

September 6, 2011

SOUND SCIENCE: ANTIBIOTIC USE IN FOOD ANIMALS LEADS TO DRUG RESISTANT INFECTIONS IN PEOPLE

Dear Senator/Representative:

The undersigned medical and public health organizations wish to clarify misinformation and confusion about the state of scientific knowledge concerning the contribution of animal agriculture to human antibiotic resistance.

Recent statements made on the House floor called into question forty years' worth of peer-reviewed scientific literature, suggesting this body of evidence is not "hard science." These statements took aim at the Food and Drug Administration (FDA), claiming the agency lacks scientific proof to support addressing antibiotic (or antimicrobial) misuse in food animal production. H. Res. 98, introduced in February, also questions FDA's scientific basis for decision-making. On the contrary, the evidence is so strong of a link between misuse of antibiotics in food animals and human antibiotic resistance that FDA and Congress should be acting much more boldly and urgently to protect these vital drugs for human illness. In fact, government data show that the vast majority of antibiotics in the U.S. are sold for use in food animals, not people.

Below are highlights from the significant body of literature on the human health threat posed by antibiotic misuse in food animals, including recent federal agency testimony, government summary reviews of peer-reviewed journal articles and individual examples from within the literature.

RECENT FEDERAL AGENCY TESTIMONY:

During July 2010 House hearings, the FDA, U.S. Centers for Disease Control and Prevention (CDC), and U.S. Department of Agriculture (USDA) affirmed the definitive scientific evidence that the overuse of antibiotics in food animal production contributes to the development of antibiotic-resistant bacterial infections in people.

- USDA testified, "USDA believes that it is likely that the use of antibiotics in animal agriculture does lead to some cases of antibacterial resistance among humans."¹
- FDA testified, "The overall weight of the available evidence to date supports the conclusion that using medically important antimicrobial drugs for production purposes is not in the interest of protecting and promoting the public health."²
- CDC gave similar testimony, and wrote a follow-up letter stating³, "Studies related to *Salmonella*, including many studies in the United States, have demonstrated that (1) use of antimicrobial agents in food animals results in antimicrobial resistance in food animals, (2) resistance strains are present in the food supply and commonly transmitted to humans, and (3) increases in resistant strains result in adverse human health consequences (e.g., increased hospitalization)."^{4,5}

U.S. GOVERNMENT AND INTERNATIONAL REVIEWS:

- In 2009, FDA data showed that 80 percent of antibacterial drugs were sold for use in food animals in the United States⁶ for promoting growth, preventing disease, and treating animal illness.
- An April 2004 report by the Government Accountability Office concluded that, based on the scientific evidence, antibiotic-resistant bacteria have been transmitted from animals to humans and pose a significant threat to human health.⁷
 - The Department of Health and Human Services responded with additional evidence, stating: “These [11 additional] studies, along with those cited in the GAO report, all demonstrate a relationship between the use of antimicrobials in food-producing animals, antibiotic resistance in humans, and adverse human health consequences as a result. We believe that there is a preponderance of evidence that the use of antimicrobials in food-producing animals has adverse human consequences....There is little evidence to the contrary.”⁸
- A 2003 Institute of Medicine report recommended that “FDA ban the use of antimicrobials for growth promotion in animals if those classes of antimicrobials are also used in humans.”⁹
- A 2003 joint report by the Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (OIE), and the World Health Organization (WHO) concluded: 1) “there is clear evidence of adverse human health consequences due to resistant organisms resulting from non-human usage of antimicrobials;” 2) “the foodborne route is the major transmission pathway for resistant bacteria and resistance genes from food animals to humans, but other routes of transmission exist;” and 3) the “consequences of antimicrobial resistance are particularly severe when pathogens are resistant to antimicrobials critically important in humans.”¹⁰
- A 1997 WHO report stated that, based on the scientific evidence, “low-level, long-term exposure to antimicrobials may have greater selective potential than short-term, full-dose therapeutic use” and recommended ending the use of important human antibiotics for growth promotion in food animals.¹¹
- A 1988 Institute of Medicine study found a considerable body of indirect evidence implicating both subtherapeutic and therapeutic use of antimicrobials in food animals as a potential human health hazard.¹²
- A 1970 FDA task force review acknowledged evidence showing that antibiotic use in food-producing animals, especially in subtherapeutic amounts, was associated with the development of drug-resistant bacteria, and that treated animals might serve as a reservoir of antibiotic-resistant pathogens that could produce human disease.¹³

REPRESENTATIVE SCIENTIFIC JOURNAL ARTICLES:

- A 2010 Canadian study showed that voluntary withdrawal of extralabel cephalosporin use in poultry resulted in a dramatic decrease in related drug resistance in chicken *Salmonella* and *E. coli*, and a similar decrease in drug-resistant *Salmonella* infections in

people. A partial reintroduction of the drug in hatcheries caused a rise in drug-resistant *E. coli*.¹⁴

- A 2007 study in Wisconsin and Minnesota found that antibiotic-resistant *E. coli* in people was likely to have come from poultry.¹⁵
- U.S. studies in 2001 and 2008 concluded that the data suggest that drug-resistant *E. coli* strains in the human urinary tract may have an animal origin.¹⁶
- A 2003 study reported that a specific strain of *Salmonella* infections in New England rose from 0 to 53 percent between 1998 and 2001, showed resistance to several antimicrobials used in livestock, and mirrored the same infections in cattle.¹⁷
- A 1999 study in Minnesota reported that ciprofloxacin-resistant *Campylobacter* was found in 14 percent of domestic chicken products, and that the number of related human infections had increased, largely because of poultry consumption.¹⁸
- A 1984 U.S. Public Health Service, FDA, and Seattle-King County study found that tetracycline-resistant *Campylobacter* appeared “to flow from chickens to man via consumption of poultry products.”¹⁹

While scientific understanding may evolve and improve over time, there is certainly enough evidence today to warrant action. Overuse and misuse of important antibiotics in food animals must end, in order to protect human health. We would be happy to meet with you or your staff to answer any questions. Please feel free to contact Shannon Heyck-Williams at sheyck-williams@pewtrusts.org.

Sincerely,

Alliance for the Prudent Use of Antibiotics
American Academy of Pediatrics
American College of Preventive Medicine
American Medical Association
American Public Health Association
Center for Science in the Public Interest
Infectious Diseases Society of America
Johns Hopkins Center for a Livable Future, Bloomberg School of Public Health
Michigan Antibiotic Resistance Reduction Coalition
National Foundation for Infectious Diseases
Pediatric Infectious Diseases Society
Pew Health Group
Society of Infectious Diseases Pharmacists
Union of Concerned Scientists

cc: The Hon. Kathleen Sebelius, Secretary, U.S. Department of Health and Human Services
The Hon. Margaret A. Hamburg, Commissioner, U.S. Food and Drug Administration
The Hon. Tom Vilsack, Secretary, U.S. Department of Agriculture
The Hon. Thomas R. Frieden, Director, U.S. Centers for Disease Control and Prevention
Michael R. Taylor, Jr., Deputy Commissioner, U.S. Food and Drug Administration

William M. Daley, Chief of Staff, Executive Office of the President
Melody C. Barnes, Director, Domestic Policy Council, Executive Office of the President
Andrea J. Palm, Senior Advisor for Health, Executive Office of the President

¹ Antibiotic Resistance and the Use of Antibiotics in Animal Agriculture, Before the House Subcommittee on Health, Energy and Commerce, 111th Cong. (2010) (testimony of Dr. Josh Sharfstein, Principal Deputy Commissioner Food and Drug Administration).

² Antibiotic Resistance and the Use of Antibiotics in Animal Agriculture, Before the House Subcommittee on Health, Energy and Commerce, 111th Cong. (2010) (testimony of Dr. John Clifford, Deputy Administrator Animal and Plant Health Inspection Service, Department of Agriculture).

³ Questions Submitted for the Record by Thomas Frieden to House Subcommittee on Health, April 28, 2010.

⁴ Dutil et al., January 2010, "Ceftiofur Resistance in *Salmonella enterica* Serovar Heidelberg from Chicken Meat and Humans, Canada," *Emerging Infectious Diseases*.

⁵ Folster et al., January 2010, "Characterization of Extended-Spectrum Cephalosporin-Resistant *Salmonella enterica* Serovar Heidelberg Isolated from Humans in the United States," *Foodborne Pathogens and Disease*, and Zhao et al., August 2008, "Antimicrobial Resistance in *Salmonella enterica* Serovar Heidelberg Isolates from Retail Meats, Including Poultry, from 2002 to 2006," *Applied and Environmental Microbiology*.

⁶ U.S. Food and Drug Administration to Rep. Louise Slaughter, letter, April 2011, http://www.louise.house.gov/images/stories/FDA_Response_to_Rep._Slaughter.pdf (accessed July 26, 2011).

⁷ U.S. Government Accountability Office. 2004, *Antibiotic Resistance: Federal Agencies Need to Better Focus Efforts to Address Risks to Humans from Antibiotic Use in Animals*.

⁸ Ibid.

⁹ Institute of Medicine, 2003, *Microbial Threats to Health: Emergence, Detection and Response*.

¹⁰ 2003, *Joint FAO/OIE/WHO Expert Workshop on Non-Human Antimicrobial Usage and Antimicrobial Resistance: Scientific assessment*.

¹¹ World Health Organization, 1997, *The Medical Impact of Antimicrobial Use in Food Animals*.

¹² Institute of Medicine, 1988, *Human Health Risks with the Subtherapeutic Use of Penicillin or Tetracyclines in Animal Feed*.

¹³ U.S. Food and Drug Administration, 1970, *The Use of Antibiotics in Animal Feed*.

¹⁴ *Op cit 4*.

¹⁵ J.R. Johnson et al., June 2007, "Antimicrobial Drug-Resistant *Escherichia coli* from Humans and Poultry Products, Minnesota and Wisconsin, 2002-2004," *Emerging Infectious Diseases*.

¹⁶ Manges, A.R. et al, 2001, "Widespread distribution of urinary tract infections caused by a multidrug-resistant *Escherichia coli* clonal group, *New England Journal of Medicine*; and Johnson, T.J., et al., 2008, "Comparison of Extraintestinal Pathogenic *Escherichia coli* Strains from Human and Avian Sources Reveals a Mixed Subset Representing Potential Zoonotic Pathogens," *Applied and Environmental Microbiology*.

¹⁷ Gupta, A. et al., 2003, "Emergence of multidrug-resistant *Salmonella enterica* Serotype Newport infections resistant to expanded-spectrum cephalosporins in the United States," *Journal of Infectious Diseases*.

¹⁸ K.E. Smith, et al., 1999, "Quinolone-resistant *Campylobacter jejuni* infections in Minnesota, 1992-1998," *New England Journal of Medicine*.

¹⁹ U.S. Public Health Service, U.S. Food and Drug Administration, U.S. Bureau of Veterinary Medicine, and Seattle King County Department of Health Communicable Disease Control Section, 1984, *Surveillance of the Flow of Salmonella and Campylobacter in a Community*.