particular are totally inappropriate and provide misinformation about the antibiotic use situation.

The first came out in 1999 out of Denmark, talking about a multi-drug resistant *Salmonella typhimurium* phage type 104 that caused morbidity in people and even killed a couple of people. It was a bad bug, bad because not only was it multi-drug resistant, it had resistance to a very important class of antibiotic, the fluoroquinolones. So the authors of this paper concluded that "because of this increase in quinolone resistance in *Salmonella*, the use of fluoroquinolones in food animals should be restricted."

And, of course, in the United States, we banned the use of fluoroquinolones in poultry. But here's the problem: You go deep into the paper — and you have to go *deep* into the paper — and what do they say? "There was **no indication of fluoroquinolone use** in those implicated herds." If there ever had been use of fluoroquinolones in those herds, I guarantee they would have told us that. So they had absolutely no evidence fluoroquinolones a) caused that resistance, or b) were ever even used in those herds.

But more importantly, fluoroquinolones are a *therapy* drug. They are not used for growth promotion. They are not used for disease prevention. So it's not even the type of antibiotic we're talking about with the federal legislation. Yet people use this

article to support the notion that antibiotic uses in animals are bad; therefore, we need to ban growth promoters.

A second paper came out in 2000 about a *Salmonella* that was resistant to ceftiofur and was acquired by a child from cattle. In the abstract, they conclude that the study provides evidence that antibiotic resistant strains of *Salmonella* in the U.S. are evolving primarily in livestock. If I hear about a strain that's evolving resistance, that means that it's developing the resistance anew because of the use of the antibiotic in those herds. And yet if we do the same thing, go deep into the paper, what you'll see is they were unable to find **whether ceftiofur was ever used in that herd** — or any herd. Yet what they say is we know that ceftiofur has been approved for use in the United States. Well, third-generation cephalosporins are also used in human medicine, as well as in small animals — they're used everywhere. So we don't know why the resistance emerged, but it is irrelevant for the discussion of which antibiotic uses are appropriate or inappropriate. Again, ceftiofur is a therapy. It is not used for disease prevention. It is not used for growth promotion. So these two articles are not on issue. Yet this is the type of argument people are making.



## 6. If animal suffering is a concern, why eliminate the least stressful means of medicating animals?

Critics often paint feed and water medication as sloth, greed or ignorance on your part. They seldom appear to understand producers choose group over individual dosing for some of the **same welfare goals they espouse**.

- Reduced animal stress vs. individual restraint and dosing. Penning, restraining and medicating individuals is a mammoth task, often accompanied by measurable physiological indicators of stress.
- Less risk of handling-related animal injury such as bruising and broken

bones, as well as risk of broken needles caused by improper restraint.

- Less chance of injury to employees handling large, stubborn, panicky animals.

