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April 16, 2010

**Report on: House and Senate Briefings
Antibiotic Use on the Farm and Public Health: A Looming Crisis
Wednesday April 14, 2010**

Sponsored by: Keep Antibiotics Working, Infectious Diseases Society of America, American Public Health Association, The Pew Charitable Trusts, Union of Concerned Scientists

Senate Honorary Host: Senator Tom Harkin
House Hosts: Reps. Louise Slaughter and Jan Schakowsky

Presenters:

Margaret Mellon, Ph.D., J.D. – Director, Food and Environment Program, Union of Concerned Scientists

James Johnson, M.D. – Infectious Diseases, VA Medical Center – Minneapolis; Prof. of Medicine, University of Minnesota

Lance Price, Ph.D. – Director, Center for Metagenomics and Human Health, Translational Genomics Research Institute

Maryn McKenna – Journalist and author, *Superbug: The Fatal Menace of MRSA*

David Wallinga, M.D., M.P.H. – Director, Food and Health Program, Institute for Agriculture and Trade Policy

In the House briefing, **Rep. Slaughter** gave basic statistics related to antibiotic resistance: 70% of hospital-acquired infections are resistant to antibiotics, 38 patients die each day from these infections, and they increase healthcare costs by \$4-5 billion each year (the figure was later stated to be much higher than this.) Some of the drugs that are critically important for human health are used routinely on animals – for example, tetracyclines are used to treat humans that have been exposed to anthrax. In addition, she said, antibiotic use in animals may be contaminating groundwater. The NAS says that decreasing the use of antibiotics in humans alone will not make much of a difference in fighting resistance. With PAMTA, drug companies would have to prove that antibiotics used non-therapeutically in animals do not pose a danger to human health.

Dr. Mellon further introduced the issue of antibiotic resistance, citing the escalation of antibiotic-resistant infections in recent years. This is a result of antibiotic overuse across

the board, she said, in human and animal medicine. She then laid out the purpose of the briefings: to dispel the claim that there is no scientific evidence linking the use of antibiotics in livestock to resistant infections in humans. Another purpose of the briefing, she said, was to explain the looming trade issue that could come as a result of the use of antibiotic growth promoters in the U.S., and the importance of keeping U.S. producers ahead of the game on this issue.

Dr. Johnson, an expert on *E. coli* and antibiotic resistance, was speaking on behalf of IDSA. Along with the increase in resistant and multi-drug resistant bacterial strains, he said, there is also a lack of new antibiotics, and in his experience as a clinician we are losing ways to treat infections. He routinely sees MRSA patients, and after prolonged ineffective treatment he has seen these infections spread to the spine or brain. He cited the annual cost of antibiotic-resistant infections at \$21-34 billion. Of the 2 million hospital-acquired infections in the U.S. every year, 90,000 of which result in death, most are caused by resistant organisms. Resistant bugs are often passed through the food chain, he said, and then can be spread between people once an individual is infected. There are initiatives in place to address resistance: ISDA's 10x20 initiative (a public/private partnership), the STAAR Act, and PAMTA. The STAAR Act would give backing to the Interagency Task Force, which thus far is not doing much. PAMTA, he said, would require the FDA to do an antimicrobial safety review on drugs used as growth promoters in animals. He concluded by stating that we have a moral obligation to keep antibiotics working for future generations, after past generations made these life-saving drugs available to us.

Dr. Price spoke on drug-resistant bacteria and food safety. He started his presentation with an introduction to the scientific principles of antibiotic resistance and bacterial selection. Millions of pounds of antibiotics are used each year in animals, he said. This selects for cross-resistance – for example, resistance to tylosin, an antibiotic commonly used in animals, also results in resistance to erythromycin, an important drug in human medicine. To underscore this, he showed a graph of resistance in *Enterococcus* in ground turkey, and tylosin and erythromycin had identical resistance patterns. Instead of feeding humans antibiotics to prevent disease, he emphasized that we have public health interventions, such as improving sanitation. He cited NARMS statistics that 80% of meat and poultry in the U.S. is contaminated with antibiotic-resistant bacteria. He also cited Dr. Johnson's study on susceptible and resistant *E. coli* in humans and poultry, which found that drug-resistant *E. coli* in humans closely matched both types in poultry, suggesting it originated in poultry and was passed to humans. There is also increasing evidence, he said, that drug-resistant UTIs are caused by *E. coli* that matches *E. coli* in chickens. While this information is relatively new, there is lots of evidence that drug-resistant *Salmonella* and *Campylobacter* are passed from animals to humans. Finally, he presented a figure from the 2004 CIPARS study that showed a drastic decline in cephalosporin-resistant *Salmonella* and *E. coli* infections in humans following a voluntary ban on cephalosporin use in farm animals.

Ms. McKenna spoke on MRSA ST398, or "pig MRSA." Originating in the Netherlands, this strain has found a niche in farm animals and then spread to farm workers and the

community. It has also been isolated from retail meat. She started by giving a background on *Staph* and MRSA, explaining how MRSA was a hospital-associated phenomenon until 1998, when a new strain with a different resistance pattern was recognized in the community. MRSA causes 369,000 hospitalizations and 7 million doctor and ER visits a year, she said. MRSA ST398 was first found in July 2004 in the Netherlands in a young daughter of a big farmer. The strain was resistant to some drugs given to pigs but not humans. Hospital and nursing home outbreaks followed in 2007, and a study found that 40% of pigs in the Netherlands carry this strain of MRSA. The strain has also been found in veterinarians. Now, rules require that all farm workers must be put in isolation when they enter a hospital until it can be proven that they are not carrying MRSA. MRSA ST398 moved into the food chain in the EU; here, the concern comes from handling contaminated meat, not through eating it. Now this strain is moving to North America. An Ontario study found that 25% of pigs and 20% of farmers carry this strain of MRSA, and it has been found in Iowa and Illinois as well. In one study, 24% of confinement swine in these states carried MRSA ST398, but 0% of swine from organic farms were carriers. While the EU takes the human health threat of this strain for granted, the U.S. thus far does not.

Dr. Wallinga presented the economic issue behind the use of growth promoters in agriculture. He gave data on U.S. meat exports: in 2008, \$4.6 billion of poultry products and \$3.97 billion of pork products. The market is not well spread out; for example, Japan accounts for \$1.77 billion of pork exports. Different countries have varied policies on antimicrobial use, residues, and antimicrobial washes, procedures used in processing. If Japan decided to stop taking U.S. exports, it would override the economic benefit of using antibiotics – then again, he said, there doesn't seem to be an economic benefit anyway. In 2008-2009, Russia refused U.S. meat imports because of tetracycline residues. According to WTO guidelines, countries can determine their own protection level and restrict imports based on these levels, as long as they have a scientific basis. Growth-promoting antibiotics are an increasing danger because they result in the introduction of new resistance genes into populations. A study in Denmark found that 9 out of 10 Danes with antibiotic-resistant infections got those infections from foreign meat. The U.S. auto industry was slow to adapt to changes that needed to be made; staying ahead of the game on this issue would have an economic and public health benefit.

Questions

Senate

Q From Senator Burr's office: Is food that is labeled as being produced without antibiotics safe?

A: Dr. Johnson – According to a retail meat survey, antibiotic-free meat was less likely to have resistant bacteria, but labels often don't mean anything. There is a need for closer control because there are big resistant populations everywhere.

Dr. Price – There is also contamination between animals raised with antibiotics and those raised without them.

Q: Does the subtherapeutic use of antibiotics really promote growth?

A: Dr. Wallinga – In Denmark, when growth promoters were taken away the WHO confirmed that the loss in productivity for producers was almost zero in poultry and negligible in pork. Producers got the equivalent savings from not using antibiotics. The exception was in weaner pigs, which got more diarrhea without antibiotics.

Dr. Mellon – However, with improved sanitation productivity bounced back.

Q From Senator Franken’s office: Is the antibiotic resistance mechanism the same for different antibiotics (like tylosin and erythromycin)?

A: Dr. Mellon – They are often exactly the same.

Dr. Wallinga – When you expose bacteria to one antibiotic, you can increase resistance to others because of the resistance genes.

Dr. Price – “Resistance elements” on the same plasmid can select for resistance to multiple kinds of drugs.

Q From a farmers and ranchers organization: There are many foreclosed farms with lagoons full of manure; how are these issues being addressed?

A: Dr. Mellon – They haven’t been addressed; these pools are filled with resistant bacteria and are an important public health issue. There is information on how to close the lagoons, but there is no funding or legislation in the works.

Dr. Price – Maybe this could be done as part of a public/private partnership?

Q: How do the bacteria we’re carrying make us sick?

A: Dr. Price – These bacteria can move to the “wrong spot” to cause disease, or multiply after antibiotic treatment, or take advantage of someone with a weakened immune system.

Q: How does the dosage and duration of antibiotic use in animals contribute to resistance?

A: Dr. Price – Longer treatment means more chances for resistance to develop and a high selective pressure for resistant bacteria. A low dose means not all bacteria are killed off.

Dr. Wallinga – Recent BU research shows that low-level exposure spurs bacteria to mutate more quickly. Antibiotics that are currently used in animals were approved before this research came out, and even before antibiotic resistance was a concern.

Q: What kind of information is available on antibiotic usage in humans and animals?

A: Dr. Mellon – We don’t have good data on either; estimates say that use in food animals is around 20-30 million pounds a year, and use in humans is around 3-6 million pounds a year.

Dr. Johnson – We are way behind the EU In this regard. Collecting this data was part of the Interagency plans in 2002 and 2007, and now it is part of the STAAR Act.

Q From Senator Shaheen’s office: Is the nontherapeutic use of antibiotics that are not used in human medicine still a problem?

A: Dr. Price – It depends on the resistance genes, and it can be hard to know.

Dr. Wallinga – PAMTA focuses on the medically important antibiotics that we are most concerned with. But this issue is part of the need for more monitoring.

Q From Food Safety News: What are the political barriers to PAMTA?

A: Dr. Mellon – There is resistance from the livestock sector, and there are people who don't admit that there is a public health problem. There's a general failure to agree on this issue.

Audience members – Individual farmers are at risk from this practice; trades representing them are the issue. Farmers self-administer antibiotics to their animals because of a lack of money and vet access.

Dr. Johnson – There is inertia against change from people whose livelihoods depend on agriculture.

Q: Other countries do surveillance – what do their numbers show?

A: Dr. Wallinga – A PAMTA-like phase out in Denmark led to a decrease in total antibiotic use by 54%.

House

Q From Rep. McCollum's office: Why does the veterinary industry have the opposite point of view on this issue?

A: Dr. Johnson – There is a diversity of opinions in the veterinary community. There are also doctors in human medicine who don't think antibiotic resistance is a problem.

Dr. Mellon – When given the option, she thinks it makes sense to go with the human medicine and public health community over veterinarians.

Q From Rep. Berkley's office: It saves money for farmers to give animals antibiotics; what is the relationship between improved hygiene and profit?

A: Dr. Mellon – PAMTA still leaves producers with many options, it only bans some nontherapeutic antibiotic uses.

Dr. Wallinga – In the Denmark example, there was no net increased cost to producers. When you factor in the public health benefit, the ban was very cost-effective.

Q From Senator Neugebauer's office: How many cases of ST398 have there been in the U.S.?

A: Ms. McKenna – We don't know, because ST398 is not tested for in the U.S. There are possibly cases we don't know about, or we are just earlier on the infection curve than Europe.

Dr. Johnson – The time to act on this is now, before it becomes a big problem. We need to project if it will become a big problem and then act on it.

Ms. McKenna – CA MRSA started out in the U.S. with 25 cases 12 years ago, and there was skepticism over whether it was a real problem. We may be in the same situation now with ST398.

Q from Senator King's office: Why is there not a bill to deal with the misuse of antibiotics in humans?

A: Dr. Johnson – There's the STAAR Act, and CDC campaigns – however the CDC had its antimicrobial budget cut recently.

Dr. Wallinga – All antibiotics given to humans are with a prescription; PAMTA only deals with non-prescription drug uses.

Dr. Price – Stuart Levy has been having briefings on clinical use for a long time; APUA is taking care of the clinical side.

Dr. Mellon – We need to agree that this is a problem in animals.