


# Alternatives to Antibiotic Use in Food Animal Production

## Capitol Hill Briefing



Tuesday, March 2  
11:30 am – 1:00 pm  
Room 124, Dirksen Senate Building  
Washington, DC

## Agenda

- Introductory Remarks: Stephen J. Jay M.D.
- Panelists Remarks:
  - Bill Niman, president of BN Ranch and former CEO of Niman Ranch, Inc.
  - Andrew Carlson, owner & CEO of Central Coast Farms and Fulton Valley Farms
  - Steve Ells, chairman and co-CEO of Chipotle Mexican Grill, Inc.
  - Linda Boardman, president of Applegate Farms
- Question and Answer Session



## Moderator: Stephen J. Jay M.D.

- Professor of Medicine and Public Health, Indiana University School of Medicine, Department of Public Health.
- Internist, pulmonologist, practicing physician.
- Research background: respiratory infectious diseases, health systems, public health history and policy.
- Clinical, management, advisory roles in tuberculosis control, including drug resistance.
- Teaching: history of emerging/reemerging infectious disease and antimicrobial resistance.

## Why is this issue important to me as a clinician and public health professional?

- Increasingly, drug-resistant organisms are rendering antibiotics ineffective for treating human infections.<sup>1</sup>
- Medicine is rapidly losing one of its most important therapeutic tools—a crisis in the making.<sup>2</sup>
- Few new antibiotics are being developed.<sup>3</sup>
- Patients of all ages are suffering the ravages of often preventable, debilitating and life-threatening infectious diseases.
- Medicine has a responsibility to use the best evidence to advance the interests of the public's health.


## Antibiotics and Industrial Farms

- Any use of antibiotics eventually leads to antibiotic resistance, but overuse accelerates the process.
- Up to 70 percent of all antibiotics sold in the U.S. are given to healthy food animals on industrial farms.<sup>4</sup>
  - We don't know exactly how much, because farms are not required to report use. Best estimates are from drug company sales.
- Most antibiotics used in industrial food animal production are given routinely in feed and water to entire herds or flocks for:
  - Compensation for overcrowded and unsanitary conditions.
  - Growth Promotion.



## Antibiotics and Industrial Farms

- Many of these antibiotics are identical or from the same family as drugs used in human medicine to cure serious diseases, including: penicillins, tetracyclines, macrolides, sulfonamides and other antibiotic classes.<sup>5</sup>
- For over 30 years, science has shown that routine antibiotic use in food animal production promotes the spread of drug-resistant bacteria to people.<sup>6</sup>
  - According to WHO: "widespread use of antimicrobials for disease control and growth promotion in animals has been paralleled by an increase in resistance in those bacteria (such as *Salmonella* and *Campylobacter*) that can spread from animals, often through food, to cause infections in humans."<sup>7</sup>



## The Antibiotic Resistance Crisis

- In human medicine, the overuse of antibiotics is actively being addressed.<sup>8</sup>
- There has been little public notice of the threat of agricultural overuse to public health. Until now.
  - Associated Press five-part series in Dec. 2009.
  - CBS Evening News in February.
  - Editorials from across the country.



## Human Health Risk

- Bacteria can transfer resistance to each other. Bacteria resistant to animal drugs can become resistant to similar human drugs.
- Bacteria resistant to antibiotics can spread to people in several ways, including:
  - Eating or handling contaminated meat.<sup>10</sup>
  - Contact with farm or food workers who handle contaminated animals or meat.<sup>11</sup>
  - Contact with soil and water that has been polluted by animal waste.<sup>12</sup>
  - Breathing air vented from facilities using antibiotics non-therapeutically.<sup>13</sup>
  - Bottom line: ANYONE CAN BE AT RISK.

## A Food Safety Problem

- At least 76 million cases of food-borne disease occur each year in the U.S.
- Food-borne bacteria like *E. coli* and *Salmonella* cause 300,000 hospitalizations and 5,000 deaths each year.
- 1/5 of *Salmonella* infections/year are drug-resistant, and 1/2 of *Campylobacter* infections.<sup>14</sup>
- All ground beef recalled in 2009 for *Salmonella* was due to a resistant strain.<sup>15</sup>

## The Human Cost

- The morbidity, mortality and costs of this problem are enormous and increasing.
  - The Institute of Medicine in 1998 assessed the U.S. cost of resistant infections at \$4-5 billion/year.<sup>16</sup>
  - The Alliance for the Prudent Use of Antibiotics and Cook County Hospital (IL) in 2009 estimated \$17-26 billion/year nationally.<sup>17</sup>
- Children, the elderly, cancer patients and the chronically ill are particularly vulnerable to infection.<sup>18</sup>
- "Without effective antibiotics, modern medical treatments such as operations, transplants and intensive care will become impossible." -- Zsuzsanna Jakab, European Centre for Disease Prevention and Control<sup>19</sup>
- "If we're not careful with antibiotics and the programs to administer them, we're going to be in a post antibiotic era." -- Dr. Thomas Frieden, director of the CDC.<sup>20</sup>



## Support for Change

- Many public health agencies and organizations support dramatic reductions in routine uses of antibiotics in food animal production:
  - Major federal research-based health agencies: U.S. Food and Drug Administration, National Academy of Sciences, Institute of Medicine.
  - National medical organizations: American Medical Association, American Public Health Association, American Academy of Pediatrics, American College of Preventive Medicine, Infectious Diseases Society of America.
  - World Health Organization.
  - NGOs: Consumers Union, The Pew Charitable Trusts, Union of Concerned Scientists, Environmental Defense Fund, Physicians for Social Responsibility.
  - More than 300 additional organizations: health, consumer, agricultural, environmental, humane and others.

## Preservation of Antibiotics for Medical Treatment Act (PAMTA, H.R. 1549, S. 619)

- Congressional action is desperately needed to provide regulatory oversight of drug use on industrial farms.
- PAMTA would make great strides. Lead sponsors in Senate: Sen. Dianne Feinstein and Sen. Olympia Snowe; in House: Rep. Louise Slaughter.
- PAMTA would withdraw the use of seven classes of antibiotics vitally important to human health from use on industrial farms unless animals or herds are sick with disease or unless drug companies can prove that their routine use does not harm human health.

## Alternatives Exist

- Because of the seriousness of antibiotic resistance, we must consider alternative food animal production techniques.
- Changes to animal husbandry practices could reduce the need for antibiotics, and the burden of drug-resistant bacteria.
- Often minor changes suffice, for example:
  - Straw bedding.
  - Additional space.
  - More frequent cleaning.
  - Better ventilation.



## Success Without the Routine Use of Antibiotics on Industrial Farms

- USDA: Many producers that don't use growth promoting antibiotics rely on alternative strategies, such as extensive testing and sanitary protocols, to prevent disease and promote growth.<sup>21</sup>
- WHO: "antimicrobials [should] not be used as an alternative to high-quality animal hygiene. Evidence shows that farmers who stopped relying on antimicrobials as growth promoters in livestock have experienced no economic repercussions—provided animals were given enough space, clean water, and high-grade feed."<sup>22</sup>
- Denmark: making minor changes in animal husbandry, such as more frequent cleaning of housing, improved ventilation, later weaning, additional space for animals and experimenting with different feeds made up for the absence of antibiotics as growth promoters on most industrial farms.<sup>23</sup>

## Endnotes

1. See, for e.g.: GAO April 2004, *Antibiotic Resistance: Federal Agencies Need to Better Focus Efforts to Address Risk to Humans from Antibiotic Use in Animals*, available at: [http://www.gao.gov/new.items/04199.pdf](#); World Health Organization (WHO), June 2009, *Report of the 1<sup>st</sup> Meeting of the WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance*, available at: [http://www.who.int/csr/resources/publications/amr/1stmeetingreport.pdf](#); and Interagency Task Force on Antimicrobial Resistance, *A Public Health Action Plan to Combat Antimicrobial Resistance*.
2. See: Infectious Diseases Society of America (IDSA), 2004, *Bad Bugs: No Drugs: As Antibiotic Discovery Sluggishes... A Public Health Crisis Brews*, available at: [http://www.idsa.org/badbugs](#); IDSA 2004, *Op. cit.*
3. Mellon, Margaret, Charles Benbrook, & Karen Luke Benbrook, 2001, *Hogging It: Estimates of Antimicrobial Abuse in Livestock*, Cambridge, MA: Union of Concerned Scientists. Note: The Institute of Medicine estimated in 1985 that subtherapeutic use in cattle, swine and poultry totaled 16.1 million pounds, or more than half of all antimicrobials produced at that time.
4. See, for e.g.: GAO 2004, *Op. cit.*, e.g.: "Antibiotic-resistant bacteria have been transferred from animals to humans, and many of the studies we reviewed found that this transference poses significant risks for human health." (p. 6)
5. World Health Organization, Revised January 2002, Fact Sheet number 194, "Antimicrobial resistance." Available at: [http://www.who.int/mediacenter/factsheets/fs194/en/](#)
6. See, for e.g.: WHO 2009, *Op. cit.*
7. See, for e.g.: Taylor, James A., et al. 2003, "Effectiveness of an Educational Intervention in Modifying Parental Attitudes About Antibiotic Usage in Children." *Pediatrics* 111(6):e848-e854.
8. Congressional Research Service, January 27, 2010, *Potential Trade Implications of Restrictions on Antimicrobial Use in Animal Production*.
9. GAO 2004, *Op. cit.* See also: White, David G et al. 2001, "The Isolation of Antibiotic-Resistant *Salmonella* from Retail Ground Meats." *The New England Journal of Medicine*, 345(19): 1147-1154; Mollisek, K et al. 1999, "An Outbreak of Multidrug-Resistant, Quinolone-Resistant *Salmonella Enterica* Serotype Typhimurium DT104." *The New England Journal of Medicine*, 341(19): 1420-1425; and Johnson, James R. et al. 2008, "Similarity between Human and Chicken *Escherichia coli* Isolates in Relation to Ciprofloxacin Resistance Status." *Journal of Infectious Diseases* 194(1): 71-76.

## Endnotes

11. GAO 2004, *Op. cit.* See also: Price, Lance B. et al. 2007, "Elevated Risk of Carrying Gentamicin-Resistant *Escherichia coli* among U.S. Poultry Workers." *Environmental Health Perspectives* 115(12): 1738-1742; and Smith, Tara C. et al. 2009, "Methicillin-Resistant *Staphylococcus aureus* (MRSA) Strain ST398 Is Present in Midwestern U.S. Swine and Swine Workers." *PLoS ONE* 4(1): 1-6.
12. GAO 2004, *Op. cit.* See also: Chee-Sanford, J. C. et al. 2001, "Occurrence and Diversity of Tetracycline Resistance Genes in Leopons and Groundwater Underlying Two Swine Production Facilities." *Applied and Environmental Microbiology* 67(4): 1494-1502; and Sapkota, A. R. et al. 2005, "Antibiotic-Resistant *Enterococci* and Fecal Indicators in Surface Water and Groundwater Impacted by a Concentrated Swine Feeding Operation." *Environmental Health Perspectives* 113(7): 1041-1045.
13. Gibbs, Shawn G. et al. 2005, "Isolation of Antibiotic-Resistant Bacteria from the Air Plume Downwind of a Swine Confined or Concentrated Animal Feeding Operation." *Environmental Health Perspectives* 113(7): 1033-1037.
14. Calculations based on: USDA Economic Research Service, Foodborne Illness Cost Calculator: *Salmonella*, U.S. Food and Drug Administration, *National Antimicrobial Resistance Monitoring System 2009 Executive report*, CDC *Campylobacter* fact sheet, and CDC NARMS, *Human Isolates 2009 Final Report*.
15. USDA Food Safety and Inspection Service archived and current recalls, as of 2/2/10.
16. Harrison, P. and Lederberg, J. (eds). 1998, "Antimicrobial Resistance: Issues and Options." Workshop Report, Forum on Emerging Infections, Division of Health and Sciences Policy, Institute of Medicine. National Academy Press, Washington, D.C.
17. 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.
18. Shea, Katherine, M.D., M.P.H., Karen Flinn, J.D., and Tamar Balkam, M.D. 2001, *When Wonder Drugs Don't Work: How Antibiotic Resistance Threatens Children, Seniors, and the Medically Vulnerable*. Washington, D.C.: Environmental Defense Fund.
19. EDCO, November 20, 2009, "Experts urge prudent antibiotic use to combat resistance," available at: [http://www.edco.org/pressroom/2009/11/20/09112001.htm](#)
20. Mason, Margie and Martha Mendoza, Dec. 23, 2009, "Pressure Rises to Stop Antibiotics in Agriculture," AP.
21. MacDonald, James M. and McBride, William D. January 2009, *The Transformation of U.S. Livestock Agriculture: Scale, Efficiency and Risk*. Economic Information Bulletin No. 48, Economic Research Service, U.S. Dept. of Agriculture.
22. World Health Organization, 2000, *Report on Infectious Diseases: Overcoming Antimicrobial Resistance*, chapter 5, available at: [http://www.who.int/csr/resources/publications/infectiousdiseases/overcomingantimicrobialresistance.pdf](#)
23. Kjaeldsen, Niels J., Danish Pig Production, "Consequences of the removal of antibiotic growth promoters in the Danish pig industry."