

For the Record

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

MRSA: THE NEW RESISTANT SUPERBUG *DU JOUR*

The founder of *USA Today*, the “first newspaper for the television era,” once famously advised a junior editor that if he was going to print a picture of an attractive young woman on his front page, it was imperative to make sure he positioned the marketable points of female anatomy above the fold.

The health-reporting counterpart of that news-desk gem of wisdom occurred in October, when the CDC chose to announce an increase in the number of people killed by drug-resistant forms of the bacterium *Staphylococcus aureus*, or MRSA, by proclaiming it now killed more Americans than AIDS.

It was a masterful stroke of PR analogizing, ensuring the quote would be introduced into virtually every news story about the subject.

Other outlets picked up and expanded the theme, from the obligatory “[Insert City Here] Teenager Infected with MRSA” headlines, to most notably the *Baltimore Sun*, which jumped on the occasion of a research study that found a sampling of Canadian pigs carried MRSA, to again point an accusatory finger at farmer



greed and gullibility in insisting on feeding animals and birds antibiotics.

Faithful critic of farm antibiotic use, Dr. Margaret Mellon of the activist Union of Concerned Scientists, accused government of turning a blind eye to MRSA for fear it would disrupt a system that “ensures [animals] will get sick and therefore need to be treated.” Berkeley journalism prof turned new-age food guru Michael Pollan turned out to hawk his new book by predicting (non-existent) science implicating use of swine antibiotics in MRSA would force us all back to a kinder, gentler way of growing food. And the *Boston Globe* editorialists may have written the sentence voted most likely to never let fact stand in the way of a good story when they opined, “Researchers have not yet proven that indiscriminate antibiotic use has caused the MRSA..., but the study should bolster support for the bill backed by Senator Edward Kennedy and others that would require the phasing out of the nontherapeutic use of antibiotics in farm animals.”

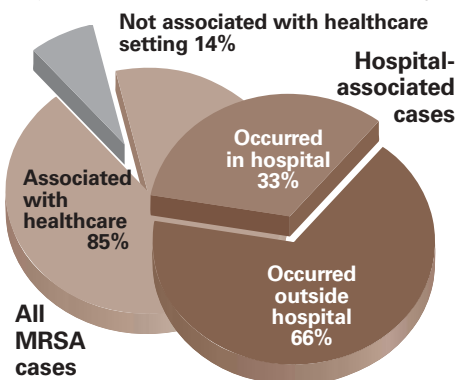
While the media repeats the activist line that “use of antibiotics in animal feed has to be considered suspect until proved otherwise,” cooler heads were suggesting we look before we leap. MRSA is an important problem, but many of the pronouncements making it above the fold on the story don’t bear up to fact. See inside.

Also in this issue

- How important is the farmer’s use of antibiotics in contributing to the creation of MRSA?
- Following the European ban on low-level antibiotic use, guess which direction MRSA has trended?
- Surveillance data call into question the alleged link between resistant bacteria in animals and in humans.

WHERE MRSA OCCURS

Of 94,360 Americans CDC estimates developed serious MRSA in 2005, the majority were related to health care settings.



Source: *Journal of the American Medical Association*, 2007.

For the record...

Activists churned the media in 2007 with claims that farm antibiotic use was causing the new superbug MRSA to spread. The fiction needs some balance with a little fact.

SOME FICTION AND FACT ABOUT MRSA

Journalistic leaps of faith like the *Baltimore Sun* editorial linking pig-farm MRSA and hospital related deaths have left a lot of fiction in their wake during the MRSA scare. For the record, here are a few facts about this disease and its link to food production:

FICTION. MRSA is new.

FACT. “Mersa,” as reporters now abbreviate it, has been with us for years. The medical literature begins reporting resistance in *Staph* more than 50 years ago—not long, in fact, after the discovery of the penicillin MRSA resists. The first reported isolation of MRSA in sick people occurred in Europe in the early ’60s, and hospitals have been fighting MRSA infections among patients for at least three decades. The recently

publicized creeping spread of the bacteria beyond its traditional hospital confines, into young people, immunocompromised patients, prisoners and contact athletes, has also been recognized for more than a decade. The one apparently new aspect is the identification of a new strain that has been isolated in Dutch and Canadian pork operations.

FICTION. MRSA is a superbug.

FACT. Last year’s “Mersaphobia” resulted from a perfect storm of the CDC announcement, the European organic association proclaiming the “monster” bug had entered the food chain, and reports of a few rare deaths in U.S. youngsters attributed to the bacteria. It resulted in school closings, calls for legislation to track hospital cleanliness, even angry parents storming one school to rescue their kids after learning a teacher carried MRSA.

Now, even CDC is seeking a little public calm.

Staph aureus—resistant or susceptible—is an important cause of disease. Its effects can be devastating to individuals infected with a toxic strain. However, MRSA is curable. Though it strongly resists the antibiotic methicillin and others, it can still be controlled with several other, readily available ones.

“This is not a superbug...” Dr. Chris Nelson, University of Kentucky infectious diseases specialist, told the Lexington *Herald-Leader*. “Some articles have made it sound like people are going to die from this because we don’t have anything left to treat it with. But there are several drugs we can use to treat these infections, and they’re very effective.”

FICTION. MRSA comes from pig farms.

FACT. Studies in 2007 reported finding MRSA in pets, food animals and farmers, most notably in swine operations in the Netherlands, Germany, Denmark and Canada. The study that was most widely churned by the activist coalition seeking an end to farm antibiotic use sampled 285 pigs of three different age groups



CDC has embarked on a public information campaign to remind consumers the best defense against MRSA, typically contracted through a break in the skin, has less to do with food than it does with simply washing your hands.

‘With a single exception, no one has demonstrated MRSA causes pig disease’

More evidence it’s dangerous to make simple assumptions about source and spread

When the authors of the widely reported Canadian pig study noted “It is likely that [one MRSA strain] colonization in pigs originated from colonized humans,”



they recognized a critical issue microbiologists have warned about regarding antibiotic resistance: You can’t assume it’s always being passed from animals to humans.

In fact, it’s not clear whether the growing problem of MRSA in pets is a case of pets giving MRSA to their owners, vice-versa, or a combination of both.

Transfer of MRSA from humans to animals has been documented in teaching clinics treating horses. A 2006 British study showed dogs were significantly more likely to be

infected with MRSA if a member of the household in which they lived worked for the National Health Service. And another study found most of the MRSA isolated from dogs, personnel and environmental surfaces of United Kingdom veterinary teaching hospitals were either identical or closely related to the most common strains in human hospitals.

As the Institute of Food Technologists warned in its 2006 review of antibiotic resistance in the food chain, the system is highly complex, and antibiotic resistance passes at many points.

from 20 pig farms in southwest Ontario. MRSA had colonized a fourth of the pigs, 45 percent of the farms had at least one colonized pig, and 20 percent of the farmers were colonized.

It's important to put those findings in the context of two points, says Alpharma Inc. microbiologist Dr. Jerry Mathers. First, the 20 percent prevalence rate for farm workers is based on a low sample size that makes extending its results across the entire population risky. Calculating the statistical confidence level for the study, he shows the chances are almost even that the incidence could actually fall anywhere between 39 percent and 8 percent. Since the normal MRSA prevalence for everyone in Ontario is 2.7 percent, if the study farms' true prevalence is at the low end of that range, the risk for MRSA colonization turns out to be only slightly higher for farmers than the general population.

Second, and more importantly, he says, the media missed an important distinction: The Canadian study looked for MRSA **colonization**, not MRSA **infection**—that is, pigs and people simply carrying the bacteria along for a ride rather than being harmfully invaded by them. It may seem a minor distinction, but it's a critical one. The presence of *Staph* does not automatically mean disease results. And with the single exception of a 2007 report that isolated enough MRSA from a case of the common piglet skin disease known as greasy pig disease to consider it at least a contributor to the case, no one has yet shown MRSA causes pig disease.

The industry needs to know the prevalence of MRSA in farms, Dr. Mathers says, and prevalence studies like this are an important starting point. However, they are just the starting point in the long scientific process necessary to prove whether a risk to human or animal health really exists.

FICTION. MRSA is food borne.

FACT. MRSA, like the antibiotic-sensitive *Staph*, is spread by direct contact with carriers, such as touching another person who has it on their skin or touching contaminated objects. It then usually infects a person through a break in the skin or other mucous membrane, not by inhalation or ingestion.

Therefore, even though there's a theoretical risk that someone handling meat harboring MRSA could infect themselves by, say, scratching their nose while doing so, MRSA can't be considered a food-borne disease in the sense *Salmonella* or *Campylobacter* are.

Even the authors of the Canadian swine farm study granted, "...further study regarding the potential for food borne disease is warranted, but the risks are likely low."

FICTION. Farm use of antibiotics is causing or contributing to MRSA.

The European MRSA experience

Europe, which banned animal antibiotics for growth promotion and mass disease prevention after 1999 to protect human health has seen an increase in human MRSA that in some countries its own reporting agency categorized as "soaring."

Only two out of 29 reporting countries have managed to reduce MRSA rates over that time period. The rest have either not changed or increased. Four countries, the Czech Republic, Slovakia, Hungary and Germany, which up until 2001 were reporting MRSA rates of less than 10 percent, saw those rates spike between 2001 and 2005 to these levels:

■ Czech Republic	13 percent
■ Slovakia	19 percent
■ Hungary	19 percent
■ Germany	21 percent

And although their overall rates are lower than those four countries, significant increases in MRSA were also reported in the Netherlands, Denmark and Finland over the decade.

FACT. Calls to support federal legislation to ban most farm antibiotics based on the MRSA studies notwithstanding, it's unlikely the resistance in MRSA has evolved because of farm use of antibiotics.

Dr. Mathers points out that because *Staph* are carried in the nose and almost never reach the gut, it's difficult to prove that the antimicrobials typically used in farm feed and water, which remain in the gut, would cause resistance to develop. Although there's always a theoretical chance on-farm MRSA could have developed from bacteria passing resistance genes back and forth independently, or from use of newer-generation, systemic antibiotics, the chances are considerably greater the resistance has come from the use of human drugs in humans.

"The role of antibiotics in agriculture on the emergence of MRSA," one of the Canadian study's authors told *Salon magazine*, "is completely unknown at this point. It will be hard to objectively evaluate as well. It is clear that antibiotic use is an important factor in the epidemiology of MRSA in humans and some animal species, and it is reasonable to assume the same in pigs, but we don't have enough information yet to say anything definitive."

At this point, the science does not support eliminating antibiotic use in swine or any food animals in the hope it will eliminate human MRSA. Doing so would simply endanger animal well-being and risk introducing sick animals into the food chain.

For the record...
MRSA is neither new nor super, and it's not being caused by farm use of antibiotics.

Principal Points

MRSA: The new superbug Vol 7. No. 1. February 2008

- MRSA is spread by direct physical contact with a carrier, not by airborne transmission or through food. Staph is a common bacterium, and most people carrying staph or MRSA don't get sick and never become aware of it.
- While some new evidence has emerged that humans and animals can exchange MRSA, it's not known how often this exchange occurs. Transmission can only take place where there is direct contact between the humans and animals or objects that have been contaminated — MRSA can't be transmitted by eating meat, milk or eggs, even if they come from an animal carrying the organism.
- No scientific evidence supports the theory that Staph bacteria acquired resistance in animals as a result of antibiotic use in them. Ending antibiotic use in food animals will not eliminate MRSA. Instead, it would compromise animal health and welfare, and lead to sick animals entering the food chain.
- The best advice for avoiding infection with MRSA? According to CDC: Wash your hands.

For the Record, sponsored by a grant from ALPHARMA Inc., 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 or editor Mike Smith at CustomMedia@Food360.com. Read past issues or link to more information on this issue at www.AntibioticTruths.com.

WHERE IS THE HUMAN-ANIMAL LINK?

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The SENTRY Antimicrobial Surveillance Program, which since 1997 has analyzed worldwide data from the collection of human and animal isolates of bacterial strains, has documented the growing antibiotic resistance problem around the world in more than 200 peer-reviewed publications. The SENTRY Program also provides useful data for evaluating the extent of current resistance threats among human pathogens and any potential correlation or link between use of antibiotics in animals, and the extent of emerging antibiotic resistance in humans.

While antibiotic resistance is a public health threat around the world, it is clear that hospital- and community-acquired diseases, unrelated to animal drug use, constitute the vast majority of problems. Surveillance data clearly show a disconnect between antibiotic resistance patterns in humans and animals, calling into question the alleged link between resistant bacteria in animals and those in humans.

The data also affirm that outbreaks of resistant bacteria are generally local, clearly suggesting that management responses should be local, usually at the ward or medical center level and dominantly attributed to patient-to-patient dissemination or related to flawed infection control practices.

Of the more than 2 million hospital-acquired infections per year in the United States, without exception none of the resistant organisms of greatest risk for poor patient therapeutic outcomes are related to food-borne pathogens, nor have food-borne pathogens been documented to have contributed significant risk to patients.

Rates of resistance among monitored institutions vary widely, but clear increases in resistance among the five most important hospital-acquired organism resistance problems are driven by use of antimicrobials in humans and a decline in the public health infrastructure and local infection control practices.

The growing problem of antimicrobial resistance has led to renewed calls to phase out or ban the use of certain antibiotics given to animals. These calls have persisted despite the lack of sufficient

evidence demonstrating a significant risk to human health. Indeed, experts have stated that banning antibiotics as growth promoters in animals will not solve or even noticeably impact the problem of antibiotic resistance in hospitals. A greater benefit could be achieved by restoring infection control infrastructures and improving public health educational efforts, especially in food preparation.



Most serious human resistance*

	RISK FROM ANIMAL SOURCES?
Staphylococci	
Resistant to methicillin or oxacillin	No
Resistant to MLS _B agents (Synercid®)	No
Resistant to glycopeptides	No
Streptococci	
Resistance in pneumococcus and other species	No
Enterococci	
Resistant to ampicillin & aminoglyc.	No
Resistant to Synercid®	Debated
Resistant to glycopeptides	No
Resistant to oxazolidinones	No
Enterobacteriaceae E. coli, Klebsiella spp., etc.	No
Salmonella and other food-borne species	
Resistant by ESBLs	No
Stably derepressed amp C (CMY-2, etc.)	Debated ¹
Resistant to fluoroquinolones	Debated ¹
Resistant to novel β-lactamases	No
P. aeruginosa	
Multi-drug resistant	No
Acinetobacters	
Multi-drug resistant	No
Campylobacters	
Resistant to macrolides	No
Resistant to fluoroquinolones	Debated ²

* For human medicine in North America

¹ Resistance rates in humans are much higher than in animal strains.

² Drugs of the choice for treatment have remained effective regardless of resistance discovered in animal pathogens.

Source: Dr. Ron Jones.