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Monday, May 02, 2005

Science & Health

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Antibiotics debate

HUMAN MEDICINES GIVEN TO COWS, PIGS, CHICKENS PROPEL GROWING THREAT OF DRUG-RESISTANT BACTERIA IN LIVESTOCK

By Jessica Scully

Special to the Mercury News

At Yolo Land and Cattle near Davis, 600 pairs of cows and calves chew through thousands of pounds of feed as they are raised for beef. Rancher Scott Stone plies the cattle with grass, hay and rice bran, but leaves out one ingredient that has become a mainstay in much of livestock farming -- antibiotics.

Until five years ago, Stone's family ranch followed a practice common among meat producers and regularly gave their animals small amounts of the powerful drugs. Many of the producers behind the chicken, beef and pork on kitchen tables say the medications are essential to producing bigger animals that can feed more people, prevent farms from losing animals to disease and bring farms more money.

Unlike what has become standard practice in meat production, Stone's family ranch never used low doses of the drugs in feed. But until five years ago, they did treat sick animals, and occasionally the entire herd, with drugs commonly used in human medicine, like erythromycin and penicillin. Then Stone decided to start producing "natural beef" and dropped the use of antibiotics and other additives such as growth hormone.

"I want to be able to eat what I produce," Stone said. "And the healthier and fresher I can make it, the better I feel about the product I'm producing."

Such ranching decisions, made one feed lot at a time, reflect a larger worry in modern medicine. An increasing number of bacterial strains are developing resistance to antibiotics, public health experts say, and the tetracycline, erythromycin and other antibiotics given to livestock and poultry are a significant part of the problem.

Concern about the effects of antibiotic use in livestock is now so widespread that even fast-food giant McDonald's recently passed a policy to limit use of the drugs among its meat suppliers.

Antibiotics in livestock aren't the only factor creating germs that can fend off drugs. Overuse of antibiotics in people is also feeding the growth of stronger strains of bacteria, and many farmers say such misuse dwarfs the issue of antibiotics in livestock.

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But increasingly, scientists tracking how antibiotics are fed to farm animals and then flow through the food chain say the meat on people's plates is helping to weaken the effectiveness of one of the world's most powerful class of medicines.

New studies are showing stronger links between antibiotics used on the farm and antibiotic-resistant germs in people. Federal officials are considering more stringent control of such drugs, and outright bans are being tried or considered in Europe.

"It's a public health concern," said Dr. Steven Heilig, an epidemiologist at the San Francisco Medical Society and author of a 2002 editorial in the Western Journal of Medicine calling for new laws to halt the use of antibiotics in farm animals. "We have to stop this practice of just throwing the antibiotics out there."

Antibiotics are designed to kill off bacterial infections, from the most mild bronchitis to the most serious case of anthrax. They can be highly effective -- but they aren't all-powerful.

Scientists say that in animals and in people, low levels of antibiotics can kill off only part of different kinds of bacteria. The germs that survive can mutate, becoming more resistant to drugs. These resistant germs can pass on the mutation, creating more and more strains of antibiotic-resistant bacteria, such as salmonella or E. coli.

When those resistant strains of bacteria arise in farm animals, the bacteria can find their way into people through consumption of contaminated meat, handling livestock or in water, experts say. Eventually, experts worry, there may be no antibiotic strong enough to kill the germs off, leaving humans vulnerable to epidemics of diseases.

But in this battle waged over American's dinner table, two questions remain unsettled. How strong a link between human health and antibiotics in livestock should be proven before action is justified? And what effect would such a change have on public health, the meat industry and consumers?

"I think it's fair to say that resistance rates used to be very small, and now they're starting to rise, and we're concerned about it," said Dr. David Bell, coordinator of the federal Centers for Disease Control's antibiotic resistance monitoring program, run in conjunction with the Food and Drug Administration and the U.S. Department of Agriculture.

Most people might think that, as in humans, antibiotics are used in livestock to cure illness. Sometimes that's the case.

But chicken, hogs and cattle are also fed low levels of antibiotics at key points in their lives to make them grow faster and become more efficient at turning feed into meat. Healthy animals are given slightly higher levels of antibiotics in feed when they are young or during times of stress.

For Elk Grove hog farmer Steve Weaver, whose baby pigs eat a prepared blend of corn and soybeans with added antibiotics, the drugs are key to keeping his animals large and healthy.

"What the antibiotics do is protect their health so you can reach the potential you're after," said Weaver, clad in a button-down shirt, work pants and knee-high rubber boots, as he surveyed a row of sows and piglets in his farm's birthing shed.

Industry representatives also argue that the system works to improve public health.

"One of the benefits of keeping animals healthy is that we keep down the amount of bacteria they carry, so that consumers receive a cleaner, more wholesome product," said Ron Phillips, vice president of legislation and policy at the Animal Health Institute, an industry group based in Washington, D.C., for companies that make medicines for animals.

But the germs that ordinarily make livestock sick aren't what public health experts are worried about. It's the big five bacteria of human food poisoning: salmonella, campylobacter, E. coli, enterococci and listeria.

Doctors have viewed the use of antibiotics in farm animals as a potential problem since January 1952. A news report in that issue of Scientific American warned that antibiotic-resistant bacteria appeared three days after a turkey was fed antibiotics.

During the past few years, researchers have found antibiotic-resistant E. coli in poultry, poultry farmers and

poultry slaughterers; resistant salmonella in meats sold over the counter; and resistant *Enterococcus faecium* in chicken manure and human stool.

But only recently have researchers been able to directly link resistant germs found in people and meat to the farm.

Link confirmed

Making a direct scientific link between livestock and antibiotic-resistant diseases in humans has been very difficult. Once a resistant germ gets out into the general population, tracking where it came from is an exercise in sleuthing. But two recent studies have been able to trace a more direct connection.

In a Danish study, a team of researchers tracked a drug-resistant strain of salmonella that killed two people to contaminated pork from a single herd of hogs. Their research was published in November 2000 in the *New England Journal of Medicine*. In the second study, published in April 2000 in the same journal, University of Nebraska researchers found that a Nebraska boy was infected with the same strain of salmonella as the cows on his father's ranch.

Other studies anticipate future problems. In an April 2002 study, researchers at the University of Maryland projected that continuing the use of antibiotics in animals could lead to serious problems with bacteria, like enterococci, that can jump from animals to people and then spread among humans. The problem would be less of an issue in bacteria like salmonella that aren't spread from person to person, the study says.

The team studied two antibiotics used to treat both people and chickens. Using a mathematical model, researchers estimated that giving antibiotics to healthy livestock could reduce the useful life of the antibiotics by 30 percent.

Groups representing farmers question such research. Antibiotic resistance caused by doctors overprescribing antibiotics to people is a far bigger problem, according to Phillips of the Animal Health Institute.

"If you look at the data and talk to physicians about germs and drugs where resistance is a very real and escalating problem, you will hear things like TB (tuberculosis) and MSRA (staph infections), germs that have nothing to do with the animal use of antibiotics," he said.

Others in the industry argue that studies should have to prove a human got sick from a resistant germ through eating meat or from contact with livestock raised with antibiotics. It's not enough, they say, to show that antibiotic-resistant germs are found in animals and in people.

"A lot of lazy scientists would argue that all you have to do is prove an 'association' between antibiotics in livestock and people," said Dr. John Maas, chairman of the Cattle Health Committee of the California Cattlemen's Association and a professor of veterinary medicine at University of California-Davis. "You can show an association, but did it really happen that way, or was it a coincidence?"

Federal views

Federal regulators' views on the safety of the drugs appear to be changing. The Food and Drug Administration recently released a set of draft guidelines for the animal drug industry explaining what companies would need to prove in order to get new antibiotics and any changes to the use or claims about existing antibiotics approved.

Under the proposal, companies will have to examine whether a given pathogen will develop resistance to the drug they are proposing, the likelihood that a human will be exposed to it and how much worse off that person would be than a person who got a germ sensitive to antibiotics, said Stephen Sundlof, director of the FDA's Center for Veterinary Medicine.

Antibiotics that are problematic, such as those that are important in human medicine, would be less likely to be approved or would be approved with restrictions.

Sundlof said this is the first time the FDA has asked drug companies to provide specific information on antibiotic resistance. The guidelines are expected to be approved without major changes by the end of the year, he said.

The guidelines give companies "a very clear regulatory pathway to get that determination of safe or unsafe," he said.

Public health experts concerned about antibiotic resistance approve of the FDA's move but think the guidelines have a flaw.

"The main concern on this is that it's a good step for newly proposed antibiotics, but not for existing ones," Heilig said. That is because the burden of proof for pulling drugs already on the market is on the FDA -- and it could take years before the drugs are actually removed.

For example, in 2001, the FDA moved to pull a class of antibiotics used for chickens, called fluoroquinolones. That class of medicines includes the drug Cipro, a powerful antibiotic strong enough to treat anthrax infections in people. But Bayer, one of the makers of the drugs for chickens, is fighting the move in court.

Europe plans ban

Several countries have flirted with banning or limiting antibiotics, but European countries are the first to do so. Two years ago, the European Union decided to end the use of medically important antibiotics on healthy livestock. In March of 2002, the EU food safety commissioner recommended phasing out all antibiotics used as growth boosters in livestock by 2006.

A series of health organizations, including the World Health Organization, the American Medical Association, the American Public Health Association and the American College of Preventive Medicine favor such approaches, and advocate limiting or phasing out the use of antibiotics important for human health on healthy livestock.

Bell, of the CDC, said such moves aren't necessary in the United States right now. The more conservative American approach may take longer, he said, "but it has the potential to offer equivalent protection."

Concerned doctors and public health experts, however, say that by the time the government has the evidence it wants, it could be too late. They're pushing for a law to limit or ban the use of antibiotics in healthy animals. Several legislators, including two federal lawmakers and California state Sen. Debra Bowen, D-Redondo Beach, have backed bills to further study or curtail antibiotic use in livestock.

Consumers can always choose -- with their wallet. But if they want a guarantee of antibiotic-free meat, they'll have to pay extra.

The average retail price for a pound of pork chops in June was \$3.23, according to the Farm Bureau. On NaturalMeat.com, an online seller of antibiotic-free meat, a pound of the same cut of meat is \$5.50, without shipping.

But according to a Danish example, that price difference could disappear if all farmers stopped using antibiotics in healthy livestock.

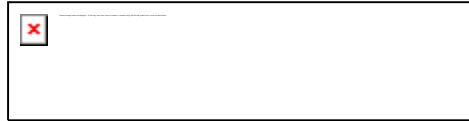
Denmark's 2001 partial ban led to less antibiotic-resistant germs but didn't dramatically increase the cost of meat or compromise animal health, according to Dr. Henrik Wegener of the Danish Veterinary Institute in Copenhagen.

But some point to downsides beyond economics in the Danish experience. Death rates for hogs on the Dutch farms were higher than on American farms where the antibiotics are used, said Dr. Steve Henry, a veterinarian, swine expert and consultant to large-scale hog producers. If the U.S. government takes a similar stance, producers would have to raise more animals to meet demand, he said. That could mean more of the environmental problems that come with hog farming, such as large pools of pig waste.

Without antibiotics, farmers would have to feed the animals more, using more resources to produce as much meat, he said. Efforts to cut antibiotics, he said, could ultimately mean less for people to eat.

"At the end of this process," he said, "there's a whole world out there, with its mouth open."

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