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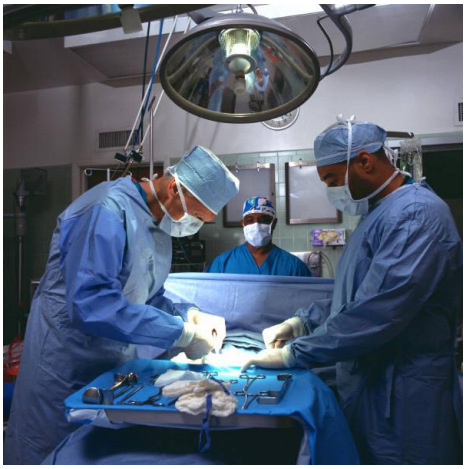
Health Care and the Antibiotic Resistance Crisis

Many public health officials and medical organizations are increasingly concerned about the rising incidence of antibiotic-resistant infections in the United States. According to the Interagency Task Force on Antimicrobial Resistance (co-chaired by the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA) and National Institutes of Health), unless antibiotic resistance "problems are detected as they emerge—and actions are taken quickly to contain them—the world may soon be faced with previously treatable diseases that have again become untreatable, as in the pre-antibiotic era."[1]

Children, seniors, pregnant women, cancer patients and other vulnerable populations are at greater risk of contracting infections that are becoming less and less responsive to vital antibiotics. Patients in hospitals and residents in nursing-home facilities are particularly susceptible to infection, as they often have weakened immune systems and high exposure to contagions that may originate in health care settings, or in the general community.

One of the key factors contributing to this dramatic increase in antibiotic resistance is the routine, non-therapeutic use of antibiotics in food animal production—not because the animals are sick, but to promote growth and to compensate for the effects of overcrowded and unsanitary conditions. This practice puts human health at risk, because it can breed dangerous strains of bacteria that are antibiotic resistant, and some of them can spread to humans. Last year the FDA, the U.S. Department of Agriculture and the CDC testified before Congress that there was a definitive link between the non-therapeutic uses of antibiotics on industrial farms and the crisis of antibiotic resistance in humans.[2]



Resistant bacterial infections are harder to treat and require multiple applications of antibiotics, longer hospital stays, and possibly other interventions. Researchers with the Alliance for the Prudent Use of Antibiotics and Cook County Hospital in Chicago estimate the extra costs to the U.S. health care system due to antibiotic-resistant infections range from $16.6 billion to $26 billion per year.[3] Health experts recommend that all inappropriate uses of antibiotics be curtailed, including the non-therapeutic use of antibiotics in food animal production, in order to stem the rising tide of resistant infections, and to reduce health care costs.

To help address the public health care crisis of antibiotic resistance, protect patients and communities and lower health care costs, Congress should pass legislation to phase out the use of these life-saving drugs on industrial farms unless animals are sick or directly exposed to disease.

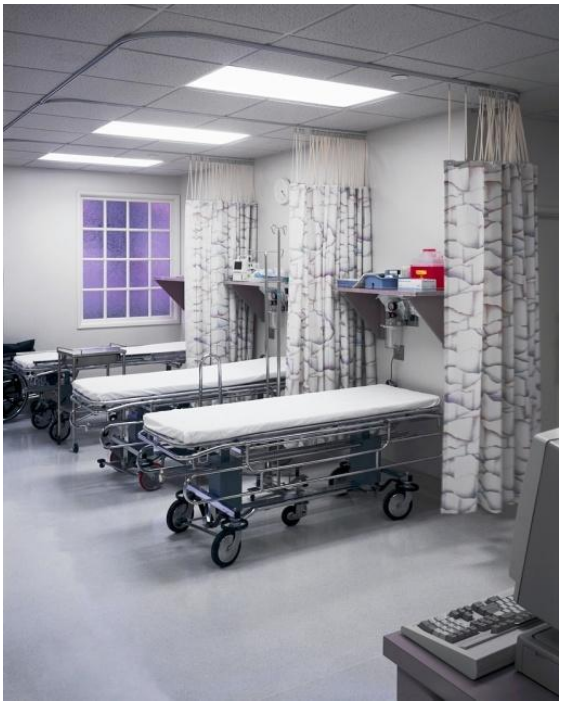
Reasons to be concerned about the non-therapeutic use of antibiotics in food animal production:

Animal antibiotics are human antibiotics.

- Many of the antibiotics used in food animal production—for example, penicillins, tetracyclines, macrolides and sulfonamides—are identical to, or from the same family as, drugs used in human medicine to cure serious diseases. According to the CDC, because these classes of antibiotics are similar, bacteria resistant to antibiotics used in animals also will be resistant to antibiotics used in humans.[4] The FDA reported that more than 20.5 million pounds of antibiotics were sold for use in U.S. food animal production in 2009, including for non-therapeutic purposes.[5]
- As the use of antibiotics has increased, there has been a growth in the number of antibiotic-resistant bacterial strains against which common antibiotics are no longer effective.

Food-borne illnesses can be antibiotic resistant.

- According to the FDA, 5,000 deaths, 325,000 hospitalizations, and 76 million cases of food-borne illness occur annually in the U.S.[6]
- Many of these antibiotic-resistant strains of bacteria include those that cause common food-borne illness. These bacteria include, but are not limited to, *Escherichia coli* 0157:H7, *Salmonella*, *Listeria monocytogenes*, *Cyclospora cayetanesis* and *Campylobacter jejuni*.
- Food-borne illnesses are now becoming more difficult to treat due to the increase in antibiotic-resistant strains and the decreased effectiveness of antibiotics routinely used as a first-line defense.



Resistant infections can be deadly.

- According to the Infectious Diseases Society of America, 90,000 people die each year of a hospital-acquired infectious disease. Many of these infections are resistant to at least one antibiotic.[7]
- Other antibiotic-resistant infections are causing a strain on the health care industry as well. MRSA, or Methicillin-resistant *Staphylococcus aureus*, a multi-drug resistant skin infection that can infiltrate the blood system and infect the lungs and urinary tract, causes more than 60 percent of *Staph* infections in U.S. hospitals.[8] MRSA is now showing up in people outside of the health care setting. The CDC reports that in

2007, 14 percent of people with MRSA infections had acquired them from the general community.[9]

- *Clostridium difficile* is another bacterial infection posing a challenge to doctors and hospitals. *C. diff.* causes symptoms ranging from diarrhea to life-threatening inflammation of the colon and sepsis, and often strikes after patients have been on antibiotic treatment. The Mayo Clinic says that in recent years, *C. diff.* infections have become more frequent, more severe and more difficult to treat. Each year, tens of thousands of people in the U.S. fall ill, including healthy people who are not hospitalized or taking antibiotics.[10]

Pathways to resistant infections are diverse.

- If bacteria become resistant to antibiotics, they can spread in many ways, including handling or eating contaminated meat or produce fertilized by contaminated manure or coming in contact with farm or food workers who handle contaminated animals or meat or with soil and water fouled by animal waste. [11, 12, 13, 14, 15]

Other medical and public health organizations supporting curtailing the non-therapeutic use of antibiotics in food animals include:

- American Academy of Pediatrics[16]
- American College of Preventive Medicine[17]
- American Medical Association[18]
- American Public Health Association[19]
- Council of State and Territorial Epidemiologists, National Association of State Public Health Veterinarians[20]
- Infectious Diseases Society of America[21]
- World Health Organization[22]

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[1] Interagency Task Force on Antimicrobial Resistance, *A Public Health Action Plan to Combat Antimicrobial Resistance*, http://www.cdc.gov/drugresistance/actionplan/html/executive-summary.htm.

[2] Hearing: Antibiotic Resistance and the Use of Antibiotics in Animal Agriculture, Subcommittee on Health, Energy and Commerce Committee, US. House of Representatives, July 12, 2010, http://energycommerce.house.gov/hearings/hearingdetail.aspx?NewsID=8001

[3] Roberts, R.R., et al. 2009. Hospital and Societal Costs of Antimicrobial-Resistant Infections in a Chicago Teaching Hospital: Implications for Antibiotic Stewardship. *Clinical Infectious Diseases* 49:1175–84.

[4] Centers for Disease Control and Prevention, National Antimicrobial Resistance Monitoring System (NARMS), *NARMS Frequently Asked Questions (FAQ) about Antibiotic Resistance— Which antibiotics used in food-producing animals are related to antibiotics used in humans?* (Atlanta: Centers for Disease Control and Prevention, 2005), http://www.cdc.gov/narms/faq_pages/11.htm (accessed July 15, 2010).

[5] U.S. Food and Drug Administration, 2010. *2009 Summary Report on Antimicrobials Sold or Distributed for Use in Food-Producing Animals, http://www.fda.gov/downloads/ForIndustry/UserFees/AnimalDrugUserFeeActADUFA/UCM231851.pdf.* The total listed in this document is 28.7 million pounds, but 8.2 million pounds of the drugs listed are ionophores and are not used in human medicine.

[6] FDA Center for Food Safety and Applied Nutrition (CFSAN), October, 2008. "Foodborne Illness-Causing Organisms in the U.S." Available at: http://www.cfsan.fda.gov/~dms/ff15bugs.html.

[7] Infectious Diseases Society of America (IDSA). 2004. *Bad Bugs, No Drugs: As Antibiotic Discovery Stagnates…a Public Health Crisis Brews*, http://www.idsociety.org/WorkArea/showcontent.aspx?id=5554.
[8] WebMD, "Understanding MRSA," http://www.webmd.com/skin-problems-and-treatments/understanding-mrsa-methicillin-resistant-staphylococcus-aureus.
[9] *Ibid.*
[10] http://www.mayoclinic.com/health/c-difficile/ds00736
[11] United States General Accounting Office, *Antibiotic Resistance: Federal Agencies Need to Better Focus Efforts to Address Risk to Humans from Antibiotic Use in Animals* (Washington, DC: General Accounting Office, 2004). See also: David G. White, et al., "The Isolation of Antibiotic-Resistant Salmonella from Retail Ground Meats," *New England Journal of Medicine* 345, no. 16 (2001): 1147-1154; Kare Molbak et al.., "An Outbreak of Multidrug-Resistant, Quinolone-Resistant *Salmonella Enterica* Serotype Typhimurium DT104," *New England Journal of Medicine* 341, no. 19 (1999): 1420-1425; and James R. Johnson et al., " Similarity between Human and Chicken *Escherichia coli* Isolates in Relation to Ciprofloxacin Resistance Status," *Journal of Infectious Diseases* 194, no. 1 (2006): 71-78.
[12] Ibid. See also: Joanne C. Chee-Sanford et al., "Occurrence and Diversity of Tetracycline Resistance Genes in Lagoons and Groundwater Underlying Tow Swing Production Facilities, *Applied and Environmental Microbiology* 67, no. 4 (2001): 1494–1502; Amy R. Sapotka et al., "Antibiotic-Resistant Enterococci and Fecal Indicators in Surface Water and Groundwater Impacted by a Concentrated Swine Feeding Operation," *Environmental Health Perspectives* 115, no. 7 (2001): 1041–1045; and Shawn G. Gibbs et al., "Isolation of Antibiotic-Resistant Bacteria from the Air Plume Downwind of a Swine Confined or Concentrated Animal Feeding Operation," *Environmental Health Perspectives* 114, no. 7 (2005): 1032–1037.
[13] Ana M. Rule, S. L. Evans, and E. K. Silbergeld, "Food Animal Transport: A Potential Source of Community Exposures to Health Hazards from Industrial Farming," *Journal of Infection and Public Health* 1 (2008): 33–39.
[14] M. E. Anderson and M. D. Sobsey, "Detection and Occurrence of Antimicrobially Resistant *E. coli* in Groundwater on or Near Swine Farms in Eastern North Carolina," *Water Science and Technology* 54, no 3: 211–218.
[15] Amy R. Sapotka et al., "Antibiotic-Resistant Enterococci and Fecal Indicators in Surface Water and Groundwater Impacted by a Concentrated Swine Feeding Operation," *Environmental Health Perspectives* 115, no. 7 (2001): 1041–1045.
[16] "Endorsements of the Preservation of Antibiotics for Medical Treatment Act," revised June 14, 2006, at http://www.keepantibioticsworking.org/new/resources_library.cfm?RefID=73271. See also "Keep Antibiotics Working Urges FDA Acting Commissioner to Take Strong, Quick Action to Combat Antimicrobial Resistance Crisis," April 3, 2009, at: http://www.keepantibioticsworking.org/new/news.cfm?RefID=105689.
[17] ACPM, January 23, 2002, "Principles for Combating Antibiotic Resistance," Policy Resolution # 05-02(A).
[18] AMA, 2001, "Antimicrobial Use and Resistance," Resolution 508, http://www.keepantibioticsworking.com/library/uploadedfiles/American_Medical_Association_Resolution_508_-_.htm.
[19] APHA, January 1, 1999, "Addressing the Problem of Bacterial Resistance to Antimicrobial Agents and the Need for Surveillance," Policy No. 9908, http://www.apha.org/advocacy/policy/policysearch/default.htm?id=179.
[20] CSTE/NASPHV, 1999, "Discontinuation of antimicrobials used to promote growth of food animals if they are used in or select for cross resistance to antimicrobials used in human therapy," Position Statement 1999-ID 7, http://www.cste.org/dnn/AnnualConference/PositionStatements/tabid/191/Default.aspx.
[21] IDSA PAMTA endorsement letter to Sen. Kennedy, June 12, 2007.
[22] WHO, 2000, *WHO Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food,* Geneva.